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ACCOUNTING (ACCT)

ACCT 1201 Financial Accounting and Reporting (4 SH)
Covers the basic concepts underlying financial statements and the accounting principles followed in the preparation of the balance sheet, the income statement, and the statement of cash flows. Offers students an opportunity to become familiar with accounting terminology and methods designed to enable them to interpret, analyze, and evaluate published corporate financial reports. Wherever appropriate, the course relates current economic, business, and global events to accounting issues. Analyzes how financial reporting concepts affect the behavior of investors, creditors, and other external users. Emphasizes the importance of ethics in financial reporting.
• Prerequisite: Second-semester-freshman standing or above; restricted to business majors and combined majors and to information science majors.
• Equivalent: ACCT 1202 and ACCT 1209.

ACCT 1202 Financial Accounting in a Global Context (4 SH)
Covers the basic concepts underlying financial statements and the accounting principles followed in the preparation of the balance sheet, the income statement, statement of equity, and the statement of cash flows. Compares and contrasts the International Financial Reporting Standards (IFRS) used in other countries with generally accepted accounting principles (GAAP) currently used in the United States. Relates current economic, business, and global events to accounting issues. Emphasizes the importance of ethics in financial reporting. Offers students an opportunity to become familiar with accounting terminology and methods and to understand how the information conveyed in financial reports affects the decision making of investors, creditors, and managers.
• Prerequisite: International business majors only.
• Equivalent: ACCT 1201 and ACCT 1209.

ACCT 1209 Financial Accounting and Reporting (4 SH)
Does not count as credit for business majors. Counts as ACCT 1201 for business minors only.
• Prerequisite: Nonbusiness majors with second-semester freshman standing or above.
• Equivalent: ACCT 1201 and ACCT 1202.

ACCT 2301 Managerial Accounting (4 SH)
Focuses on the development and use of information—especially financial information—for managerial decisions within the firm. Introduces managerial accounting concepts, analyses, and practices that support business decisions through class discussions, exercises, and case analysis. Topics include budgeting, cost management and behavior, cost-volume-profit analysis, relevant costs for decision making, cost allocation issues, and performance evaluation. Emphasizes the importance of ethics.
• Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; business majors and combined majors only.
• Equivalent: ACCT 2302.

ACCT 2302 Managerial Accounting in a Global Context (4 SH)
Focuses on the development and use of information—especially accounting information—for managerial decisions. Topics include budgeting, cost management and behavior, cost-volume-profit analysis, relevant costs for decision making, cost allocation issues, and performance evaluation. Emphasizes how accounting managers address differences in accounting standards both in recording activities and in managerial actions. Stresses ethics throughout the course.
• Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; international business majors only.
• Equivalent: ACCT 2301.

ACCT 3304 Business Law and Professional Ethics (4 SH)
Covers business law, professional code of conduct, and the importance of ethical behavior in today’s business environment. Examines legal aspects of commercial transactions and business relationships. Specifically, laws relating to contracts and sale of goods under the Uniform Commercial Code, agency law, and product liability law are discussed. Note: May not be used as an accounting concentration elective.
• Prerequisite: ACCT 2301 or ACCT 2302; sophomore standing or above only.
• Equivalent: MGMT 3304.
ACCT 3401 Financial Reporting and Analysis 1 (4 SH)
Examines financial reporting concepts, emphasizing the link between them and financial statements. Focuses on both the preparation and interpretation of financial statements, with students also being introduced to basic tools in financial statement analysis, such as ratio and accounting analysis. Offers students the opportunity to understand how management decisions can influence reported income, asset, and liability values, and the importance of ethics when making accounting choices. Offers students the tools necessary to analyze the impact of alternative reporting decisions on financial statements. In addition to accounting majors, this course is ideal for students who wish to pursue careers in corporate finance, investment banking, investment management, or consulting.
- Prerequisite: (a) ACCT 2301 or ACCT 2302 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; business majors and combined majors only.
- NU Core: Writing intensive in the major.
- NU Path: Writing intensive in the major.

ACCT 3403 Accounting Information Systems (4 SH)
Provides an understanding of accounting information systems, with an emphasis on the role of technology and risk analysis. Information is critical for the effective and efficient management of any organization. Addresses concepts and applications relating to the design, analysis, and implementation of accounting systems. Examines the role of e-commerce and Internet-based technologies, including their implications for ethics and privacy, throughout the course.
- Prerequisite: ACCT 3401 (which may be taken concurrently); restricted to business majors and combined majors and to information science majors.

ACCT 3416 Strategic Cost Analysis for Decision Making (4 SH)
Develops understanding of the critical role of cost measurement and management in business decisions and in managing a firm’s profitability. Focuses on the strategic use of cost information for planning and control, as well as costing products, services, and customers. Emphasizes the role of management accountants as integral members of decision-making teams and as consultants to senior management. Studies alternate ways of measuring costs to meet different management objectives, the role of budgeting as a planning and management tool, the use of cost analysis as a control tool to help management meet short- and long-term profit objectives, and the importance of ethics in achieving all of these objectives. In addition to accounting majors, this course is ideal for students who wish to pursue a career in finance, general management, operations management, supply chain management, or entrepreneurship.
- Prerequisite: ACCT 3401 (which may be taken concurrently); business majors and combined majors only.

ACCT 4412 Auditing and Other Assurance Services (4 SH)
Focuses on issues relevant to the public accounting profession and to internal auditors and managers in private or governmental organizations. Topics include legal liability and ethics, business and audit risk assessment, fraud detection and prevention procedures, planning of audit engagements, audit reports, other assurance services and reports, and the effect of information technology on the audit process. Offers students the opportunity to think critically about issues facing the auditing profession.
- Prerequisite: ACCT 3401; business majors and combined majors only.

ACCT 4414 Income Tax Determination and Planning (4 SH)
Provides a basic understanding of the structure of the federal income tax system. Taxes can have a significant impact on the viability of a number of personal finance and business decisions. Focuses on the individual taxpayer but also considers the implications for other entities. Tax return projects, research cases, and planning projects help demonstrate the potential impact of taxes on decision making.
- Prerequisite: ACCT 3401; business majors and combined majors only.

ACCT 4501 Financial Reporting and Analysis 2 (4 SH)
Continues ACCT 3401 with a more extensive study of financial statements and the financial reporting rules underlying them. Advanced topics include bonds, pensions, leases, earnings per share, and earnings management. Introduces more advanced financial statement analysis tools. Offers students an opportunity to continue to gain the ethical awareness and the knowledge necessary to analyze the impact of alternative reporting decisions on financial statements.
- Prerequisite: ACCT 3401; business majors and combined majors only.

ACCT 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
- Prerequisite: ACCT 4970.
- Repeatability: May be repeated without limit.

ACCT 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- Prerequisite: ACCT 4970.
- Repeatability: May be repeated without limit.
ACCT 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Repeatability: May be repeated without limit.

ACCT 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ACCT 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ACCT 6200 Financial Reporting and Managerial Decision Making 1 (3 SH)
Offers the first of a two-course sequence that focuses on the acquisition, measurement, and management of firm resources. Business managers make strategic decisions about the acquisition and use of a variety of firm resources. Helps enable students to understand and utilize critical information in corporate financial reports to improve business decision making. Offers students the opportunity to learn contemporary methods of financial reporting and analysis used by internal decision makers and external capital providers. Required course for co-op MBA/part-time MBA.
• Prerequisite: Business students only.

ACCT 6201 Financial Reporting and Managerial Decision Making 2 (1.5 SH)
Continues ACCT 6200, offering the second of a two-course sequence that focuses on the acquisition, measurement, and management of firm resources. Critical to the effective planning, implementation, and management of successful business strategies is the ability to measure and manage the commitment and utilization of entity resources. Focuses on contemporary methods and frameworks used in the process of measuring, analyzing, and allocating firm resources to achieve strategic and operating objectives. Required course for co-op MBA/part-time MBA.
• Prerequisite: ACCT 6200.

ACCT 6203 Business Entity Taxation (3 SH)
Provides an in-depth look at the structure of the federal income tax system as it relates to different taxable entities. Emphasizes tax compliance, planning, and research as they impact the decision-making process for corporation and flow-through entities. Also examines the implications of wealth transfer taxes.
• Prerequisite: Accounting students only.

ACCT 6204 Financial Reporting for Integrated Multinational Enterprises (3 SH)
Presents and discusses financial reporting practices for diversified, international business entities. In today’s global business environment, many corporations operate diverse economic activities and often conduct those activities across geographic boundaries. Examines accounting and disclosure standards in the United States that are relevant to presenting consolidated financial statements. Also analyzes accounting and disclosure standards in other countries and those developed by international bodies with respect to their effects on reporting entities and the financial markets.
• Prerequisite: ACCT 6203; accounting students only.

ACCT 6205 Professional Environment of the Audit and Assurance Industry (3 SH)
Intended for students with a prior course in assurance services and/or auditing. Focuses on the coverage of current significant issues in the assurance services environment. Topics include the impact of technology on the audit process, client risk assessment and statistical data analysis, other assurance services and nonattestation engagements, and the use of complex decision aids. Emphasis is also on contemporary ethical and legal issues confronting the public accounting profession. Offer students the opportunity to think critically about a number of significant issues facing the auditing profession and also introduces the audit judgment and decision-making process through the completion of a variety of audit cases.
ACCT 6206 Management Control Systems (3 SH)
Examine the systematic processes by which managers influence other members of the organization to implement the organization’s strategies. Management control systems encompass both financial and nonfinancial measures used for planning, coordinating, communicating, evaluating information, and deciding actions. Topics include budgeting, capital budgeting, transfer pricing, performance measurement and evaluation, and performance-based incentives.
• Prerequisite: Accounting students only.

ACCT 6207 Contemporary and Emerging Issues in Financial Reporting (3 SH)
Focuses on the theoretical concepts of accounting with an examination of standards issued by various professional organizations including the FASB, SEC, and AICPA. Also examines emerging issues in corporate, governmental, and nonprofit financial reporting. Real-world cases are used to illustrate and discuss the complex financial reporting process and ethical issues confronted by the business community and accounting profession.

ACCT 6208 Financial Reporting and Managerial Decision Making (4 SH)
Offers students an opportunity to understand and utilize critical information in corporate financial reports to improve business decision making regarding the acquisition, measurement, and management of firm resources. Business managers make strategic decisions about acquiring and using a variety of resources. Effectively measuring and managing the acquisition and utilization of resources is critical to the implementation and management of successful business strategies. Teaches contemporary methods of financial reporting to external capital markets; analytic approaches used by external capital providers; and internal frameworks used to measure, analyze, and allocate firm resources to achieve strategic and operating objectives.

ACCT 6209 International Accounting and Reporting (1.5 SH)
Designed to enhance the ability of a manager in a global setting to understand the statements and be aware of issues that can make them incomparable or misleading. Many businesses operate in global markets, competing, hiring, purchasing, and selling across many country borders. International mergers and businesses not bound by geographic borders (banking, telecommunications, or Internet) have accelerated globalization, challenging managers, consultants, and investors to understand how these developments influence business strategies and decision making. Financial reporting and accounting methods that summarize financial performance of the business differ across the world. The accounting choices and games differ, terminology and practices in disclosing the profits and asset values differ, and the interpretation of financial reports requires understanding of the cultures before one can assess the financial performance of a business.
• Prerequisite: ACCT 6200.

ACCT 6210 Analyzing Financial Statements to Assess Firm Performance, Strategy, and Value (3 SH)
Provides students with the knowledge and skills necessary to assess the underlying economic condition and strategic direction of a firm through the analysis of its financial statements using a case-based approach. Identifies potential distortions contained in financial reports using techniques such as operating, financing, and investing cash flow analysis and through the examination of financial statement footnote disclosures. Performance measures are derived that eliminate distortions and improve the quality and comparability of financial information. These measures enable effective firm comparisons to key competitors and historical performance. Forecasted financial statements are utilized to make estimates of firm value.
• Prerequisite: ACCT 6200 and ACCT 6208.

ACCT 6211 Global Financial Statement Analysis (1.5 SH)
Designed to enhance the ability of a user of financial statements in a global setting to understand the statements and be aware of issues that can make them incomparable or misleading. Many businesses operate in global markets, competing, hiring, purchasing, and selling across many country borders. International mergers and the growing types of businesses not bound by geographic borders (banking, telecommunications, or Internet) have accelerated globalization, challenging managers, consultants, and investors to understand how these developments influence business strategies and decision making. Financial reporting and accounting methods that summarize financial performance of the business differ across the world. The accounting choices and games differ, terminology and practices in disclosing the profits and asset values differ, and the interpretation of financial reports requires understanding of the cultures before one can assess the financial performance of a business.
• Prerequisite: ACCT 6210.

ACCT 6212 Fraud Detection and Prevention (3 SH)
Provides students with an awareness of a variety of frauds that affect business enterprises and individuals, such as fraudulent financial reporting, securities fraud, healthcare fraud, computer and Internet fraud, and identity theft. Occupational fraud and abuse cost U.S. organizations an estimated $400 billion annually. In addition to occupational fraud, such fraudulent schemes perpetrated against individuals as identity theft are also on the rise. Fraud awareness is a critical factor in its detection and prevention. Emphasizes fraud detection and prevention skills, and introduces students to the concepts of the fraud triangle, the fraud scale, and fraud risk management.
• Prerequisite: ACCT 6200.
ACCT 6213 Managing Resources to Implement Strategy (3 SH)
Provides knowledge and skills to enable managers to design, implement, and evaluate systems used to manage the allocation of resources including time, energy, cash, and capital investment. To implement the organization’s strategy successfully requires managers to direct resources to key strategic tasks. Examines whether a firm’s existing management systems create the right incentives for managers and employees to support and advance its strategies by, for example, making appropriate capital investments, developing suitable new products, or providing effective customer support. Students integrate their knowledge of competitive strategy and organizational behavior with ideas about planning, budgeting, performance measurement, incentive compensation, and capital budgeting to determine how to design systems that increase strategic success.
• Prerequisite: ACCT 6201.

ACCT 6215 Corporate Government Ethics and Financial Reporting (1.5 SH)
Deals with issues related to corporate governance and audit committee mechanisms in preventing financial reporting disasters and in providing high-quality financial reports to global capital markets. Emphasizes the role of the board of directors and its committees, management, shareholders, external auditors, and internal auditors in developing sound ethical practices and a good corporate governance culture. Examines efforts by legislative and regulatory bodies and the accounting profession in improving financial reporting transparency and auditor independence.
• Prerequisite: ACCT 6201.

ACCT 6216 Financial Reporting for Governments and Nonprofit Entities (2 SH)
Covers business issues and financial reporting standards for state and local governments within the United States, as well as for nonprofit organizations. These organizations make up a large and growing share of the economy, and so it is important to consider whether the funds entrusted to them by taxpayers and donors are being used effectively. These entities have unique ways of reporting their financial results, based on their specific business purposes and the needs of their constituents. The course discusses these reporting methods and the use of the resulting financial reports in evaluating performance within the government and nonprofit contexts.

ACCT 6217 Corporate Governance, Ethics, and Financial Reporting (3 SH)
Deals with issues related to corporate governance and audit committee mechanisms in preventing financial reporting disasters and in providing high-quality financial reports to global capital markets. Emphasizes the role of the board of directors and its committees, management, shareholders, external auditors, and internal auditors in developing sound ethical practices and a good corporate governance culture. Examines efforts by legislative and regulatory bodies and the accounting profession in improving financial reporting transparency and auditor independence.
• Prerequisite: Accounting students only.

ACCT 6218 Financial and Management Accounting (4.5 SH)
Covers financial accounting and management accounting. Financial accounting offers an opportunity to develop an understanding of financial statements, the critical financial foundation and language of business. Management accounting offers an opportunity to develop the ability to use financial accounting, other financial information, and nonfinancial information to evaluate the impact of alternate business decisions on profitability and cash flow.
• Prerequisite: Business students only.

ACCT 6219 Advanced Business Law (1.5 SH)
Examines the key concepts of business law. Topics include agency issues, fundamentals of contracts, Uniform Commercial Code, debtor-creditor relationship, and the governmental regulation of business.

ACCT 6220 Corporate Financial Reporting and Decision Making 1 (3 SH)
Examines the development of financial reports including their underlying concepts and measurement theories. Corporate financial reporting is a dynamic process in which information is provided to internal and external decision makers to assist them in the effective allocation of economic resources. Examines the legal, economic, and political processes that influence the financial reporting process.
• Prerequisite: Professional accounting students only.

ACCT 6221 Corporate Financial Reporting and Decision Making 2 (6 SH)
Continues ACCT 6220. Examines corporate financial reporting in the decision-making process. Emphasis is on the economic consequences of alternative financial reporting practices. Provides students with the ability to understand and utilize critical information contained in corporate financial reports to improve business decision making.
• Prerequisite: ACCT 6220; professional accounting students only.
ACCT 6222 Corporate and Governmental/Nonprofit Financial Reporting and Decision Making (6 SH)
Continues the study of corporate financial reporting, covering specialized topics that assume knowledge of the accounting principles covered in the first two courses. Topics include corporate reporting as equity instruments, executive compensation, reporting of fund flows, and reporting and disclosures for corporations engaged in diverse economic activities and those operating across geographic boundaries. Examines accounting and disclosure standards in the United States and in other countries, as well as standards developed by international bodies. Covers financial reporting models used by governmental and nonprofit entities.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6223 Audit and Other Assurance Services (6 SH)
Introduces the attest function and its application to financial statement opinion audits and other assurance services common in today’s professional environment. Emphasizes a risk-based approach to audit planning, the internal control structure, and the control environment; the design of test of controls, substantive tests, and the resultant audit report. Topics include audit sampling, audit evidence, audit procedures, workpaper preparation, the impact of information technology on the audit process, and the auditor’s responsibility to detect fraud. A primary focus is the auditor’s legal and ethical responsibilities. Emphasis is also on operational audits, compliance audits, reviews, compilation, and other attestation services.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6224 Taxation of Individuals and Business Entities (6 SH)
Introduces the principles of taxation including income and expenses, tax accounting methods, and the tax implications of property transactions (including the calculation of basis as well as gains and losses). Emphasizes tax compliance, planning, and research as they impact the decision-making process for individuals, corporations, and flow-through entities.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6225 Accounting Information Systems (3 SH)
Provides students with an opportunity to utilize basic management information systems concepts to examine typical business processes. Information systems play a critical role in all aspects of planning, organizing, and controlling an organization and in helping the organization to achieve its operational and strategic objectives. Topics include objectives and procedures of internal control, how to determine and satisfy the information requirements of system users, typical business documents and reports, system documentation and analysis, and the effect of e-commerce and Internet-based technologies on accounting information systems.
• Prerequisite: MGSC 6201; professional accounting students only.

ACCT 6226 Strategic Cost Management (3 SH)
Examines the strategic decisions that managers need to make concerning the acquisition, measurement, and management of firm resources. Focuses on the strategic use of cost information for planning and controlling, and the use of cost analysis in making critical business decisions.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6227 Accounting for Business Combinations (3 SH)
Examines the conceptual and practical aspects of business combinations. Topics include mergers and acquisitions, purchase accounting, cost vs. equity method, and accounting for intercompany transactions between a parent company and its subsidiaries.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6228 Contemporary Issues in Accounting Theory (3 SH)
Offers a capstone course on the theoretical concepts of accounting, with a focus on standards issued by various professional organizations including the FASB, SEC, and AICPA. Examines emerging issues in financial reporting. Real-world cases are utilized to illustrate the complex financial reporting issues confronted by the business community and accounting profession.
• Prerequisite: ACCT 6221; professional accounting students only.

ACCT 6229 Accounting for Foreign Currency Transactions (1 SH)
Examines the accounting and reporting issues facing multinational enterprises operating in foreign countries. Business transactions that are denominated in foreign currency may result in risk for the entity as a result of fluctuations in exchange rates. This course evaluates risk management techniques by use of forward exchange contracts and other financial derivatives. Covers reporting issues dealing with the translation of foreign entities financial statements into U.S. dollars and appropriate remeasurement techniques.
• Prerequisite: MSA students only.
ACCT 6230 Federal Tax Issues and Analysis (3 SH)
Gives a broad examination of tax authority as it guides action on tax issues including personal and business decisions. Examines the tax structure with a specific focus on the income and expenses for individual taxpayers. Emphasizes property transactions (including the calculation of basis, gain/loss, and the resulting tax treatment). Also incorporates tax planning and research related to these issues.
• Prerequisite: Taxation students only.

ACCT 6231 Corporations and Shareholders (3 SH)
Provides an in-depth study of the tax issues related to the corporate form and the corresponding tax implications for its shareholders. Given the importance of corporations in the federal income tax system, an understanding of the tax issues related to this type of business is essential for tax professionals. Topics include capital formation and structure, the operations of the corporation, distributions, dividends and redemptions, sales and liquidations, and taxable and tax-free reorganizations.
• Prerequisite: ACCT 6230; taxation students only.

ACCT 6232 Estate and Gift Taxation (3 SH)
Focuses on the study of the taxes common to the transfer of property and wealth. Topics include gift tax deductions and exclusions, estate valuation, state tax deductions and exemptions, and tax rates. Also explores planning opportunities for these wealth transfer taxes.
• Prerequisite: ACCT 6230 (which may be taken concurrently); taxation students only.

ACCT 6233 Tax Research Methodology (1.5 SH)
Provides an opportunity for students to develop and enhance their tax research skills. Success as a tax professional often hinges on the ability to find solutions effectively and efficiently. In addition to covering the creation of various sources of tax authority, also introduces students to a variety of research resources. Students are required to complete written research reports.

ACCT 6234 Tax Practice, Procedure, and Ethics (1.5 SH)
Investigates the procedures used in dealing with the Internal Revenue Service, with an emphasis on practitioner responsibilities. Reviews the organization of the IRS, filing requirements, appeal procedures, civil/criminal statutes, assessments, and protests. Also examines a study of the value and moral judgments inherent in the field of taxation including client confidentiality, disclosure of false or misleading information, and advice counter to the law or public good.

ACCT 6235 Partners and Partnerships (3 SH)
Provides an in-depth study of the tax issues related to one of the central flow-through entities, the partnership. The increasing popularity of flow-through entities as an organizational form has made an understanding of the tax issues related to this type of entity an important area of study for tax professionals. Topics include capital formation, operations, transactions between the partner and the partnership, distributions, sales of partnership interests, and liquidation of the partnership.
• Prerequisite: ACCT 6230; taxation students only.

ACCT 6236 Reorganizations (1.5 SH)
Examines the tax impact of the transfer of stock, securities, and property in connection with acquisitions, divestitures, and other business ownership changes. Topics include the taxability of the transactions, the basis of property exchanged, corporate liquidations, tax attributes available to successors of an interest, and the overall impact to both the acquirer and the acquiree. Also discusses planning for the optimization of tax benefits.
• Prerequisite: ACCT 6231.

ACCT 6237 Consolidated Returns (1.5 SH)
Focuses on the procedures and statutes of taxing a multicorporate entity as a single taxpayer. Particular attention is paid to eligibility requirements, intercompany transactions, accounting adjustments, the impact of net operating losses, excess loss accounts, and the basis of property.
• Prerequisite: ACCT 6231.

ACCT 6238 Income Tax Accounting (1.5 SH)
Investigates the accounting treatment accorded current and deferred income tax liabilities and expenses. Topics include accounting methods and periods (particularly in cases where the accounting and tax records differ), special elections available to taxpayers, installment reporting, inventory methods, long-term contract accounting, and cash vs. accrual reporting.
• Prerequisite: ACCT 6230.

ACCT 6239 State and Local Taxation (3 SH)
Addresses the most common types of taxes imposed by state and local governments. Examines state and local income, sales, excise, property, and city taxes. Emphasis is on the underlying principles governing the application of each type of tax and the interrelationships where they exist.
• Prerequisite: ACCT 6230.
ACCT 6240 International Taxation: Inbound Transactions (3 SH)
Addresses the taxation of foreign individuals or corporations receiving income from sources, or conducting business, in the United States. With the globalization of the economy, a greater number of taxpayers must consider the impact of international taxation. Topics include the sourcing of income, taxation of passive income, taxation of income connected to a U.S. trade or business, branch-level taxes, issues of foreign-owned U.S. corporations, income tax treaties, and transfer pricing.
• Prerequisite: ACCT 6231 and ACCT 6235; business students only.

ACCT 6241 International Taxation: Outbound Transactions (3 SH)
Examines the federal taxation of U.S. individuals receiving income from sources or conducting business in foreign jurisdictions. An increase in the number of U.S. individuals and corporations operating in other countries has enhanced the importance of understanding of international transactions for tax professionals. Examines sourcing of income, allocation and apportionment of deductions, foreign tax credits, taxation of U.S. citizens and residents abroad, controlled federal corporations, passive foreign investment companies, foreign currency translations and transactions, and special entities.
• Prerequisite: ACCT 6231 and ACCT 6235; taxation students only.

ACCT 6242 Taxation of Financial Instruments (1.5 SH)
Provides an overview of the federal taxation of financial instruments. Topics include transactions in stock, debt securities, commodities, options, futures and foreign currency transactions, taxation of the time value of money inherent in financial instruments, tax treatment of risk management strategies and investment entities, such as regulated investment companies, and tax information reporting.
• Prerequisite: ACCT 6230.

ACCT 6243 Advanced Flow-Through Entities (3 SH)
Offers an in-depth look at the tax consequences of businesses formed as flow-through entities (including partnerships, S corporations, and LLCs). Discusses allocation rules, liability sharing rules, disguised sales rules, partnership debt workouts, the S corporation election, and tax treatment of shareholders in an S corporation.
• Prerequisite: ACCT 6231 and ACCT 6235; taxation students only.

ACCT 6244 Tax Exempt Entities (1.5 SH)
Examines organizations exempt from income tax under Subchapter F of the Internal Revenue Code. Focuses on the requirements for exemptions, feeder organizations, charitable organizations, private foundations, and business income of certain exempt organizations.
• Prerequisite: ACCT 6230.

ACCT 6245 Strategic Tax Planning (1.5 SH)
Uses the life cycle of the firm as the framework for examining the strategic tax planning issues that tax professionals need to consider. Emphasis is on the legal, capital, and tax factors related to the formation of the new business enterprise, international and multistate considerations, executive compensation (including stock options and stock-related compensation programs), and succession planning for the family business.
• Prerequisite: ACCT 6231, ACCT 6232, and ACCT 6235.

ACCT 6246 Retirement Plans (3 SH)
Examines employee benefit plans including requirements for qualification, funding, coverage, and distribution requirements. Discusses a variety of plans including pension, profit-sharing, CODAs, IRAs, SEPs, TSAs, and stock plans.
• Prerequisite: ACCT 6230; business students only.

ACCT 6247 Estate Planning (1.5 SH)
Examines strategies for maximizing personal goals (including probate avoidance, tax minimization, and asset protection) related to property passed from one generation to another. Emphasis is on wills and other vehicles for estate planning; the principles of estate taxation; the impact of employee benefits, trusts, and their taxation; and life insurance policies and associated annuities.
• Prerequisite: ACCT 6232.

ACCT 6248 Income Taxation of Trusts and Estates (3 SH)
Examines the general rules for the taxation of estates and trusts. Topics include trusts that distribute current income only, grantor trusts, irrevocable trusts, charitable vehicles, income in respect of a decedent, estates and trusts that may accumulate income or may distribute corpus, and treatments of excess distributions and beneficiaries.
• Prerequisite: ACCT 6232; business students only.

ACCT 6249 Financial Planning for Investments (3 SH)
Surveys the investment products that can be used for financial planning. Emphasis is on constructing the investment plan, the investment policy statement, the asset allocation strategy, and implementation recommendations.
• Prerequisite: ACCT 6232; taxation students only.

ACCT 6250 Financial Planning for Insurance (3 SH)
Surveys insurance products used for financial planning. Topics include life, accident, health, disability, long-term care, homeowner, auto, and personal liability, with emphasis on personal risk management and the use of insurance products in the financial planning process.
• Prerequisite: ACCT 6232; taxation students only.
ACCT 6251 Executive Compensation (1.5 SH)
Provides an understanding of the key tax concepts involved in the various compensation arrangements used to achieve the goal of attracting and retaining key executives, which is essential to the success of many companies. Topics include incentive stock options, nonqualified deferred compensation, golden parachute rules, and Internal Revenue Code Section 83 issues.
• Prerequisite: ACCT 6230.

ACCT 6252 Taxation of E-Commerce (1.5 SH)
Provides an overview of the current state of Internet taxation including the Internet Tax Freedom Act and what proposals Congress and others are considering. Also examines how investment management firms can position themselves to optimize both their current and future Internet taxation position.
• Prerequisite: ACCT 6230.

ACCT 6253 Ethics in the Accounting Profession (3 SH)
Focuses on the roles and ethical responsibilities in the accounting, auditing, and tax professions. Also covers ethical behavior by management as well as the legal guidelines that apply in a business setting.
• Prerequisite: MSA students only.

ACCT 6254 Accounting Research and Communication (3 SH)
Requires students to research and analyze auditing issues by using quantitative and/or qualitative research methods. Offers students an opportunity to learn how to more effectively communicate those findings in a professional format.
• Prerequisite: MSA students only.

ACCT 6255 Forensic Accounting (3 SH)
Offers an overview of occupational fraud and the methodology of fraud examination (i.e., obtaining documentary evidence, interviewing witnesses and potential suspects, writing investigative reports, testifying to findings, and forensic document examination). Offers students an opportunity to learn how to detect the most common types of occupational fraud, determining how each type of fraud is committed, and implementing prevention strategies.
• Prerequisite: MSA students only.

ACCT 6256 Internal Auditing (3 SH)
Offers an overview of the internal audit function and explores the duties and responsibilities of the internal auditor. Offers students an opportunity to learn about the planning and organizing of an internal audit department and its coordination with an outside auditor as well as to learn how the design of an internal control auditing process can reduce risk exposure and enhance internal controls.
• Prerequisite: MSA students only.

ACCT 6257 Tax Research and Communication (3 SH)
Requires students to research and analyze tax issues by using quantitative and/or qualitative research methods. Offers students an opportunity to learn how to more effectively communicate those findings in a professional format.
• Prerequisite: MSA students only.

ACCT 6260 Advanced Topics in Accounting (3 SH)
Offers an in-depth examination of selected issues and problems in accounting that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: ACCT 6201.
• Repeatability: May be repeated without limit.

ACCT 6261 Advanced Topics in Accounting (1 SH)
Offers an in-depth examination of selected issues and problems in accounting that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: ACCT 6230.
• Repeatability: May be repeated without limit.

ACCT 6262 Advanced Topics in Accounting (1.5 SH)
Offeres an in-depth examination of selected issues and problems in accounting that are of current interest to faculty and students. Alternates specific topics depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: ACCT 6235.
• Repeatability: May be repeated without limit.

ACCT 6263 Government and Nonprofit Accounting (3 SH)
Covers the reporting methods government entities use to report their financial status, including the use of general fund accounting and special fund accounting. Also discusses the financial reporting standards for nonprofit entities. Governmental and nonprofit entities have unique ways of reporting their financial status, based on their specific business purposes and the needs of their constituents or donors.
• Prerequisite: Online MSA students only.

ACCT 6264 Planning for Estate Tax Issues (3 SH)
Examines advanced strategies for maximizing personal goals (including probate avoidance, tax minimization, and asset protection) related to property passed from one generation to another. Emphasizes trust vs. will planning and other vehicles for estate planning; the principles of estate taxation; the impact of employee benefits, trusts, and their taxations; and life insurance policies and associated annuities.
• Prerequisite: Online MST students only.
ACCT 6265 Tax Accounting for Income Taxes (3 SH)
Investigates the reporting of uncertain positions and accounting treatment accorded current and deferred income tax liabilities and expenses. Topics include accounting for uncertain tax positions, accounting methods and periods (particularly in cases where the accounting and tax records differ), special elections available to taxpayers, installment reporting, inventory methods, long-term contract accounting, and cash vs. accrual reporting.
• Prerequisite: Online MST students only.

ACCT 6270 Financial Accounting and Decision Making (4 SH)
Offers students an opportunity to understand how an entity’s economic activity is measured and reported for internal decision making and external communication with capital providers. Thoroughly examines the underlying assumptions of enterprise financial statements as well as the accounting techniques employed to create them. Also addresses the analysis of financial statements for the purpose of predicting the future performance and growth of the firm. Explores the financial strategies, policies, and methods utilized by technology-driven organizations to measure and create shareholder value.
• Prerequisite: Business students only.

ACCT 6271 Managerial Accounting and Decision Making (4 SH)
Addresses the concepts, problems, and issues related to the measurement and internal use of economic information regarding the resources used in the process of producing goods and providing services. Introduces the conventional methods of internal reporting used in planning, control, and decision making, with a constant focus on the efficient and effective use of enterprise resources. Also examines fundamental aspects of cost behavior and cost accounting, flexible budgeting, capital budgeting, variance analysis, and management control systems.
• Prerequisite: Business students only.

ACCT 6272 Financial Statement Preparation and Analysis (2.25 SH)
Offers students an opportunity to understand how to prepare corporate financial reports and utilize critical information in these reports to improve business decision making. Introduces contemporary methods of financial statement analysis used by internal decision makers and external capital providers.
• Prerequisite: Online MBA students only.

ACCT 6273 Identifying Strategic Implications in Accounting Data (2.25 SH)
Focuses on developing and analyzing accounting information to identify strategic implications and, using that information, to make effective decisions in various business functions that must work together for overall strategic success. Introduces key management accounting concepts and techniques, including the impact of different cost behaviors, activity-based costing, evaluating profitability of products and customers, flexible budgeting, and variance analysis. Offers students an opportunity to learn to use the data they develop to think objectively about the business, to ascertain why a situation occurs, to identify the implications of data for management decisions, and to use the data to discover strategically important opportunities and challenges.
• Prerequisite: ACCT 6272; online MBA students only.

ACCT 6280 Planning and Budgeting for Innovation (3 SH)
Covers the fundamental methods by which the financial successes and failures of business enterprises are measured and reported to management and external capital providers. Offers students an opportunity to become proficient at analyzing financial statement information in order to assess the effects of business decision making on firm performance. Addresses analytics focusing on the identification of capital to fund innovation initiatives in conjunction with metrics to measure the potential value associated with new product and service offerings. Seeks to help students understand how management decisions and innovation initiatives affect enterprise financial statements and shareholder perceptions of value creation.
• Prerequisite: MS-in-innovation students only.

ACCT 6281 Measuring and Managing the Costs of Production and Growth (3 SH)
Explores the information managers need to effectively and efficiently run their business operations. Offers students an opportunity to learn how to identify and analyze the information needed for decision making in diverse service-, product-, and manufacturing-oriented industries. Topics include determining the costs and profitability of products and services; analyzing the cost savings related to outsourcing opportunities; estimating and assessing the financial impact of new products, new marketing, and other programs; budgeting for operating businesses and new ventures; variance analysis; and cost management. Offers a fundamental managerial accounting skills course that seeks to enable students to make management decisions armed with specific and the most appropriate financial information.
• Prerequisite: ACCT 6280; high-technology students only.
ACCT 6282 Design and Management of Control Systems within Dynamic Organizations (3 SH)
Deals with the design and utilization of control systems for fast-moving, innovative firms. Includes the policies, tools, metrics, and procedures an organization employs to manage the strategy-implementation process. Topics include responsibility accounting, transfer pricing, performance measurement and evaluation, as well as designing control systems for cost allocation, budgeting, and variance analysis systems. Also includes the linkage between performance measurement and enterprise resource planning systems. Asks students to evaluate effectiveness of a control system in their own companies to show how these concepts apply to practice.
  • Prerequisite: High-tech MBA students only.

ACCT 6290 Interpreting and Evaluating Financial Statements (3 SH)
Offers students an opportunity to develop skills required to interpret, analyze, and evaluate the financial statements published in corporate annual reports. Also offers an opportunity to learn accounting terminology, basic accounting concepts, and the accounting principles underlying the preparation of financial statements. Understanding the structure that lies beneath financial statements is vital to being able to analyze and estimate the effects of events on the firm’s income and financial position.
  • Prerequisite: Executive MBA students only.

ACCT 6291 Identifying Strategic Implications in Accounting Data (3 SH)
Emphasizes developing and analyzing accounting information to identify strategic implications and, using that information, to make effective decisions in various business functions that must work together for overall strategic success. Introduces key management accounting concepts and techniques, including the impact of different cost behaviors, activity-based costing, evaluating profitability of products and customers, flexible budgeting, and variance analysis. Offers students an opportunity to learn to use the data they develop to think objectively about the business, to drill down to ascertain why a situation occurs, to identify the implications of data for management decisions, and to use the data to discover strategically important opportunities and challenges.
  • Prerequisite: ACCT 6290: executive MBA students only.

ACCT 6292 Tax Research, Practice, and Ethics (3 SH)
Offers students an opportunity to develop and refine their tax research skills through practical exercises. Covers the creation of various sources of tax authority. Exposes students to the procedures used in dealing with the Internal Revenue Service (IRS), with an emphasis on practitioner responsibilities. Reviews the organization of the IRS, filing requirements, appeal procedures, civil/criminal statutes, assessments, and protests. Includes a study of the value and moral judgments inherent in the field of taxation, including client confidentiality, disclosure of false or misleading information, and advice counter to the law or public good.
  • Prerequisite: Online MST students only.

ACCT 6960 Exam Preparation—Master's (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

ACCT 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
  • Repeatability: May be repeated without limit.

ACCT 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
  • Repeatability: May be repeated without limit.

AFRICAN STUDIES (AFRS)

AFRS 1101 Introduction to African Studies (4 SH)
Uses a multidisciplinary approach to offer an introduction and overview of the geographical, demographic, socioeconomic, and political conditions of the African continent, emphasizing sub-Saharan Africa. Africa, “the cradle of humankind,” is a vast, complex continent of diverse peoples that has fascinated observers and evoked multiple images. Topical areas of interest range from ethnic relations, politics, colonial experience, and international relations to religion, environment, health, economic development, gender, culture, and literature. Course materials aim to provide contemporary African perspectives and analyses that offer students an opportunity to acquire and interpret broad knowledge about the continent.
  • NU Core: Comparative study of cultures, social science level 1.

AFRS 1128 The African Experience through Music (4 SH)
Surveys various African musical traditions with respect to their historical, social, and cultural heritage. Examines traditional and contemporary African music, instruments, and performance traditions.
  • Prerequisite: Not open to students who have taken MUSC 1128.
  • NU Core: Arts level 1, comparative study of cultures.
  • Equivalent: MUSC 1128.
AFRS 1180 African History (4 SH)
Explores the history of the African continent from 1000 C.E. to the present era. Topics include medieval kingdoms (Ghana, Mali, Songhai, Zimbabwe, the city-states of East Africa, and the Kongo kingdom); slave trades (Indian Ocean, trans-Saharan, and transatlantic); the partition of Africa and European colonization; and the decolonization process. Due consideration is given to the interactions of African peoples with the rest of the world, particularly the relations between Africa and Europe after 1500 C.E.
• Equivalent: HIST 1180.

AFRS 1185 Gender in the African Diaspora (4 SH)
Studies variations in gender roles throughout the African Diaspora, from precolonial Africa to the modern United States. Areas of the African Diaspora include Africa, the West Indies, Latin America, Europe, and the Islamic world. Issues include sexuality, labor, reproduction, and social constructions of gender.
• Cross-list: INTL 1185 and WMNS 1185.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: INTL 1185 and WMNS 1185.

AFRS 1270 Introduction to Global Health (4 SH)
Introduces global health in the context of an interdependent and globalized world focusing on four main areas of analysis: infrastructure of global health; diseases; populations; and terms, concepts, and theories. While the focus is on lower-income countries, the course examines issues in a broader global context, underscoring the interconnections between global health disparities and global health policy response. Applies case studies describing interventions to improve healthcare in resource-poor settings in sub-Saharan Africa and elsewhere to help illuminate the actors, diseases, populations, and principles and frameworks for the design of effective global health interventions.
• Cross-list: PHTH 1270.
• NUpath: Understanding societies and institutions.
• Equivalent: PHTH 1270.

AFRS 2307 Africa Today (4 SH)
Studies the complex political and social picture of Africa. Examines some of the salient features of black art, politics, and identity in Africa.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions.

AFRS 2348 Arts and Culture of Africa (4 SH)
Presents a multidisciplinary approach to the study of art and culture of an African nation taught in a specified African country. Students have the opportunity to interact with master artisans in the areas of music, art, dance, literature, and film. Offers students the opportunity to gain a more global understanding of the role of art and culture on the development of African countries.
• NU Core: Comparative study of cultures.
• Repeatability: May be repeated without limit.

AFRS 2390 Africa and the World in Early Times (4 SH)
Addresses the place of Africa in the world, from human evolution to the establishment of large-scale iron-making societies. Examines debates on the evolution of man in Africa and migrations to other regions. Traces the formation and spread of language groups, the rise of agriculture, formation of family and political structures, and patterns of trade up to 1000 C.E.
• Prerequisite: Sophomore standing or above.
• Equivalent: HIST 2390.

AFRS 2391 Modern African Civilization (4 SH)
Explores African history and culture from the early 1500s to the present era. Emphasizes the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process.
• Prerequisite: Sophomore standing or above.
• Equivalent: HIST 2391.

AFRS 2392 African Diaspora (4 SH)
Explores the creation and transformation of the African Diaspora-connections among communities of African descent in Africa, the Americas, Europe, and Asia. Centers on the years from 1500 to the present and emphasizes connections among themes of migration, identity, and popular culture.
• Prerequisite: Sophomore standing or above.
• Equivalent: HIST 2392.

AFRS 2414 Global Revolution (4 SH)
Introduces the tensions that produce conflict throughout the world and the African Diaspora and explores how social justice emerges in societies worldwide. Global unrest, street protests, and citizen activism are happening everywhere as broad political struggles that express civil discontent about social and economic inequalities and lead to crisis, conflict, revolution, and change. Globalization has affected the dynamics of power, the interdependence of nations, struggling democracies, global citizenship, and how civil society and community organizing are challenging political repression and corruption and improving the quality of life for all. Covers the Arab Spring in Africa and the Middle East, Occupy Wall Street/Occupy Together campaigns, international debates on climate change and immigration reform, and the digital age and open courseware.
• NU Core: Comparative study of cultures.
AFRS 2465 The Scope and Dynamics of Conflicts in Africa (4 SH)
Surveys the faces, character, and manifestations of violent and nonviolent conflicts across the landscape of continental Africa. Addresses the causes/sources of conflict, types of conflicts and their impact on society, and the conflict resolution mechanisms. The contemporary history of the continent of Africa is defined most markedly by conflict that has impacted heavily on the continent’s societies, polities, and economies. The structure of conflicts in the continent is complex and, indeed, exhibits many faces; conflicts differ in their roots and causes and between the different regions and population groups in the south, east, central, west, and north. The course critically analyzes this broad range of aspects using case-based analyses and critical thinking.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: AFRS 3465.

AFRS 2900 Swahili, Culture, and Politics in Kenya (4 SH)
Introduces and immerses students in Kenyan African culture, the Swahili language and politics, and studies their impact on the everyday life of the local population. Offers students an opportunity to learn Swahili, which is the national language of Kenya; its use in a context of varied indigenous languages; and cultural dynamics. Exposes students to the major issues that characterize everyday life in rural and urban settings through visits to and stays in the rural areas and transect walks in villages and urban communities. Students visit projects run by community-based organizations, observing the everyday life of ordinary Kenyans and attending formal and informal classes and settings on Swahili language, culture, and the local politics.
• NU Core: Comparative study of cultures.
• NUpath: Integrating knowledge and skills through experience.

AFRS 3310 Applied Research in the African Diaspora (4 SH)
Introduces students to three major types of evidence used in basic and applied research in Africa and its worldwide Diaspora: written documentation; orally gathered information; and visual materials, artifacts, and material culture. Covers methods of data gathering such as archival research, participant observation, interviews, and archaeological excavation. Discusses various qualitative and quantitative techniques of verifying, analyzing, interpreting, and reporting or displaying the research findings. Emphasis is on selecting types of evidence and techniques of analysis appropriate to the topics selected. In addition to reading examples of research on Africa, and on the African Diaspora in Europe, Asia, Latin America, and the Caribbean, students usually develop their own research projects.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Writing intensive in the major.

AFRS 3410 Religion and Spirituality in the African Diaspora (4 SH)
Examines religious thought and rituals and the Diaspora in a comparative context. Topics include traditional religions, Islam, Christianity, and Judaism in Africa, and the Diaspora. Emphasizes the transformation of religions practiced in Africa when African captives were forced into the three slave trades affecting the continent of Africa: trans-Saharan, Indian Ocean, and transatlantic.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: PHIL 3410 and RELS 3410.

AFRS 3424 Epidemiology of Pandemic Diseases and Health Disparities in the African Diaspora (4 SH)
Examines the epidemiology and determinants of diseases and the public health practice among continental African peoples and African-derived populations in the Americas and elsewhere in the African Diaspora. Emphasizes such epidemic diseases as malaria, yellow fever, tuberculosis, smallpox, the current AIDS pandemic, obesity, and cancer. The course also aims to critically address the breadth of factors behind these pandemics, such as socioeconomic, political, health system, behavioral, and genetic. A cross-cutting theme throughout the course is the entrenched health disparities in society.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

AFRS 3428 African Languages (4 SH)
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Explores the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.
• Prerequisite: LING 1150 or ENGL 1150; sophomore standing or above.
• Equivalent: LING 3428.

AFRS 3460 Contemporary Government and Politics in Africa (4 SH)
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions.
• Equivalent: POLS 3460.
AFRS 3464 Natural Resources and Sustainable Development (4 SH)
Examines the social dimensions of resource extraction. Focusing mainly on developing nations, studies global issues, including developments in industrial nations, to assess their impact on resource extraction and living and working conditions in resource-rich regions. Uses case studies of key countries producing oil/gas, minerals, and forest/agricultural commodities to illustrate the past/current causes of resource mismanagement; their social consequences; and how public policies, legislation, and financial and human resource management with industrialization can be used to avert or reduce the adverse effects of resource extraction, especially in poor countries.
• Prerequisite: Sophomore standing or above or permission of instructor.
• NUpath: Understanding societies and institutions.

AFRS 3467 Diaspora in Motion: Contemporary African and Caribbean Migration (4 SH)
Offers an introduction to the contemporary international migration of African and Caribbean people to North American and European countries. Emphasizes a sociological understanding of contemporary international migration, while drawing knowledge from multiple disciplines that influence the study of international migration. Focuses on these migrants’ social position as Black, foreign-born persons in contemporary Western societies. Introduces key topics, debates, categories, concepts, and theories of international migration and immigrant assimilation. Offers students an opportunity to read empirical research on Black African and Caribbean migrants in the United States, Canada, England, and France and to research African and Caribbean immigrants in Boston.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.

AFRS 4645 National Model African Union (4 SH)
Offers students the opportunity to participate in teams and conduct research on political issues in assigned nations and then represent those nations in a model African Union role-playing exercise in Washington, D.C. Focuses on intra-African relations and the roles of Africans in international affairs, emphasizing the new African Union (AU) that replaced the Organization of African Unity (OAU). Examines the Pan-Africanist origins, challenges, and achievements of the African Union.
• Prerequisite: Sophomore standing or above.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Equivalent: AFRS 4645 and POLS 4645.

AFRS 4500 Arts of the African Diaspora (4 SH)
Traces the historical development of the art forms and production practices of the African Diaspora, from traditional to contemporary styles in Africa, the Americas, and elsewhere in the African Diaspora. Emphasizes the study of art objects, the historical and social context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.
• Prerequisite: Junior or senior standing.
• NU Core: Comparative study of cultures.
• Equivalent: ARTH 3410 and ARTH 4500.

AFRS 4585 Current Issues in the African Diaspora (4 SH)
Introduces students to present-day issues and problems that confront various segments of the worldwide African Diaspora. Includes the social, political, and economic aspects of the experiences of Africans in the Diaspora. Students are asked to assess the validity of several social theories in relation to the African Diaspora.
• Prerequisite: Junior or senior standing.

AFRS 4690 Topics in African History (4 SH)
Covers special topics in African history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.
• Equivalent: HIST 4690.
AFRS 4939 Community Health, Culture, and Development in Kenya (4 SH)
Introduces the community health and development arena in Kenya. Community development has been presented as the panacea to many of Africa’s problems, including leadership, democracy, conflict, disease, and poverty. Through teaching, research, and action, the course seeks to expose and sensitize students to the global and local debate on poverty, primary healthcare, and community development. Offers students an opportunity to gain hands-on experiences in some of the major determinants and solutions to poverty and disease by interacting with community stakeholders and organizations in a variety of cultural, rural, and urban settings and through visits to, and participating in, projects run by community-based organizations.
• NUpath: Integrating knowledge and skills through experience.

AFRS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

AFRS 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

AFRS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

AFRS 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

AFRS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

AFRICAN-AMERICAN STUDIES (AFAM)

AFAM 1101 Introduction to African-American Studies (4 SH)
Explores several of the possible historical, sociological, cultural, and political avenues of study in the broad interdisciplinary spectrum of African-American studies. Provides an introductory overview of the field and offers an opportunity to identify areas for more specific focus.
• NU Core: Comparative study of cultures, social science level 1.

AFAM 1102 Research and Writing in the African Diaspora 1 (4 SH)
Introduces students to academic research, college-level writing techniques, and scholarly inquiry. Offers students an opportunity to develop critical-thinking skills. Focuses on the interpretation and analysis of current events and the diverse topics and scholarly texts of the African Diaspora through writing. Emphasizes identifying patterns of organization, providing supporting evidence, documenting sources, and practicing editing techniques and the process of revisions. Requires students to produce multiple written drafts to build a comprehensive writing portfolio.
• Equivalent: FSEM 1103.

AFAM 1103 Research and Writing in the African Diaspora 2 (4 SH)
Designed to expand students’ grasp of diverse styles and genres of writing from among the African Diaspora. Explores fiction, nonfiction, and writing for multimedia. Expands upon the analysis and interpretation of scholarly texts, with a particular focus on the interpretation and analysis of literature of the African Diaspora through writing. Offers students an opportunity to expand their writing portfolio as well as deliver oral presentations. Requires students to develop original, qualitative research through a semester-long research project.
• Prerequisite: AFAM 1102.
• Equivalent: FSEM 1104.

AFAM 1104 The African-American Experience through Music (4 SH)
Explores the various musical traditions of African Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American music, with selected video presentations.
• Prerequisite: Not open to students who have taken MUSC 1104.
• NU Core: Arts level 1, comparative study of cultures.
• NUpath: Interpreting culture.
• Equivalent: MUSC 1104.

AFAM 1109 Foundations of Black Culture 1 (4 SH)
Studies music, literature, visual and performing arts, and other cultural and artistic traditions as they have evolved among African, African-American, and Caribbean peoples.
• NU Core: Humanities level 1, comparative study of cultures.
AFAM 1113 Black Popular Culture: Music, Movies, and More (4 SH)
Surveys Black popular culture from the mid-1950s to the present
through music, movies, music videos, and other forms of
multimedia, paying close attention to social commentary, political
critique, economic inference, cultural formation, explications of
religious and spiritual beliefs, and the like. Issues of
representation, identity, values, and aesthetics are pondered and
discussed. Seeks to cause students to rethink and reexamine the
intent and impact of Black popular culture as a method and means
of expression and communication.
• NU Core: Arts level 1, comparative study of cultures.

AFAM 1135 John Coltrane and Black America’s Quest for
Freedom (4 SH)
Studies the life of John Coltrane, one of the greatest musicians of
all time. Presents his growing up in a Black North Carolina
community during the era of U.S. apartheid to becoming a world-
class artist whose music touched listeners around the globe and
continues to be a major influence in current times. His advanced
and innovative conceptions (melodic, rhythmic, and harmonic)
and stylistic contributions to African-American creative
improvisation changed the way to play the music forever.
Emphasizes his immense impact on jazz and other improvisational
music and expressive art forms, as well as his spiritual legacy,
which focused on using music for the improvement of humanity.
• Prerequisite: Not open to students who have taken MUSC 1135.
• NU Core: Arts level 1.
• Equivalent: MUSC 1135.

AFAM 1140 Introduction to African-American History (4 SH)
Surveys the development of African Americans in the United
States from their African background to the present. Covers
medieval and early modern societies in West and Central Africa;
the transatlantic slave trade; the evolution of slavery from the
colonial period through the Civil War; free blacks;
Reconstruction; migration; civil rights; and black nationalism.
Considers gender relations throughout the entire period and
emphasizes how an historical perspective helps to inform
discussions of contemporary issues.
• NU Core: Comparative study of cultures, social science level 1.

AFAM 1220 African-American Theatre (4 SH)
Surveys the history of African-American theatre artists in the
United States from the time of Ira Aldridge to the present day.
Also examines the works of African-American playwrights from
the Harlem Renaissance to the present, with an emphasis on the
period beginning with Baraka’s Dutchman.
• Equivalent: THTR 1220.

AFAM 1225 Gender, Race, and Medicine (4 SH)
Examines the basic tenets of “scientific objectivity” and
foundational scientific ideas about race, sex, and gender and what
these have meant for marginalized groups in society, particularly
when they seek medical care. Introduces feminist science theories
ranging from linguistic metaphors of the immune system, to the
medicalization of race, to critiques of the sexual binary.
Emphasizes contemporary as well as historical moments to trace
the evolution of “scientific truth” and its impact on the U.S.
cultural landscape. Offers students an opportunity to develop the
skills to critically question what they “know” about science and
the scientific process and revisit their disciplinary training as a site
for critical analysis.
• Cross-list: HIST 1225 and WMNS 1225.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Engaging difference and diversity.
• Equivalent: HIST 1225 and WMNS 1225.

AFAM 1270 Economic Status of Ethnic Minorities (4 SH)
Examines the economic conditions and processes as they impact
minorities within the U.S. economy. Considers the role of national
economic policies undertaken to address general economic and
social conditions, as well as policies targeted at minority markets
and institutions. Emphasis is on empirical analysis; historical and
cultural materials may be incorporated.
• NU Core: Comparative study of cultures, social science level 1.
• Equivalent: ECON 1270.

AFAM 1300 The African-American Experience through Short Fiction
and Black Cinema (4 SH)
Surveys the expressions of African-Americans through the lens of
short fiction and black cinema. Engages both the traditional and
contemporary forms of cultural expression, grounding the lineages
through numerous African forms, contributions from the West and
Far East, and looking toward futuristic engagement.
• NU Core: Humanities level 1.

AFAM 2301 Foundations of Black Culture 2 (4 SH)
Continues AFAM 1109. Provides an interdisciplinary approach to
the cultural production of African-based traditions in the Americas
and elsewhere in the African Diaspora. Forms of cultural
production include film, theatre, the visual arts, literary arts, and
dance. While several issues in theory and practice in the arts are
discussed, emphasis is on the ways in which an African-based
tradition is rooted in the intellectual and cultural histories of
African descendants in the United States, the Caribbean, South
and Central America, and Great Britain.
AFAM 2312 Black History of Boston (4 SH)
Examines the social, economic, political, and educational history of Boston’s black community in the nineteenth and twentieth centuries. The development of the black community and its institutions is a major focus, and students are encouraged to study the past in an attempt to understand the present and interpret the future. Research data include participant observation, oral history, interviews, and primary and secondary source materials.
• Prerequisite: Sophomore standing or above.

AFAM 2320 The Black Family (4 SH)
Studies how the black family functions, both interpersonally and as a social unit. Anthropological and sociological theories deal with variations in family structure and the function of the black family in black society. The effects of slavery and colonization on the black family structure and functions are also explored. Discusses some of the differences and similarities between African, African-American, and African-Caribbean families.
• Prerequisite: Sophomore standing or above.

AFAM 2325 African-American Women (4 SH)
Examines themes and topics in the history of African-American women using an interdisciplinary approach. Themes and topics include women’s lives in precolonial Africa, their role in the transatlantic slave trade, women and American slavery, community and institution building after Emancipation, black women and labor, stereotypes of black women, black women and civil rights, and black women today.
• Prerequisite: Sophomore standing or above.
• Equivalent: HIST 2325.

AFAM 2337 African-American History before 1900 (4 SH)
Covers the development of black America from slavery through the Booker T. Washington-W. E. B. DuBois controversy, with emphasis on the historical links between Africa and America that have shaped the African-American experience. Includes in-depth discussion of slavery’s impact, the role of the antebellum free black, the Civil War and Reconstruction, and the black response to the new racism of the late nineteenth century.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: HIST 2337.

AFAM 2338 African-American History since 1900 (4 SH)
Examines the modern development of black America, with major emphasis on the twentieth century and the rising tide of African-American nationalism. Provides an historical perspective regarding key contemporary issues including the founding of the National Association for the Advancement of Colored People (NAACP), the Marcus Garvey back-to-Africa movement, the Harlem Renaissance, the Black Muslims, the impact of Martin Luther King, Jr., and the idea of Black Power.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: HIST 2338.

AFAM 2339 Analysis of American Racism (4 SH)
Discusses the cycle by which racism in our institutions helps form our attitudes and the manner in which our attitudes, in turn, shape our institutions. Emphasizes the practical, day-to-day aspects of racism, rather than the theoretical and historical.
• Prerequisite: Sophomore standing or above.
• Equivalent: IDSC 2339.

AFAM 2344 Contemporary Black Politics (4 SH)
Analyzes the evolution of black political thought in the United States and examines the sociopolitical contexts that have served as catalysts to modern black political movements.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: POLS 2344.

AFAM 2345 The Black Experience in the Caribbean (4 SH)
Offers a descriptive and interpretive analysis of the growth of the modern black community in the Caribbean. Although the focus is the contemporary period, the course examines that period in the context of colonialism and slavery in the Americas. Important racial, social, political, economic, and religious issues are addressed.
• Prerequisite: Sophomore standing or above.

AFAM 2350 History of Blacks in the Media and the Press (4 SH)
Offers a historical and visual examination of the development of the African-American experience in the U.S. mass media and press. Analyzes contemporary and historical literature, films, and people with respect to history, racism, images, psychology, and social movements. Newspapers, film, television, and radio are prime focal points, and are used to help form strategies for the future of black Americans.
• Prerequisite: Sophomore standing or above.
AFAM 2360 Politics of Poverty (4 SH)
Explores how and why there is poverty, how it affects people’s lives, and how it can be eliminated. Examines the relations between poverty, racial and ethnic factors, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.
◆ Equivalent: POLS 2360.

AFAM 2365 Blacks and Jews (4 SH)
Compares the black and Jewish experiences in the United States. Themes include remembered slavery and commemoration of freedom; Holocaust and genocide; religious expressions of politics; black-Jewish relations; and black Judaism.
◆ Equivalent: POLS 2365.

AFAM 2367 Race and Social Identity (4 SH)
Provides an interdisciplinary look at the social, political, and psychological factors shaping contemporary African-American identity. Explores several different factors that interact with blackness to shape the diversity of African-American experience, such as skin color, gender, culture, and class. Studies black identity as it has been conceptualized, measured, and researched by psychologists. Readings include essays written by important African-American thinkers, fiction, and autobiographical narratives, as well as empirical research in the field of psychology.
◆ Prerequisite: Sophomore standing or above.

AFAM 2399 Black Community and Social Change (4 SH)
Explores the dynamic changes experienced by black communities in the United States since the civil rights era in the 1950s and 1960s. Includes discussions and applications of key concepts and methods in several fields of the social sciences, and seeks to understand the relationship of race, class, gender, and social change in addressing the current search for policies and programs for community development.
◆ Prerequisite: Sophomore standing or above.
◆ NU Core: Comparative study of cultures.

AFAM 2549 Public Policy and Black America (4 SH)
Examines the impact of public policy on African Americans and the role of African Americans in the formulation of public policy. These roles include protest, interest-group politics, electoral politics, and blacks as policy researchers and advisers. The process of public policy formulation as it affects blacks is explored through a series of case studies ranging from the formulation and enforcement of fugitive slave laws in the pre–Civil War era to strategic military and foreign policy, affirmative action, welfare reform, and reparations in our own time.
◆ Equivalent: AFAM 4549.

AFAM 2600 Contemporary Issues: Race, Science, and Technology (4 SH)
Examines the social impact of diverse forms of technological development and application that will have sweeping effects on the everyday lives of individuals, groups, governments, and societies in the twenty-first century. The global, transforming effects of technology as it affects communities of color in the United States and internationally are explored in three main areas: the computer, DNA, and quantum revolutions. Topics include the digital divide, minority media ownership, human cloning, the “dot.com” phenomenon, race and cultural representations in cyberspace, and biopiracy. Lectures, class discussions, fieldwork, and interaction with leaders in these various fields are integral elements of the course.
◆ Equivalent: AFAM 4600 and IDSC 4600.

AFAM 2639 Globalism, Racism, and Human Rights (4 SH)
Explores the historical stages of globalization as a geopolitical and social phenomenon having significant impact on social change. Focuses on multiple effects of racism and the gradual emergence of human rights as an extension of basic freedoms internationally. Topics and themes include the African and Latino Diaspora, North-South debates, gender, Third World countries, democratization, poverty, healthcare/pandemic disease, censorship, political repression, new development strategies, and the role of the United Nations and other international organizations in increasingly complex societies.
◆ NUpath: Understanding societies and institutions.
◆ Equivalent: AFAM 4639.

AFAM 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
◆ Prerequisite: Sophomore standing or above and permission of instructor.
◆ Repeatability: May be repeated once for up to 4 total semester hours.

AFAM 3402 African-American English (4 SH)
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relationship of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.
◆ Prerequisite: LING 1150 or ENGL 1150; sophomore standing or above.
◆ Equivalent: LING 3402.
AFAM 3422 Blacks in Science and Medicine (4 SH)
Studies the contributions that African Americans have made to the development of science and technology in America. Examines the cultural and social factors that have encouraged blacks to work in the fields of science (biology, chemistry, physics, and medicine) and technology (engineering). Certification of blacks within the U.S. scientific community and the availability of science to the past and contemporary African-American communities are also explored. Uses readings, discussions, individual research topics, and interviews with black scientists, inventors/engineers, and doctors.
• Prerequisite: Sophomore standing or above.

AFAM 3441 Third World Political Relations (4 SH)
Offers a comparative regional analysis of the political systems of Third World nations of Africa, Asia, Latin America, and the Caribbean. Emphasis is on development strategies; problems of development, including national identity, political socialization and participation, national defense, and urbanization; and the positions of Third World nations in the international community.
• Prerequisite: Sophomore standing or above.
• Equivalent: POLS 3441.

AFAM 3454 Black Elderly in the Americas (4 SH)
Examines in historical context the economic, healthcare, and cultural issues surrounding the aging process among blacks in the Americas, with emphasis on the United States. Identifies the treatment of elders in traditional African societies, major diseases with differential incidence among the black elderly (such as cardiovascular disease and diabetes), racial health disparities, and institutions that African Americans have developed to cope with the conditions of elderly blacks.
• Prerequisite: Sophomore standing or above.

AFAM 3458 Labor, Unions, and Work in Black Society (4 SH)
Focuses on the nature and meaning of work in black society in the United States, especially the interface between black workers and organized labor. Explores the long-term exclusion of black workers from many unions affiliated with the American Federation of Labor (AF of L) in the late nineteenth and early twentieth centuries; the efforts of industrial unions affiliated with the Congress of Industrial Organizations (CIO); the rise of such black unions as the Brotherhood of Sleeping Car Porters; and more recent efforts to organize public employees.
• Prerequisite: Sophomore standing or above.

AFAM 3485 Education Issues in the Black Community (4 SH)
Focuses on some of the important issues in today’s urban elementary and secondary education systems. Examines the historical development of these issues, and students are encouraged to think about and discuss the issues’ future significance.
• Prerequisite: Sophomore standing or above.
• Equivalent: EDUC 3485.

AFAM 3663 The Black Novel (4 SH)
Focuses on the black novelist’s place in the history of American fiction. Emphasis is given to Chesnutt, Toomer, Wright, Ellison, and contemporary novelists, and to their different perceptions of the black experience in America.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENGL 3663.

AFAM 3664 Black Poetry and the Spoken Word (4 SH)
Focuses on the black poet’s place in the history of American poetry. Considers black poetry as both written words and spoken words.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENGL 3664.

AFAM 4501 Contemporary Issues: Hip-Hop Culture (4 SH)
Surveys the global impact of hip-hop culture on a new generation of young people. Begun in the 1970s and 1980s in the United States as a cross-cultural expression of black and Puerto Rican traditions, it has become a major force worldwide. Using an interdisciplinary and practice-oriented approach, addresses such issues as youth identity formation, the role of women and gender in rap music, and the use of novel expressive forms. The combination of fieldwork and weekly critiques on contemporary public debates (such as censorship and the U.S. Constitution, violence and aggression, and sexism and misogyny) yield a final document to be presented to the University community and to be deposited in the Twenty-First Century Hip-Hop Library and Archive Project.
• Prerequisite: Junior or senior standing.
• Equivalent: IDSC 4501.

AFAM 4507 Afro-Cuban Culture—International Study (4 SH)
Offers students an opportunity to obtain fundamental knowledge of the legacy of African-based cultures in Cuba, from historical to contemporary times. Examines origins of Africans in Cuba, including study of plantation culture, transculturation, African-derived religions, the visual arts, music literature, images of blacks in film and the mass media, and African-derived culture in Cuban daily life. Also includes visits to temples and other ritual spaces, meetings with writers, encounters with artistic troupes, meetings with priests or priestesses, visits to cultural organizations, and possible participation in rituals or ceremonies (tambor, cajón, violin).
• NU Core: Comparative study of cultures.
• Equivalent: CLTR 4507.

AFAM 4533 Field Research Seminar (4 SH)
Enables advanced students to design and execute research studies in the field utilizing such methods as community surveys, courtroom observation, archival research, archaeological excavation, and participant observation. Includes performance studies.
• Prerequisite: Junior or senior standing.
AFAM 4544 Seminar in Black Leadership (4 SH)
Enables students to conduct in-depth studies of significant black leaders—male and female—in a wide range of fields. Focuses on black leadership in the political arena as elected officials, leaders of pressure groups, leaders of protest organizations, black nationalist organizations, and feminist/womanist groups, and as advisers to political parties and presidential administrations.
  • Prerequisite: Junior or senior standing.
  • Equivalent: POLS 4544.

AFAM 4588 Literature in Context (4 SH)
Places writers in the context of a special theme; for example, students might discuss a group of writers influenced by their common interest in psychoanalysis, by the social consciousness, or by an interest in the settlement of America.
  • Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  • Equivalent: ENGL 3588.

AFAM 4618 Laboratory in Community Psychology (4 SH)
Familiarizes students with some of the research methods employed by psychologists and other scientists working in the area of community psychology. Community psychologists study people in their social contexts, with emphasis on the mutual influences that individuals and communities have upon each other. Rather than attempt to understand and treat problems at the individual level, research in community psychology aims to offer practical solutions to social problems, focusing on prevention. Familiarizes students with a particular community, which they utilize for data collection. Students develop survey instruments/interview schedules, collect data, and analyze and interpret the findings with a qualitative design if possible.
  • Prerequisite: PSYC 2320, PSYC 3406, and junior or senior standing.
  • NU Core: Experiential learning.
  • Equivalent: PSYC 4618.

AFAM 4640 Topics in African-American History (4 SH)
Covers special topics in African-American history.
  • Prerequisite: Junior or senior standing.
  • NU Core: Comparative study of cultures.
  • Repeatability: May be repeated without limit.
  • Equivalent: HIST 4640.

AFAM 4642 Topics in African-American Art History (4 SH)
Explores special topics in African-American art history in this advanced seminar.
  • Prerequisite: Junior or senior standing.
  • Repeatability: May be repeated without limit.

AFAM 4663 Early African-American Literature (4 SH)
Surveys the development and range of black American writers, emphasizing poetry and prose from early colonial times to the Civil War.
  • Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  • NU Core: Comparative study of cultures.
  • Equivalent: ENGL 2296 and ENGL 4663.

AFAM 4670 Modern African-American Literature (4 SH)
Surveys the development and range of black American writers in poetry and prose from the post-Civil War period to the present.
  • Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  • NU Core: Comparative study of cultures.
  • Equivalent: ENGL 2360 and ENGL 4670.

AFAM 4700 Advanced Seminar (4 SH)
Offers students the opportunity to prepare a professional research paper under the close supervision of a scholar interested in students’ particular research areas. The senior thesis is required of all African-American studies majors. Fulfills experiential education requirement.
  • Prerequisite: Senior standing.
  • NU Core: Capstone, experiential learning, writing intensive in the major.
  • NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

AFAM 4710 Field and Lab Methods for Researching Afro-Caribbean Music (4 SH)
Designed to provide students with principles and practices of ethnomusicological field techniques and research focused on selected African-based music cultures throughout the Caribbean. Offers students an opportunity to obtain a firm foundation so that they may be able to explore research in various genres, forms, and styles of Black music across the globe. Combines theory and practice in an experiential course.
  • NU Core: Comparative study of cultures.
  • Repeatability: May be repeated without limit.

AFAM 4900 Seminar: Authors in the African Diaspora (4 SH)
Enables students to conduct in-depth studies of significant bodies of work—both fiction and nonfiction—by individual authors of the African Diaspora such as Chinua Achebe, W. E. B. DuBois, Toni Morrison, Richard Wright, Zora Neale Hurston, Frantz Fanon, and Leopold Senghor.
  • Repeatability: May be repeated without limit.
AFAM 4939 Afro-Caribbean Music Research (4 SH)
Examines the highly diverse and unique African-based music cultures of the Caribbean. Exposes students to musical repertories, ideas about music, relationship of music to culture, musical instruments, musical contexts, musicians, dancers, and musical syncretism. Examines the roles and functions of music within human life. Taught as part of the Afro-Caribbean Music Research Project while in the field in various Caribbean contexts and takes advantage of firsthand aspects of the specific music culture being studied. Activities include study of historical and contemporary musical history of the Caribbean as well as applied ethnomusicological field research methods, techniques, approaches, and procedures.
• NU Core: Comparative study of cultures.
• Repeatability: May be repeated without limit.

AFAM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

AFAM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: AFAM 4970.
• Repeatability: May be repeated without limit.

AFAM 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

AFAM 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

AFAM 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

AFAM 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

AFAM 4995 AAMARP Practicum (4 SH)
Offers students mentoring by artists-in-residence at the African-American Master Artists in Residency Program (AAMARP). Students gain hands-on studio experience mainly in the graphic and visual arts and in the preparation and management of artistic exhibitions mounted at the AAMARP gallery and other local and regional venues where AAMARP artists exhibit their work.
• Repeatability: May be repeated without limit.

AFAM 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

AIR FORCE ROTC (AIRF)

AIRF 1110 Foundations of the U.S. Air Force 1 (1 SH)
Examines the role of the United States Air Force in the contemporary world. Surveys background, mission, and organization of the Air Force and functions of United States strategic forces. Also emphasizes development of written communication skills.
• Prerequisite: ROTC students only.

AIRF 1111 Leadership Laboratory 1 (0 SH)
Introduces the customs, traditions, and courtesies of the Air Force through guest speakers, seminars, and a field trip to an Air Force base.
• Prerequisite: ROTC students only.

AIRF 1120 Foundations of the U.S. Air Force 2 (1 SH)
Continues study of the contemporary Air Force by examining general-purpose forces, aerospace support forces, and the total force structure.
• Prerequisite: ROTC students only.

AIRF 1121 Leadership Laboratory 2 (0 SH)
Continues AIRF 1111. Emphasizes the role and responsibilities of an Air Force company grade officer.
• Prerequisite: AIRF 1111; ROTC students only.

AIRF 1210 Evolution of U.S. Air Force Air and Space Power 1 (1 SH)
Traces the historical development of air power and its uses starting before the Wright brothers and extending through the Korean War. Concentrates on the advent of the air age, the airplane at war (1914-1918), the interwar years, air power in World War II, the Berlin Airlift, air-power in the Korean War, and the evolution of air power concepts and doctrine. Emphasizes student participation and presentations to enhance communication skills.
• Prerequisite: ROTC students only.
AIRF 1220 Evolution of U.S. Air Force Air and Space Power 2 (1 SH)
Traces the historical development of air power and its uses starting after the Korean War and continuing through its present role in international policies. Emphasizes experiences from the Vietnam conflict and Operations Desert Shield and Desert Storm. Continues emphasis upon student participation and presentations to enhance communication skills.
• Prerequisite: ROTC students only.

AIRF 2211 Leadership Laboratory 3 (0 SH)
Emphasizes development of techniques used to direct and inform. Assigns students to leadership and management positions in the AIRF 1111 programs previously described.
• Prerequisite: ROTC students only.

AIRF 2221 Leadership Laboratory 4 (0 SH)
Continues AIRF 2211. Adds a special program in preparation for field training.
• Prerequisite: AIRF 2211; ROTC students only.

AIRF 2310 U.S. Air Force Leadership Studies 1 (3 SH)
Examines management and leadership from the point of view of the Air Force junior officer. Covers the individual motivational and behavioral processes, leadership, communication, and group dynamics to provide a foundation for the development of the junior officer’s professional skills as an Air Force officer.
• Prerequisite: ROTC students only.

AIRF 2320 U.S. Air Force Leadership Studies 2 (3 SH)
Continues AIRF 2310. Offers special emphasis on the basic managerial processes that involve decision making, and the use of analytical aid in planning, organizing, and controlling in a changing environment. Discusses organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics in the context of the military organization. Uses actual Air Force cases to enhance the learning and communication processes.
• Prerequisite: AIRF 2310; ROTC students only.

AIRF 3311 Leadership Laboratory 5 (0 SH)
Focuses on exercise of management functions in planning, supervising, and directing cadet group activities. Provides students the opportunity to acquire proficiency in military leadership skills.
• Prerequisite: ROTC students only.

AIRF 3321 Leadership Laboratory 6 (0 SH)
Continues AIRF 3311. Offers students the opportunity to prepare themselves for professional duties.
• Prerequisite: AIRF 3311; ROTC students only.

AIRF 3410 National Security Affairs (3 SH)
Studies the role of the military in maintaining the security of the United States. Examines the international environment, the background of defense policy, strategy, and forms of conflict. Addresses specific issues including weapons acquisition, arms control, nuclear deterrence, and the national military decision-making process. Emphasizes developing communication skills through student presentations.
• Prerequisite: ROTC students only.

AIRF 3420 Preparation for Active Duty (3 SH)
Studies the military’s role as an institution in a democratic society. Topics include civil-military interaction and the military as a profession. Emphasizes developing communication skills through student presentations.
• Prerequisite: ROTC students only.

AIRF 4411 Leadership Laboratory 7 (0 SH)
Provides supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet group. Develops leadership potential in a practical, supervised training lab.
• Prerequisite: ROTC students only.

AIRF 4421 Leadership Laboratory 8 (0 SH)
Continues AIRF 4411. Emphasizes supervisory and leadership skills. Discusses advantages of an Air Force career.
• Prerequisite: AIRF 4411; ROTC students only.

AMERICAN SIGN LANGUAGE (AMSL)

AMSL 1101 Elementary ASL 1 (4 SH)
Introduces students to American Sign Language (ASL). Students develop expressive and receptive competence in using ASL to fulfill various social functions (such as introductions, explanations of personal history, and descriptions of simple narratives). Additional topics include the use of signing space and further use of nonmanual components including facial expression and body postures.

AMSL 1102 Elementary ASL 2 (4 SH)
Continues AMSL 1101. Continues development of expressive and receptive competence in using American Sign Language to fulfill various social functions (such as introductions, explanations of personal history, and descriptions of simple narratives). Emphasizes further development of receptive and expressive skills, finger spelling, vocabulary building, grammatical structures; encourages more extensive use of nonmanual behaviors, classifiers, body postures, and signing space. Students are also introduced to regional and ethnic sign variations and political and educational institutions of the Deaf community.
• Prerequisite: AMSL 1101.
A**MSL 1401 Elementary ASL 1 for Healthcare Professionals (4 SH)**
Focuses on the development of basic conversational skills using a variety of conversational strategies in ASL. This is the first course in a sequence of American Sign Language (ASL) courses offered for students in the Bouvé College of Health Sciences at Northeastern University. ASL is the primary sign language of the Deaf community throughout the United States and much of Canada. Addresses those conversational skills most often used in medical settings. Emphasizes basic rules of grammar, finger spelling, and cultural behaviors of the Deaf community, as well as the ASL vocabulary and phrases needed for a variety of medical situations. Guest speakers share their experiences in various medical settings.
- **Prerequisite:** Bouvé students only.

A**MSL 1402 Elementary ASL 2 for Healthcare Professionals (4 SH)**
Continues AMSL 1401 or AMSL 1101. Offers students an opportunity to continue to develop the conversational skills used in medical settings. Constitutes the second course in a sequence of American Sign Language (ASL) courses designed for students in the Bouvé College of Health Sciences and in the premed program. Emphasizes further development of receptive and expressive skills, finger spelling, vocabulary building, and grammatical structures.
- **Prerequisite:** AMSL 1401 or AMSL 1101.

A**MSL 1511 ASL Classifiers (4 SH)**
Seeks to improve understanding of and use of ASL classifiers, including appropriate nonmanual grammatical features and other nonmanual markers. Discusses classifier hand shapes and how movement, location, and orientation of classifiers affect meaning in ASL. Covers eight types of ASL classifiers: semantic, instrumental, descriptive, locative, plural, body part, sport, and elemental. Offers students an opportunity to build on existing classifier vocabulary and eventually use an expanded range of classifiers to express narratives.
- **Prerequisite:** AMSL 1101.

A**MSL 1512 ASL Numbers and Fingerspelling (4 SH)**
Offers students an opportunity to improve receptive and expressive skills in the specific areas of fingerspelling and numbers. Includes a brief history of fingerspelling. Focuses on strategies for understanding fingerspelling/word phrases and number recognition; recognizing number patterns (e.g., ordinal and cardinal numbers, height, age, time); and additional strategies for understanding and using numbers and fingerspelling in context. Uses drills to improve speed, clarity, and fluency skills.
- **Prerequisite:** AMSL 1102.

A**MSL 2101 Intermediate ASL 1 (4 SH)**
Continues the student’s development of expressive and receptive competence in using American Sign Language to fulfill various communicative functions, such as making and responding to inquiries, constructing and comprehending narratives, and engaging in debates. Students also continue to expand their ASL lexicon.
- **Prerequisite:** AMSL 1102.

A**MSL 2102 Intermediate ASL 2 (4 SH)**
Continues AMSL 2101. Emphasizes further development of receptive and expressive skills, finger spelling, vocabulary building, grammatical structures; encourages more extensive use of nonmanual behaviors, classifiers, body postures, and signing space. Continues exposure to regional and ethnic sign variations and political and educational institutions of Deaf people. Offers intensive practice involving expressive and receptive skills in storytelling and dialogue. Introduces language forms used in American Sign Language poetry and the features of culture as they are displayed in art.
- **Prerequisite:** AMSL 2101.

A**MSL 2900 Specialized Instruction in ASL (1 to 4 SH)**
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings (e.g., media, medical, legal, mental health), or it might be focused on specific conversational nuances of the language.
- **Repeatability:** May be repeated without limit.

A**MSL 3101 Advanced ASL 1 (4 SH)**
Focuses on continued development of syntactic competence in American Sign Language with particular attention to the use of ASL in formal discourse. Also focuses on lexical semantics and semantic equivalents for multiple meaning English lexical items.
- **Prerequisite:** AMSL 2102.

A**MSL 3102 Advanced ASL 2 (4 SH)**
Continues AMSL 3101. Focuses on further development and refinement of American Sign Language competence in various discourse settings, predominantly formal and consultative. Continues development of lexical semantics and uses individual diagnostic assessment of ASL competence to determine individual competency goals.
- **Prerequisite:** AMSL 3101.
AMS 3900 Specialized Instruction in ASL (1 to 4 SH)
Designed for individuals whose language skills are at the advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings (e.g., media, medical, legal, mental health), or it might be focused on specific conversational nuances of the language.
• Repeatability: May be repeated without limit.

AMS 4900 Specialized Instruction in ASL (1 to 4 SH)
Designed for individuals whose language skills are at the advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings (e.g., media, medical, legal, mental health), or it might be focused on specific conversational nuances of the language.
• Repeatability: May be repeated without limit.

AMS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

AMS 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major requirements in certain situations. Priority is given to American Sign Language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

AMS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

AMS 4976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

AMS 4978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ANTH 1000 Anthropology at Northeastern (1 SH)
Intended for first-year students in the College of Social Sciences and Humanities. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Equivalent: CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, INTL 1000, LANG 1000, PHIL 1000, POLS 1000, and SOCL 1000.

ANTH 1101 Peoples and Cultures (4 SH)
Surveys basic concepts in cultural anthropology by looking at a range of societies and the issues they face in a globalizing world. Examines the manner in which cultures adapt to, reject, or modify all of the changes they face. These changes impact everything from traditional family structure, to religion, gender, all the way to patterns of joking and concepts of beauty the world over.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Interpreting culture.

ANTH 2300 Reading Culture through Ethnography (4 SH)
Examines culture by reading some of the discipline’s best-known ethnographic works and by revisiting core anthropological themes and methods. Emphasizes critical reading practices within anthropology, how ethnographies and their subjects are constructed, and how anthropologists bring their perspectives to bear upon the study of culture.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

ANTH 2302 Gender and Sexuality: A Cross-Cultural Perspective (4 SH)
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.
• NU Core: Comparative study of cultures.
• Equivalent: WMNS 2302.
ANTH 2305 Global Markets and Local Culture (4 SH)
Examines selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, globalization, commodity production, and international labor migration. Focuses on the impact of global capitalist development on contemporary developing and postcolonial societies as well as local responses and/or resistances to those changes.
  • NU Core: Comparative study of cultures.
  • NUpath: Interpreting culture.

ANTH 2306 Global Markets and Local Cultures Abroad (4 SH)
Examines selected topics in the socioeconomic transformation of other cultures, including urbanization, industrialization, globalization, commodity production, and international labor migration. Focuses on the impact of global capitalist development on contemporary developing and postcolonial societies as well as local responses and/or resistance to those changes. To be taken as part of a Dialogue of Civilizations.
  • Repeatability: May be repeated without limit.

ANTH 2312 The Anthropology of Masculinity (4 SH)
Provides a cross-cultural examination of the ways in which social and cultural institutions shape men, and how men respond to those institutions. After studying the ways in which gender is constructed, the ways in which women are distinguished from men, and a history of masculinity, the course explores the range of masculinities that compete with one another for expression. Uses case studies from Latin America, Melanesia, North America, and Africa.

ANTH 2315 Religion and Modernity (4 SH)
Introduces a cross-cultural, comparative perspective on religious practice and belief. Explores theoretical definitions of and methodological approaches to the study of religion, as well as more specific concepts of ritual, myth, healing, and identity. Select case studies allow for an in-depth look at the unique formations of a few religious practices and groups.
  • NU Core: Comparative study of cultures.
  • NUpath: Interpreting culture, understanding societies and institutions.

ANTH 2330 Environmental Anthropology (4 SH)
Introduces the study of human-environment interactions over time and across cultures. Drawing on a range of scholarship from ecological anthropology, environmental history, political-economy, and environmental justice, this class examines transitions in subsistence systems and cultural factors from early hunting-gathering societies through to industrial giants in a globalizing world.
  • NU Core: Comparative study of cultures.

ANTH 2331 Scientific Controversies: Culture, Science, and Public Debate (4 SH)
Introduces the social studies of science. How and why is science vital to contemporary public controversies? Whose expertise and data should we trust and why? How do scientific facts and practices change over time? Examines public controversies in which science and scientists play a determining role (e.g., climate change, endocrine disruption, smoking and cancer, and genetic engineering). Studies how and why scientific practice creates social and ethical challenges by looking at controversies produced through scientific research, including model organisms, stem cells, and cell lines. Offers students an opportunity to learn how scientific cultures develop by performing ethnographic fieldwork within laboratories and in class projects that engage students in how scientific facts and figures are made and unmade.

ANTH 2350 Urban Anthropology (4 SH)
Introduces students to the anthropological literature on cities and their subjects. Explores the ways in which cities are seen as places of cultural fascination and exchange, as well as spaces of modernity and futurity. Analyzes the urban character of contemporary cultural, political, economic, and global processes that take place in cities, and provides foundational concepts to understand urban spaces, the construction of urban identities, the complexities of urban living, and the local and global significance of cities.
  • NU Core: Comparative study of cultures.
  • NUpath: Understanding societies and institutions.

ANTH 2365 Sport, Culture, and Society (4 SH)
Looks at the ways in which sport reflects and obscures social and cultural institutions. Half of the course focuses upon American sport, and the rest upon the global character that modern sport has taken on. Case studies are used from the United States, Dominican Republic, Japan, Brazil, and elsewhere.
  • NU Core: Comparative study of cultures.
  • NUpath: Interpreting culture.

ANTH 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
  • Prerequisite: Sophomore standing or above and permission of instructor.
  • Repeatability: May be repeated once for up to 4 total semester hours.
ANTH 3120 Consumer Cultures (4 SH)
Introduces students to anthropological theories of consumption and debates about the “social life of things.” Explores the politics invested in material objects ranging from hijab fashions in Teheran to forms of global hipsterism, debates about nationalism and commodity cultures, as well as the political economy of production and consumption. Includes, but is not limited to, commodity fetishism, value, social/cultural capital, distinction, neoliberalism, consumerism, and materiality.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

ANTH 3410 Ethnographic Field Experience (4 SH)
Offers students an opportunity to experience fieldwork while studying current ethnographic methods and theory and to design a semester-long ethnographic field research project. Field sites may include public and outdoor spaces, online communities, cultural centers, schools, immigrant neighborhoods, sports organizations, social service agencies, nonprofit groups, religious institutions, etc.
- Prerequisite: ANTH 1101.
- NU Core: Experiential learning.
- NUPath: Analyzing and using data, integrating knowledge and skills through experience.
- Equivalent: ANTH 4524.

ANTH 3415 Anthropology of Travel and Tourism (4 SH)
Examines the rationale and functions of tourism around the world. Explores the relationship between tourist and host from the following perspectives: kinds of tourism; the tourist “desire”; the tourist “gaze”; and the ways in which hosts manipulate the relationship. Examines the nature of what constitutes satisfaction and sustainability of tourism.
- NU Core: Comparative study of cultures.
- NUPath: Interpreting culture.

ANTH 3417 Political Anthropology (4 SH)
Examines the anthropology of politics, focusing on the anthropology of the state. Studies the history of political anthropology with its roots in British structural-formalism and contextualizes it within the anthropology of Africa and witchcraft. Explores the linkages between the nation and the state, using classic works of Benedict Anderson on nationalism, before commencing an in-depth study of the problems of the state, classical theories of the state and statecraft, and how these ideas are traced to contemporary ethnographies of politics. Students interested in the study of resistance, displacement, social exclusion, citizenship, state violence, and communities may find this course relevant to their interests.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

ANTH 3418 Wired/Unwired: Cybercultures and Technopolitics (4 SH)
Explores the impacts of technology and new media on politics, society, and culture. Emphasizes the socioeconomic and political frameworks within which technologies are embedded as well as the role of technology and the Internet in contemporary political and cultural movements. Topics may include the political and cultural effects of the census, the radio, and the camera; the history of the Internet; virtual worlds and communities; online politics and activism; as well as blogging, gaming, and social networking.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
- Equivalent: ANTH 4525.

ANTH 3421 Foundations of Anthropological Theory (4 SH)
Introduces the foundations of anthropological theory. Examines recurring themes surrounding structure and agency, culture and power, and the tension between the individual and society. Addresses these questions by returning to anthropology’s Enlightenment roots, early evolutionary thought, classic and contemporary theories, as well as ongoing critiques of the discipline. Explores different schools of thought, including functionalism, structural functionalism, symbolism, interpretivism, and more recent theoretical developments that address history, political economy, reflexivity, poststructuralism, and feminism, as well as transnational/global and activist approaches.
- Prerequisite: (a) ANTH 1101 and (b) two ANTH courses numbered 1000 or above.

ANTH 4350 Ethnography of Southeast Asia (4 SH)
Offers a seminar on the societies and cultures of Southeast Asia. Uses an interdisciplinary approach to this diverse and dynamic geopolitical region, with readings from anthropology, history, political science, and literature. Covers the major political and cultural changes that have shaped Southeast Asia in relation to the world—from the age of colonial expansion, to the rise of nation-states, to the present global era. Examines central questions in the ethnography of Southeast Asia, emphasizing the postcolonial legacies of Southeast Asia, states and violence, culture and mobility, and pressing contemporary issues in globalizing Southeast Asia.
- Prerequisite: (a) Sophomore standing or above and (b) ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, SOCL 1101, or WMNS 1103.
- Cross-list: INTL 4350.
- NUPath: Interpreting culture, understanding societies and institutions.
- Equivalent: INTL 4350.
ANTH 4500 Latin American Society and Development (4 SH)
Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: INTL 4500.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.
• Equivalent: INTL 4500.

ANTH 4505 Native North Americans (4 SH)
Examines Native American cultures and their reactions to Anglo-American attempts to, first, remove them from their lands and, then, incorporate them into the contemporary framework of modern America. Selects specific groups to explore contemporary issues, including native gaming, racism, gender, cultural appropriation, and economic development.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.

ANTH 4510 Anthropology of Africa (4 SH)
Explores Africa’s changing place in the world. Studies the history of Africa and explores the role of ethnography in the making of colonial Africa and the cultural transformations and continuities produced by the emergence of African cities during and after colonialism. Studies postcolonial Africa to critically and comparatively engage with contemporary issues facing African societies. Considers the efflorescence of new cultural forms of music, art, film, and literature, in conjunction with new sources of identity such as nationality, religion, ethnicity, consumption, and migration.
• Prerequisite: (a) Sophomore standing or above and (b) ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, SOCL 1101, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: INTL 4510.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.
• Equivalent: INTL 4510.

ANTH 4515 Culture and Politics in Modern India (4 SH)
Introduces the histories, cultures, and peoples of India. Seeks to convey a sense of how knowledge has been constructed about the region and how the subcontinent has been shaped by its engagements with the world through such processes as colonization, state building, and globalization. Uses readings, films, and class discussions to examine themes and topics that include Orientalism, postcolonialism, caste and community, gender and sexualities, conflict and violence, development and resistance, and transnational structures and processes. Critically evaluates some commonly held assumptions, including classical understandings of tradition and modernity, cohesion and conflict, and nation and identity.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• Cross-list: INTL 4515.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.
• Equivalent: INTL 4515.

ANTH 4580 Special Topics in Anthropology (4 SH)
Designed as a specialized themes course for students with prior experience in anthropology and/or sociology. Offers unique opportunities—visiting guests, special thematic interests—which are not part of the regular curriculum.
• Repeatability: May be repeated without limit.

ANTH 4600 Senior Seminar (4 SH)
Designed to deal with anthropological theory and work with students who are asked to apply these theories to some of their own work. Content may vary.
• Prerequisite: Junior or senior standing; cultural anthropology majors and international affairs and anthropology combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

ANTH 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student's major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: Junior or senior standing; cultural anthropology majors and international affairs and anthropology combined majors only.
• Repeatability: May be repeated without limit.
ANTH 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- **Prerequisite:** ANTH 4970 and junior or senior standing; cultural anthropology majors and international affairs and anthropology combined majors only.
- **Repeatability:** May be repeated without limit.

ANTH 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- **NUpath:** Integrating knowledge and skills through experience.

ANTH 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability:** May be repeated without limit.

ANTH 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability:** May be repeated without limit.

ANTH 4994 Internship (4 SH)
Offers students an opportunity for internship work.
- **NUpath:** Integrating knowledge and skills through experience.
- **Repeatability:** May be repeated without limit.

ANTH 4996 Experiential Education Directed Study (4 SH)
Offers independent work on a chosen topic under the direction of a member of the department.
- **NU Core:** Experiential learning.
- **NUpath:** Integrating knowledge and skills through experience.
- **Repeatability:** May be repeated without limit.

ANTH 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

ARABIC (ARAB)

ARAB 1101 Elementary Arabic 1 (4 SH)
Designed for students with very little or no prior knowledge of Modern Standard Arabic. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. Uses practical vocabulary drawn from realistic situations, and aims at good pronunciation and ease in response. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with various audio-visual resources.

ARAB 1102 Elementary Arabic 2 (4 SH)
Continues ARAB 1101. Reviews and continues the study of grammar and basic language skills. Offers progressively more intensive practice in oral and written communication. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with various audio-visual resources.
- **Prerequisite:** ARAB 1101 or ARAB 1301.

ARAB 1301 Elementary Arabic Immersion 1 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ARAB 1302 Elementary Arabic Immersion 2 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ARAB 2101 Intermediate Arabic 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from current standard Arabic materials.
- **Prerequisite:** ARAB 1102 or ARAB 1302.

ARAB 2102 Intermediate Arabic 2 (4 SH)
Builds on ARAB 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from current standard Arabic materials.
- **Prerequisite:** (a) ARAB 2101 or ARAB 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.
- **Equivalent:** ARAB 2701.
ARAB 2301 Intermediate Arabic Immersion 1 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ARAB 2302 Intermediate Arabic Immersion 2 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ARAB 2701 Intensive Arabic 2 (4 SH)
Offers students an opportunity to develop proficiency in modern standard Arabic and in developing knowledge of spoken Arabic, especially the Egyptian and Levantine dialects. Focuses on building language skills and mastering more vocabulary and grammar. Includes short readings, composition exercises, review of basic Arabic grammar, and extensive training in listening and conversation. The textbook is supplemented with material that includes print media, audios, and videos. Some of the material is available on the companion Web site for the textbook, Al-Kitaab; other material is prepared by the instructor. Requires students to purchase access to the Web site. Seeks to complete all thirteen units of Al-Kitaab by the end of the course. Preq. ARAB 1701 or ARAB 1102.
• Equivalent: ARAB 2102.

ARAB 2900 Specialized Instruction in Arabic (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.

ARAB 3101 Advanced Arabic 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: ARAB 2102 or ARAB 2302.

ARAB 3102 Advanced Arabic 2 (4 SH)
Builds on ARAB 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: ARAB 3101 or ARAB 3301.
• Equivalent: ARAB 3701.

ARAB 3301 Advanced Arabic Immersion 1 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

ARAB 3302 Advanced Arabic Immersion 2 (4 SH)
Designed for students who are in an Arabic-speaking country, this is an off-campus immersion course. Focuses on standard Arabic as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

ARAB 3701 Intensive Arabic 3 (4 SH)
Offers students an opportunity to build language skills and master more advanced vocabulary and grammar. Focuses on developing proficiency in standard and spoken Arabic to a degree where similarities and differences between the two are analyzed and assimilated. Includes readings of medium length, composition exercises, review of Arabic grammar, listening skills, and conversation practice in standard Arabic and in one of the two dialects introduced in ARAB 1701 and ARAB 2701 (ARAB 4701 focuses on the other dialect). Begins with a brief review of Al-Kitaab 1 and moves on to the first half of Al-Kitaab 2. To prepare students for ARAB 4701, the class devotes at least one full weekly meeting to media Arabic.
• Prerequisite: ARAB 2701 or ARAB 2102.
• Equivalent: ARAB 3102.

ARAB 3800 Special Topics in Arabic (1 to 4 SH)
Focuses on a unique aspect of the Arabic language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an intermediate level of skill in the language.
• Repeatability: May be repeated up to 3 times.
ARAB 3900 Specialized Instruction in Arabic (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

ARAB 4701 Intensive Arabic 4 (4 SH)
Continues with the approaches of ARAB 3701 to build language skills toward higher proficiency in both standard and spoken Arabic. Offers students an opportunity to use their knowledge in one to enhance their skills in the other by studying and analyzing the similarities and differences between the two. Includes readings, composition exercises, review of Arabic grammar, listening skills, and conversation practice in standard Arabic and in one of the two dialects introduced in ARAB 1701 and ARAB 2701—Egyptian or Levantine. Continues with and finishes Al-Kitaab 2. Offers students an opportunity to achieve proficiency equivalent to “advanced intermediate.”
- Prerequisite: ARAB 3701 or ARAB 3102.

ARAB 4800 Special Topics in Arabic (1 to 4 SH)
Focuses on a unique aspect of the Arabic language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

ARAB 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

ARAB 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

ARAB 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

ARAB 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ARAB 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ARCHITECTURE (ARCH)

ARCH 1000 Architecture at Northeastern (1 SH)
Intended for freshmen in the College of Arts and Sciences. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

ARCH 1110 Fundamental Architectural Representation (6 SH)
Introduces students to architectural representation as a form of documentation, experimentation, and communication, through a series of exercises in orthographic, axonometric, and perspective projection as well as physical modeling. Emphasizes the development of an iterative design methodology. Includes workshops in introductory digital media.
- Prerequisite: ARCH 1310 (may be taken concurrently).
- NUpath: Engaging with the natural and designed world, exploring creative expression and innovation.

ARCH 1120 Fundamental Architectural Design (6 SH)
Introduces architectural design. Examines a number of approaches to spatial organization, massing, and envelope articulation through the analysis of pertinent case studies as well as through a series of fast-paced design exercises. Offers students an opportunity to develop a single design through a series of design studies that deal with issues of site planning, program, user input, and collective negotiation. Requires a portfolio demonstrating the student’s representational abilities and iterative design process.
- Prerequisite: ARCH 1110 and ARCH 1320 (which latter may be taken concurrently).
- NUpath: Engaging with the natural and designed world, exploring creative expression and innovation.
ARCH 1310 Architecture and Global Cultures, Prehistory to 1400 (4 SH)
Offers a chronological history of civilizations from prehistory to 1400. Global in scope, introduces key themes including housing, the vernacular, materials and techniques, sacred architecture, architecture and power, and urban planning. Emphasizes the relationship between architectural works and the cultures that produce them.
• Corequisite: ARCH 1311.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.

ARCH 1311 Recitation for ARCH 1310 (0 SH)
Offers a small-group discussion format to cover material in ARCH 1310.
• Corequisite: ARCH 1310.

ARCH 1320 Architecture and Global Cultures, 1400 to Present (4 SH)
Offers a chronological history of early modern architecture. Focuses on significant moments in Western culture as well as the architecture and planning of Mughal India, Ottoman Empire, and Japan. Continues major themes from ARCH 1310. Also covers ideal cities and urban planning, the relationship between theory and practice, the Enlightenment, the emergence of the professional architect, trade, colonization, and landscape.
• Corequisite: ARCH 1321.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.

ARCH 1321 Recitation for ARCH 1320 (0 SH)
Offers a small-group discussion format to cover material in ARCH 1320.
• Corequisite: ARCH 1320.

ARCH 1350 American Architecture (4 SH)
Offers an introduction to the history, theory, and criticism of American architecture and urban planning from the mid-1600s to the 1930s. Explores the social and cultural forces that shape the built environment. Examines European influences as well as uniquely American contributions. Emphasizes the work of Louis Sullivan, H. H. Richardson, and Frank Lloyd Wright.
• NU Core: Arts level 1.
• Equivalent: ARCH 2350.

ARCH 1450 Understanding Design (4 SH)
Introduces undergraduates at all levels to the importance of design thinking as a method of inquiry and problem solving. Each class meeting includes a short presentation on a different kind of design problem (houses, furniture, electronics, automobiles, apparel, tools, interiors, cities, typography, information, tall buildings, networks, etc.) and then an interview with a leading practitioner at a roundtable on the stage. Evaluation is based on quizzes and student presentations. Seeks to expose students to the power of design thinking as a tool for multi-variable problem solving.
• NU Core: Arts level 1.

ARCH 2130 Site, Space, and Program (6 SH)
Studies how to analyze, draw, and model the built environment. Students engage in issues of program, composition, type, and material. Offers the opportunity to think conceptually about architectural design.
• Prerequisite: ARCH 1120; restricted to BS students in architecture and architectural studies, BLA students, and three-year MArch students.

ARCH 2140 Urban Institutions (6 SH)
Studies how to analyze, model, and intervene in the city. Offers students an opportunity to engage in urban analysis, urban massing strategies, and architectural design of urban institutions.
• Prerequisite: ARCH 2130; restricted to BS students in architecture and architectural studies, BLA students, and three-year MArch students.

ARCH 2170 Urban Research Studio: Context, Sustainability, Development (6 SH)
Seeks to develop students’ technical skills and critical thinking in the studio environment through a semesterlong research and design project. Offers students an opportunity to investigate an urban site in the Boston area: investigating possible solutions, focusing on strengthening conceptual strategies, and articulating a developed argument through their research and design process.
• Prerequisite: ARCH 2130 and sophomore standing or above; architecture studies students only.
ARCH 2230 Structural Systems (4 SH)
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historical and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams.
• Prerequisite: (a) either PHYS 1141 or PHYS 1151 and either MATH 1241 or MATH 1341 or (b) graduate standing; restricted to students in the architecture BS program and to students in the three-year MArch program.
• Corequisite: ARCH 2231.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world, conducting formal and quantitative reasoning.

ARCH 2231 Recitation for ARCH 2230 (0 SH)
Provides a small-group discussion format to cover examples from the material in ARCH 2230.
• Corequisite: ARCH 2230.

ARCH 2240 Architectonic Systems (4 SH)
Introduces the theory of materials and structures. Examines basic structural elements in masonry and wood construction. Uses historical and current building types to explore the relationship between structure, materials, construction process, and architectural space. Includes lectures, discussions, field trips, and student presentation of structural models and diagrams.
• Prerequisite: Restricted to students in the architecture BS program and to students in the three-year MArch program.
• NU Core: Mathematical/analytical thinking level 2.

ARCH 2250 Introduction to Sustainable Design in Architecture (4 SH)
Explores the issues and practices of architectural design as it relates to natural systems, using critical readings of seminal and current texts, lectures, films, field trips, and projects that use both design and analysis as means of inquiry. Examines varied approaches to sustainable design, including using nature and wilderness as models; biophilia; biomimicry; material sources and reuse; accounting systems such as LEED, Zero Net Carbon, and the 2030 Challenge; and the Living Building Challenge. Course work couples these thematic explorations with projects that investigate the application of the ideas in built form. Designed to offer both a broad understanding of sustainable design and a deep understanding of the varied ways one might approach green as a design professional.
• Prerequisite: Sophomore standing or above.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world.

ARCH 2260 Introduction to Building Systems (4 SH)
Introduces fundamentals of building technology and explores technology as means and manifestation of architecture in the world. Using a systems approach, studies the interactions among natural forces, material properties, technological capabilities, and human cultural values and the ways these relationships give rise to architecture. Considers a series of physical principles—including gravity, moisture, heat, light, and air—to reveal specific architectural possibilities and material responses. Explores the ways design shapes the interaction of materials and forces to provide for human safety, shelter, comfort, and delight through a combination of hands-on workshops, seminal readings, and design exercises.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world.

ARCH 2310 Chinese Architecture 1: Premodern (4 SH)
Covers the development of the built environment in China from prehistory to the nineteenth century. Emphasizes technological transformation, structural and stylistic evolvement, cultural exchange, and ideological engagement.
• Prerequisite: ARCH 1310, ASNS 1150, or HIST 1250.

ARCH 2320 Chinese Architecture 2: Modern (4 SH)
Covers the development of the built environment in China from 1840 to the present. Emphasizes educational and professional shifts in architectural practice, political engagement in the design process, structural and technological transformation, conceptual background, and global impact.
• Prerequisite: ARCH 1320, ASNS 1150, or HIST 1250.

ARCH 2330 Architecture, Modernity, and the City, 1800 to 1910 (4 SH)
Focuses on architecture and urban design in the United States and Europe from 1800 to 1910. Major topics include the birth of the modern city and urban planning, capitalism and industrialization, modern typologies, infrastructure, urban parks and early suburbs, materials and technology, Western architecture in colonial India and Asia, architectural education, and modern architectural theory.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students in the architecture BS program with sophomore standing or above and to students in the three-year MArch program.
• Corequisite: ARCH 2331.
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

ARCH 2331 Recitation for ARCH 2330 (0 SH)
Offers a small-group discussion format to cover material in ARCH 2330.
• Corequisite: ARCH 2330.
ARCH 2340 Architecture, Modernity, and the City, 1910 to 1980 (4 SH)
Examines the forms and principles of European and American architecture of the twentieth century in the context of society’s changing conditions. Major topics include craft vs. industry, avant-garde and “other” modernisms, the architect and critical positions, suburbs, new concepts of space, modernism and its critique, and global extensions of modernism.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students in the architecture BS program with sophomore standing or above and to students in the three-year MArch program.
- Corequisite: ARCH 2341.
- NU Core: Writing intensive in the major.
- NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

ARCH 2341 Recitation for ARCH 2340 (0 SH)
Offers a small-group discussion format to cover material in ARCH 2340.
- Corequisite: ARCH 2340.

ARCH 2360 Design Thinking and Architecture (4 SH)
Exposes students to the key principles of design thinking, focusing in particular on its relationship to architecture and how the specific skills of the architects are integral to its definition. At its core, design thinking offers a specific framework for innovation. By exposing students to the ways in which design thinking has been theorized and defined, offers students an opportunity to develop a more detailed understanding.
- Prerequisite: Sophomore standing or above.
- NUpath: Exploring creative expression and innovation.

ARCH 2550 Real Estate Development and Design (4 SH)
Introduces the challenges and opportunities in real estate development for design professionals. Offers students an opportunity to obtain the knowledge and skills necessary to engage meaningfully in real estate development, which is exercised through application to real-life problems. Reviews the property types, terminology, and core concepts in the real estate industry; introduces a set of analytical tools and techniques for evaluating real estate investment and development; and explores innovation and entrepreneurship in real estate development practice models.
- Prerequisite: Sophomore standing or above.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Analyzing and using data.

ARCH 3155 Studio Abroad (6 SH)
Offers students an opportunity to understand the challenges of designing contemporary building types in parallel situations—the dense historic fabric of a city with ancient origins that has been manipulated over centuries and the more diffused, diverse, and irregular landscape typically found on the edge of the modern city. Offered only abroad.
- Prerequisite: ARCH 2140; architecture majors only.

ARCH 3165 Suburban Types (6 SH)
Explores the important differences in designing for dense cities vs. more automotive suburbs in a studio format. Offers students an opportunity to study existing urban and suburban building types and then design for similar use in the two different settings.
- Prerequisite: ARCH 3150; architecture majors only.

ARCH 3170 Architecture, Infrastructure, and the City (6 SH)
Offers a studio course addressing the architectural and urbanistic consequences at the intersection of large-scale infrastructure and the contemporary city. Focuses on how to integrate buildings and neighborhoods with highways, rail lines, storm water management, bus, bike, parking, rivers, watersheds, and industrial networks.
- Prerequisite: ARCH 3155; architecture majors only.
- NUpath: Demonstrating thought and action in a capstone.

ARCH 3350 American Houses and Housing (4 SH)
Examines the architecture of American houses from first settlements of European colonists in the sixteenth century to issues in the twentieth century. Aims to uncover the ways that architecture, seen through the lens of a particular building type, responds to the demands of materials, climate and geography, ethnic traditions, artistic expression, and changing societal forms.
- Prerequisite: Previous architectural history course or permission of instructor; architecture students only.

ARCH 3361 Architecture and Urbanism Abroad (4 SH)
Covers the detailed history of architecture and urban development in the host city, from its founding to the present. Offered only abroad.
- Prerequisite: ARCH 2340; architecture majors only.

ARCH 3362 Seminar Abroad (4 SH)
Offers students an opportunity to learn and discuss historical and contemporary European theory and criticism, from Vitruvius and Alberti to contemporary figures. Raises and addresses architectural questions of composition, society, politics, and environment. Offered only abroad.
- Prerequisite: ARCH 2340; architecture majors only.
ARCH 3364 Architecture and Planning in Twenty-First-Century China (4 SH)
Offers real-world insight into the fastest-growing urbanization process in the world. Offers students an opportunity to learn about the physical history of Chinese cities, especially Shanghai, Beijing, and Hangzhou. Explores the differences in scale of both contemporary and historic urban fabric, building types, and development types. Students are encouraged to produce case studies comparing and contrasting these elements.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated up to 3 times.

ARCH 3370 Topics in Architectural History (4 SH)
Covers a variety of topics in architectural history and theory with the aim of offering students a greater degree of choice in shaping their curriculum and the opportunity to study subjects that interest them in greater detail. Course topics encompass a wide range of themes and complement the mission of the department, the college, and the university. Taught by a number of different faculty members according to their interests and expertise.

ARCH 3450 Advanced Architectural Communication (4 SH)
Builds on CAD (computer-aided design) skills to develop ability to model in three dimensions and develop surfaces and lighting. Also addresses strategies in design communication for effective presentation of digital material.
• Prerequisite: ARCH 2130 or graduate standing.
• NU Path: Engaging with the natural and designed world, analyzing and using data.

ARCH 4850 Urban and Architectural History Abroad (4 SH)
Offers an on-site study of architecture and urban history conducted abroad. Instructors accompany students to visit and lecture about the most significant sites in the history of architecture, art, and urban development of a specific country. In comparison to a traditional on-campus course, the number of examples covered is smaller; however, each example is discussed in much greater detail. Encourages students to discover problems and aspects in art, architecture, and urbanism that have not been raised before, something only possible through direct survey and observation. Offers students an opportunity to obtain a real sense of architectural research without neglecting the basics of the field. Interactions with practicing architects, city planners, policymakers, preservationists, museum professionals, and artists are integral parts of this course.
• Repeatability: May be repeated without limit.

ARCH 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ARCH 4970; architecture students only.
• Repeatability: May be repeated without limit.

ARCH 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Architecture students only.
• NU Path: Integrating knowledge and skills through experience.

ARCH 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• Prerequisite: Architecture students only.
• NU Core: Experiential learning.
• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ARCH 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• Prerequisite: Architecture students only.
• NU Core: Experiential learning.
• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ARCH 5110 Housing and Aggregation (6 SH)
Provides an understanding of multiunit housing in the United States and Europe. Working in teams, students develop new patterns of housing for Boston-area sites and develop those sites with their own individual interventions.
• Prerequisite: ARCH 3170 or graduate standing; architecture students only with junior, senior, or graduate standing.
ARCH 5115 Option Studio (6 SH)
Effective Spring 2017
Offers an upper-level design studio that covers new studio topics, content, and studio instructors each semester. The studio instructors offer topical content that best aligns with their research and practice expertise, which provides students with the latest concepts in architectural design, theory, and research on a consistently updated and rotating basis. Students select their top choices of studio topics and instructors, giving them more flexibility in the areas for which they would like to focus their education.
• Prerequisite: (a) ARCH 3170 or graduate standing and (b) junior, senior, or graduate standing; restricted to students in the College of Arts, Media and Design.

ARCH 5120 Comprehensive Design Studio (6 SH)
Focuses on the materials and making of architecture. Considers architectural connections at all scales, from the nut and bolt to the scale of a door or window to the scale of the whole building and the city. Grounds design proposals upon a tectonic strategy, unlike traditional design studios that produce a schematic design before considering constructional ideas.
• Prerequisite: ARCH 5110; architecture students with junior, senior, or graduate standing.
• NUpath: Demonstrating thought and action in a capstone.

ARCH 5210 Environmental Systems (4 SH)
Explores the ways in which architectural form can create particular conditions of light and shadow; provide shelter from heat, cold, and rain; and incorporate systems that provide for water, electricity, and sanitation. Provides a series of simple and straightforward small-scale design projects.
• Prerequisite: Junior, senior, or graduate standing; restricted to selected programs in architecture, architectural studies, landscape architecture, energy systems, sustainable urban environments, and sustainable building systems.
• Corequisite: ARCH 5211.
• NUpath: Engaging with the natural and designed world, analyzing and using data.

ARCH 5211 Recitation for ARCH 5210 (0 SH)
Offers a small-group discussion format to cover material in ARCH 5210.
• Corequisite: ARCH 5210.

ARCH 5220 Integrated Building Systems (4 SH)
Studies how to integrate into students' building designs all the environmental and tectonic systems that they have covered in previous architecture courses.
• Prerequisite: ARCH 5210; architecture students with junior, senior, or graduate standing.

ARCH 5310 Design Tactics and Operations (4 SH)
Encourages students to develop the connections between critical attitudes and techniques in design, through important historical texts. Offers a kind of “great books” approach to the integration of design and history, introducing the writings and seminal designs of Alberti, Palladio, Wright, Le Corbusier, Semper, Sitte, Rowe, Colquhoun, Moneo, Koolhaas, Rossi, Frampton, Venturi and Scott Brown, Scarpa, and Lynch.
• Prerequisite: Architecture students with junior, senior, or graduate standing.

ARCH 5320 Applications of Architectural Design Methods (4 SH)
Effective Spring 2017
Explores the different means through which we analyze, interpret, and ultimately understand the built environment and how, in turn, the built environment contributes to our understanding of the world itself. Offers students an opportunity to learn how to think critically themselves, to learn to ask questions, and to develop their own perspectives on the production of architecture and design.
• Prerequisite: (a) ARCH 1450 or permission of instructor and (b) junior, senior, or graduate standing.
• NU Core: Capstone.
• NUpath: Demonstrating thought and action in a capstone.

ARCH 5530 Innovative Models in Real Estate Development and Design (4 SH)
Effective Spring 2017
Addresses advanced topics in real estate development and finance and examines innovative models of practice in real estate development available to design professionals. Studies a set of advanced analytical tools and techniques for evaluating the cash flows and economic returns of real estate investment and development. Introduces advanced methods of financing real estate and the structure of capital markets involved in property assets. Uses the case instruction method and includes active, discussion-oriented learning.
• Prerequisite: Junior, senior, or graduate standing.
• NU Core: Capstone.
• NUpath: Demonstrating thought and action in a capstone.

ARCH 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Architecture students with junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
ARCH 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Architecture students with junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ARCH 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Architecture students with junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ARCH 6100 Graduate Skills Studio (6 SH)
Presents students new to architecture with the fundamentals of three-dimensional thinking and spatial representation with a series of increasingly complex assignments. Offers students an opportunity to learn a wide variety of graphical software tools and then use these tools to complete their assignments. Covers freehand sketching and physical model building skills. This intensive course is taught as a hands-on design studio (with ample studio access outside class meetings).
- Prerequisite: Three-year MArch students only.

ARCH 6110 Graduate Architectural History Case Studies (4 SH)
Presents students new to architecture with an overview of architectural history and key concepts that have framed the disciplinary focus of architecture over the centuries. The overall organization of this intensive course is roughly chronological, with each lecture focusing on a series of influential or important buildings in a given period. Considers theoretical ideas and professional discourse, as well as larger cultural, political, and social contexts. Also discusses the lasting impact of certain buildings, historical styles, and theoretical concepts.
- Prerequisite: Three-year MArch students only.

ARCH 6140 Urban Institutions (6 SH)
Studies how to analyze, model, and intervene architecturally in the urban context. Offers students an opportunity to engage in urban analysis, urban massing strategies, and architectural design of urban institutions.
- Prerequisite: ARCH 6200; restricted to students in architecture and in sustainable urban environments.

ARCH 6200 Graduate Studio 1: Architectural Design (6 SH)
Focuses on a series of increasingly complex assignments that emphasize the fundamentals of architectural design. Offers students an opportunity to propose and test proposals through an iterative process using a wide variety of tools and media, including design software, physical models, and freehand sketches. Explores spatial definition, the orchestration of a spatial sequence, modulation of natural light, and responsiveness to existing conditions (whether natural or man-made). Taught as a hands-on design studio (with ample studio access outside class meetings).
- Prerequisite: Three-year MArch students only.

ARCH 6210 Graduate Studio 2: Urbanism (6 SH)
Focuses on a mixed-use building program proposed for an urban infill site in Berlin. Covers not only the conception and design of a complex work of architecture but also the broader urban design issues raised by the problem. Offers students an opportunity to test and recommend urban design proposals for the district where their proposed building is located. The course is taught as a hands-on design studio in the Berlin studio as part of the School of Architecture’s Berlin program.
- Prerequisite: MArch students only.

ARCH 6330 Seminar in Modern Architecture (4 SH)
Examines the state of architecture and urbanism in the two decades leading up to 2000. Explores contemporary issues in architectural theory and urban design. Examines a broad range of ideas affecting contemporary developments in architectural practice. Engages cultural and historical forces as well as contemporary criticism to define the nature of modernism, late modernism, postmodernism, and deconstruction. Case studies, analysis of theoretical models, and application of methods of history provide students with support for their own design work in studio and co-op experiences.
- Prerequisite: Architecture students only.

ARCH 6340 Graduate Topics in Architecture (4 SH)
Explores focused research topics relevant to the graduate program curriculum. The professor presents his or her research related to a particular urban, architectural, or technical topic. This exposes the students to methods of research and topics in current and ongoing research in the field. The students have an opportunity to engage in related and parallel research projects during the course of the semester.
- Prerequisite: Architecture students only.
- Repeatability: May be repeated without limit.
ARCH 6430 Case Studies 1 (4 SH)
Focuses on how architectural practice occurs and must be understood within a larger social context. The cultures-interests and objectives of the constellation of participants in the bringing of a building to completion are dynamic, diverse, and complex, especially in an urban environment. Seeks to make sense of this broader social contract from within the perspective of professional design practice. As one of many participants in the process of bringing a building to completion, students review the roles, responsibilities, and interests of each contributor. Our task is to understand the obligations and constraints that constitute these relationships. Examines the products of design as manifestations of these relationships and situates them within a discourse of value-determined actions. Investigates normative and critical professional practices through selected readings and individual field research. Develops project case studies that provide examples of excellent design results achieved through the application of expert professional practices.
• Prerequisite: Architecture students only.

ARCH 6440 Case Studies 2 (4 SH)
Continues ARCH 6430. Builds on the understanding of professional practice developed in the previous course and investigates the array of “artful ways in which some practitioners deal competently with the indeterminacies and value conflicts of practice.” These indeterminacies, uncertainties, and value conflicts are part of a rapidly changing, dynamic world. There is an unprecedented need for flexible and responsive practices that can bridge the gap between traditional professional techniques and these situations. Requires core competencies that are not mismatched with the changing situations of practice. Requires new skills as well as traditional analytic techniques to respond adequately to these unique conditions of work. Through a closer examination and development of an in-depth project case study, students speculate on possible approaches to a revised and restructured model of professional knowledge and guidelines for reflective practice that can sustain a culture of design excellence.
• Prerequisite: ARCH 6430; architecture students only.

ARCH 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.
• Prerequisite: Architecture students only.

ARCH 7130 Master’s Research Studio (6 SH)
Offers the research portion of a two-part graduate project focused on the complex issues facing the postindustrial landscape of the contemporary city. Examines in detail the design elements of everyday building types, such as office buildings, labs, parking garages, and retail spaces, with an eye toward creating new prototypes for urban architecture that are informed by the realities of contemporary market forces. Provides the foundation for the more speculative design proposals of ARCH 7140.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 7140 Master’s Degree Project (6 SH)
Offers the second of a two-part degree project focused on manipulating contemporary market-driven building types. Seeks to invent new variations and hybrids from the existing store of urban building types to address new challenges, such as irregular sites, new adjacencies, and other unmet demands in cities. Based on research, analysis, and modeling of different types done in the first semester, offers students an opportunity to propose synthetic solutions to the complex problems of postindustrial development, housing, and identity facing the contemporary city.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Architecture students only.
• Repeatability: May be repeated without limit.

ARCH 7996 Thesis Continuation (0 SH)
Offers thesis supervision by members of the department.
• Prerequisite: Architecture students only.
ARMY ROTC (ARMY)

ARMY 1101 Introduction to the Army and Critical Thinking (1 SH)
Introduces cadets to the Army and the Profession of Arms. Examines the Army profession and what it means to be a professional in the U.S. Army. Offers students an opportunity to develop basic knowledge and comprehension of the Army Leadership Requirements Model while gaining a complete understanding of the Reserve Officers’ Training Corps (ROTC) program, its purpose in the Army, and its advantages for the student. Cadets also have an opportunity to learn how resiliency and fitness support their development as an Army leader. Includes a leadership laboratory where cadets conduct practical applications of their military science curriculum.
• Prerequisite: ROTC students only.

ARMY 1102 Introduction to the Profession of Arms (1 SH)
Introduces personal challenges and competencies that are critical for adaptive leadership. Offers students an opportunity to learn the basics of the communications process and the importance for leaders to develop the essential skills to effectively communicate in the Army. Examines the Army profession and what it means to be a professional in the U.S. Army.
• Prerequisite: ROTC students only.

ARMY 1111 Introduction to the Army and Critical Thinking Lab (0 SH)
Accompanies ARMY 1101. Introduces basic soldier skills and introduces squad-level tactical operations in Leadership Lab. Students also participate in physical fitness training three days per week.
• Prerequisite: ROTC students only.

ARMY 1112 Introduction to the Profession of Arms Lab (0 SH)
Accompanies ARMY 1102. Introduces basic soldier skills and introduces squad-level tactical operations in Leadership Lab. Students also participate in physical fitness training three days per week.
• Prerequisite: ROTC students only.

ARMY 2201 Innovative Team Leadership (3 SH)
Offers students the opportunity to identify successful leadership characteristics through observation of others and self through experiential learning exercises. Students record observed traits (good and bad) in a dimensional leadership journal and discuss observations in small group settings.
• Prerequisite: ROTC students only.

ARMY 2202 Foundations of Tactical Leadership (3 SH)
Examines how to build successful teams, various methods for influencing action, effective communication in setting and achieving goals, the importance of timing the decision, creativity in the problem-solving process, and obtaining team buy-in through immediate feedback.
• Prerequisite: ROTC students only.

ARMY 2211 Innovative Team Leadership Lab (0 SH)
Accompanies ARMY 2201.
• Prerequisite: ROTC students only.

ARMY 2212 Foundations of Tactical Leadership Lab (0 SH)
Accompanies ARMY 2202.
• Prerequisite: ROTC students only.

ARMY 3301 Adaptive Team Leadership (4 SH)
Gives students the opportunity to conduct self-assessment of leadership style, develop personal fitness regimen, and learn to plan and conduct individual/small-unit tactical training while testing reasoning and problem-solving techniques. Students receive direct feedback on leadership abilities.
• Prerequisite: Basic course or equivalent military experience (prior service, JROTC, USA, ARNG, ROTC, Leader’s Training course). ROTC students are expected to register concurrently for ARMY 3311.

ARMY 3302 Leadership in Changing Environments (4 SH)
Examines the role communications, values, and ethics play in effective leadership. Topics include ethical decision making, consideration of others, spirituality in the military, and Army leadership doctrine. Emphasis is on improving oral and written communication abilities.
• Prerequisite: ARMY 3301. ROTC students are expected to register concurrently for ARMY 3312.

ARMY 3311 Adaptive Team Leadership Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 3312 Leadership in Changing Environments Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 3503 American Military History (4 SH)
Focuses on the employment of the armed forces while examining the underlying factors that affected warfare, starting in the seventeenth century. Begins with European warfare and concludes with the issues facing the United States military today. Provides significant coverage of military operations and innovations to warfare. Encourages new ideas, thoughts, and creative discussion from students.
• Prerequisite: ROTC students are expected to register concurrently for ARMY 3513.
ARMY 3504 Contemporary Army Operations (2 SH)
Introduces the roles and organization of the United States Army’s Active, Reserve, and National Guard components. Uses these concepts as building blocks to discuss United States Army doctrine and tactics, and examines recent and ongoing military operations around the world.
• Prerequisite: ARMY 1102; ROTC students only. ROTC students are expected to register concurrently for ARMY 3514.

ARMY 3513 American Military History Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 3514 Contemporary Army Operations Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 4011 The Army Officer (4 SH)
Examines differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism.
• Prerequisite: ARMY 3302; ROTC students are expected to register concurrently for ARMY 4411.

ARMY 4012 Company Grade Leadership (4 SH)
Explores the dynamics of leading in complex situations during Unified Land Operations I, II, and III. Examines the art of command and counseling.
• Prerequisite: ARMY 3302; ROTC students are expected to register concurrently for ARMY 4412.

ARMY 4401 Developing Adaptive Leaders (4 SH)
Develops student proficiency in planning and executing complex operations, functioning as a member of a staff, and mentoring subordinates. Students explore training management, methods of effective staff collaboration, and developmental counseling techniques.
• Prerequisite: ARMY 3302. ROTC students are expected to register concurrently for ARMY 4411.

ARMY 4402 Leadership in a Complex World (4 SH)
Covers case study analysis of military law and practical exercises on establishing an ethical command climate. Students complete a semester-long Senior Leadership Project that requires them to plan, organize, collaborate, analyze, and demonstrate their leadership skills.
• Prerequisite: ARMY 3302. ROTC students are expected to register concurrently for ARMY 4412.

ARMY 4411 Developing Adaptive Leaders Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 4412 Leadership in a Complex World Lab (0 SH)
Offers a leadership lab introducing basic soldier skills and squad-level tactical operations.

ARMY 4993 Independent Study (1 to 4 SH)
Offers independent study under direction of department staff. Intended for terms abroad. Students research the organization, characteristics, and mission of the military forces of the country where they are studying abroad. Emphasis is on recent and current operations in a regional and/or global context as well as engagement activities with the United States military.
• Prerequisite: Basic course or equivalent military experience (prior service, USAR, ARNG, ROTC, Leader’s Training Course); ROTC students only.
• Repeatability: May be repeated without limit.

ARTG 1250 Design Process Context and Systems (4 SH)
Explores common design practices, principles, and vocabularies, introducing the design process as a method of inquiry and problem solving through studio projects. Emphasizes the importance of an awareness of audience and context in the creation of meaningful communications and experiences. Explores the practice of design as an iterative process, offering students an opportunity to obtain an understanding of the value of systems thinking and the importance of feedback and exchange as a means for assessing the quality of design’s effectiveness in helping users achieve their goals.
• NUpath: Exploring creative expression and innovation.

ARTG 1255 Design Process Context and Systems Abroad (4 SH)
Explores common design practices, principles, and vocabularies, introducing the design process as a method of inquiry and problem solving through studio projects. Emphasizes the importance of an awareness of audience and context in the creation of meaningful communications and experiences. Explores the practice of design as an iterative process, offering students an opportunity to obtain an understanding of the value of systems thinking and the importance of feedback and exchange as a means for assessing the quality of design’s effectiveness in helping users achieve their goals. Taught abroad.
• Repeatability: May be repeated without limit.
ARTG 2250 Typography 1 (4 SH)
Introduces typography as the basis of graphic design and visual communication. Guides students through an understanding of letterforms, words, sentences, and text as both image and information. Studies form, context, and visual meaning. Introduces use of the typographic grid and issues of hierarchy and legibility through assigned projects, readings, and lectures. Includes the historical evolution of typefaces and their classification as a rational system.
• Prerequisite: ARTF 1122.
• Corequisite: ARTG 2251.
• NUpath: Exploring creative expression and innovation.

ARTG 2251 Type Tools (1 SH)
Offers students an opportunity to acquire technical software skills used in typesetting, such as Adobe InDesign, in this introductory lab.
• Corequisite: ARTG 2250.

ARTG 2252 Graphic Design 1 (4 SH)
Explores graphic form and vocabulary through the development of icons and symbols. Applies graphic design principles to the correlation of forms with their function, content, and context. Incorporates a variety of media as visual communication elements.
• Prerequisite: ARTF 1122.
• NUpath: Exploring creative expression and innovation.

ARTG 2260 Programming Basics (4 SH)
Exposes students to basic programming design for user interfaces. Offers students an opportunity to become familiar with the logical elements of programming languages. Through lectures, hands-on in-class exercises, and modular projects, explores Web-based design and programming solutions for managing interaction and animation.
• Equivalent: IM 2250 and MMST 3350.

ARTG 2300 Business Literacy for Design and Media (4 SH)
Provides students with a toolkit that offers insight into how companies operate, what their managements do, and how success is measured. Exposes students to creative rights issues and professional paths they might pursue—employee, freelancer, and entrepreneur. Evaluates various company cultures and offers students an opportunity to assess their personal career fit.
• Equivalent: IM 2300 and MMST 4160.

ARTG 2400 Interaction Design 1: Responsive (4 SH)
Applies information design principles to Web and mobile interface design. Explores user-centered interface and programming design strategies for the delivery of responsive data-driven websites. Discusses audience definition, content development, information structuring, and navigation. Emphasizes tools and strategies for design, such as site maps, wireframes, prototypes, usability testing, and iterative development. Offers students an opportunity to obtain meaningful interactive experiences through team-based projects.
• Prerequisite: ARTF 2223.
• Corequisite: ARTG 2401.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: IM 2400 and MMST 4400.

ARTG 2401 Interaction Design Tools (1 SH)
Introduces skills and software used in designing and developing Web-based interactive environments. Explores Web-page scripting and tagging, CSS-based design coding, options for front- and back-end page design connections, and alternative technologies.
• Corequisite: ARTG 2400.
• Equivalent: IM 2401 and MMST 4401.

ARTG 3250 Physical Computing (4 SH)
Explores the communication between the physical world and the interactive, computer-based interface. Examines the potential of reactive analog and digital devices embedded within the physical realm. Offers students an opportunity to use simple kit sensors and indicators designed to enable student teams to create interfaces triggered by gesture, bodily movement, physical forces, and other tangible actions. Concludes with discussions of more complex interactive devices, the relationship between physical computing and robotics, and possible future directions.
• Prerequisite: ARTG 2400 or IM 2400.
• NUpath: Exploring creative expression and innovation, analyzing and using data.
• Equivalent: IM 3250.

ARTG 3350 Typography 2 (4 SH)
Continues ARTG 2250, exploring structures and hierarchies through increasing typographic complexity. Investigates meaning, legibility, and readability with an emphasis on voice, organization, sequence, and the typographic grid.
• Prerequisite: ARTG 2250.
• NUpath: Exploring creative expression and innovation.
ARTG 3351 Time-Based Design (4 SH)
Introduces principles of time-based media—such as anticipation, interval, succession, and rhythm—through a series of analog and digital projects. Explores the potential of communicating information over time with a focus on kinetic typography and visual/sonic narratives. Examines concepts from film, music, and other related time-based arts through assignments, lectures, and student presentations.
• Prerequisite: ARTF 2220 and ARTG 3350.

ARTG 3352 Interaction Design Basics (4 SH)
Introduces basic principles of interactive design, such as orientation, navigation, hierarchy, categorization, user expectation, usability, and responsiveness. Explores these concepts through the creation of Web-based user interfaces.
• Prerequisite: ARTF 2223, ARTG 2250, and junior or senior standing.

ARTG 3450 Graphic Design 2 (4 SH)
Investigates the range of conceptual possibilities inherent in the merging of words/text with images/symbols through the understanding of how their relationship can enhance meaning and comprehension. Explores visual poetry, choices in mark and form, and applied semiotics through projects, readings, and lectures/discussions.
• Prerequisite: ARTG 2252.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Exploring creative expression and innovation.

ARTG 3451 Information Design 1 (4 SH)
Introduces basic concepts, methods, and procedures of information design with a focus on mapping information. Students investigate visual systems and information structures such as maps, graphs, charts, and diagrams. Emphasizes the creative process of organizing, visualizing, and communicating data by making complex information easier to understand and use.
• Prerequisite: ARTG 3350 and junior or senior standing.

ARTG 3460 Identity and Brand Design (4 SH)
Continues ARTG 3450. Offers students an opportunity to develop the skills needed to critically examine and design logos, marketing materials, and advertising programs that establish and promote institutional and corporate identity. Examines the historical development of classic identity programs and the role of seminal identity designers in the evolution of the practice of identity design and the design of branded environments.
• Prerequisite: ARTG 3450.

ARTG 3461 Service Design (4 SH)
Addresses the challenges and opportunities in designing human-centered, memorable services. Uses case studies from diverse industries such as healthcare, transportation, banking, and retail. Introduces research and design methods such as scenario mapping, prototyping, and service enactment as means to observe and craft touchpoints throughout the service experience.
• Prerequisite: ARTF 2223.

ARTG 3462 Experience Design 1 (4 SH)
Investigates a wide range of design research methods and means of representing user intentions and actions in order to develop coherent designs based on the needs of the user. Includes use of context assessment, user experience audits, and scenario development as means to understand the motivations, behaviors, and values of audiences and participants.
• Prerequisite: ARTG 1250.

ARTG 3463 Experience Design 2 (4 SH)
Continues ARTG 3462 processes and strategies for creating compelling human-centered experiences. Offers students an opportunity to use design processes from multiple disciplines to develop real-world solutions.
• Prerequisite: ARTG 3462.

ARTG 3465 Experience Design 1 Abroad (4 SH)
Investigates a wide range of design research methods and means of representing user intentions and actions in order to develop coherent designs based on the needs of the user. Includes use of context assessment, user experience audits, and scenario development as means to understand the motivations, behaviors, and values of audiences and participants. Taught abroad.
• Repeatability: May be repeated without limit.

ARTG 3500 Transmedia Design (4 SH)
Examines how marketing, advertising, and media strategies developed across multiple media inform design and communication strategy. Topics include advertising narratives, brand development, management, and translation of branding across multiple media.
• Prerequisite: ARTH 1100 or IM 1110.
• Equivalent: IM 3500.

ARTG 3700 Interaction Design 2: Mobile (4 SH)
Explores user-centered interface design for information exchanges using handheld and mobile devices. Studies the potentials for leveraging both the social and locative possibilities of mobile devices through research, discussions, and project assignments.
• Prerequisite: ARTG 2400 or IM 2400.
• Equivalent: IM 3700.
ARTG 4500 Portfolio Workshop (1 SH)
Designed to provide guidance in defining criteria for professional presentation of art and design work, including considerations for portfolio organization and form. Lectures and discussions are designed to give an overview of best practices in the creation of digital as well as physical portfolios.
• Prerequisite: Design, graphic design, and multimedia studies majors only.

ARTG 4550 Design Degree Project 1 (4 SH)
Draws on a range of theoretical and critical texts that address current issues and research methodologies in graphic design. This course is writing intensive and offers students an opportunity to complete weekly writing assignments and to visit local design studios, galleries, and museums. Writings and discussions are designed to lead to identification of a focus for ARTG 4551.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing; design majors and graphic design majors only.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

ARTG 4551 Design Degree Project 2 (4 SH)
Forms the graphic design major capstone together with ARTG 4550. This intensive research-driven studio explores the realm of designing authorship. A single project theme extends in phases through an entire term to mirror the development sequence of complex professional design projects. Essential to the process is that the medium is not predetermined. Offers students an opportunity to investigate a topic of their choice, author and edit content, and determine the most effective medium for their message, which they design to resonate with a specific audience. Central to the course is a substantive written problem definition and proposal designed to integrate each student’s academic and design experience.
• Prerequisite: ARTG 3350, ARTG 3451, ARTG 4550, and junior or senior standing; design majors and graphic design majors only.
• NU Core: Capstone, experiential learning.
• NUpath: Exploring creative expression and innovation, demonstrating thought and action in a capstone.

ARTG 4552 Information Design 2 (4 SH)
Builds on concepts from ARTF 2223 and ARTG 3451. Offers students an opportunity to develop strategies for structuring and communicating complex information to increase understanding through dynamic states, which are controlled through the interaction of end users. Explores possibilities offered by interfaces that mediate between a person and information space through research, projects, readings, and discussions.
• Prerequisite: (a) ARTG 2400, ARTG 3352, or IM 2400 and (b) ARTG 3451 and (c) junior or senior standing.

ARTG 4553 Environmental Design (4 SH)
Explores visual communication as experienced in the time-space continuum. Projects investigate social issues that contribute to shaping the concept of spaces, such as public art installations, interpretive exhibits, and wayfinding.
• Prerequisite: ARTG 3451 and junior or senior standing.

ARTG 4554 Typography 3 (4 SH)
Offers an advanced course exploring a variety of typographical solutions, including expressive formal and complex content-based projects.
• Prerequisite: ARTG 3350.
• NUpath: Exploring creative expression and innovation.

ARTG 4700 Interaction Team Degree Project 1 (4 SH)
Offers the first course in a two-term capstone sequence. Offers students an opportunity to work in interdisciplinary teams to define, research, design, plan, and implement a large-scale interactive project. The project concept and preliminary work are completed in this course, and the final project is produced in ARTG 4701.
• Prerequisite: ARTG 2400, ARTG 3352, or IM 2400; restricted to selected Art + Design majors and combined majors.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: IM 4700 and MMST 4700.

ARTG 4701 Interaction Team Degree Project 2 (4 SH)
Continues ARTG 4700. Realizes the interactive project that was planned and designed in ARTG 4700.
• Prerequisite: ARTG 4700; restricted to selected Art + Design majors and combined majors.
• NU Core: Capstone, experiential learning.
• NUpath: Demonstrating thought and action in a capstone.
• Equivalent: IM 4701 and MMST 4701.

ARTG 5100 Information Design Studio 1—Principles (4 SH)
Explores the theories and practices of information design through studio projects. Investigates visual systems and information structures such as maps, timelines, charts, and diagrams. Emphasizes the creative process of organizing, visualizing, and communicating data by seeking to make complex information easier to understand and use.
• Prerequisite: Graduate standing.

ARTG 5110 Information Design History (4 SH)
Investigates the history of visualization practices across disciplines and in relation to technology developments. Critically examines seminal visualizations in social, cultural, and technological contexts by means of discussions and writing activities in a seminar format.
• Prerequisite: Graduate standing.
ARTG 5120 Information Design Research Methods (4 SH)
Examines qualitative and quantitative research methods pertinent to information communication systems. Through discussion and writing activities, offers students an opportunity to investigate varied inquiry toward the development of researchable questions, argument formation, and assessment methodologies.
• Prerequisite: Graduate standing.

ARTG 5130 Visual Communication for Information Design (4 SH)
Explores graphic and typographic theory, principles, and practices. Introduces students to visual communication design with a primary focus on typography as the fundamental means of conveying content. Readings locate design and typography within the larger history of visual art and writing development. Covers methods of organizing content through hierarchy and spatial organization of grid structures. Considers relationships between positive and negative space, depth perception, transparency, and color theory.
• Prerequisite: Information design and visualization students only.

ARTG 5310 Visual Cognition (4 SH)
Introduces human visual cognition as it applies to information design and visualization. Focuses on perception, attention, pattern recognition, information acquisition, memory, and creation of mental models. Explores reasoning, cognition, decision making, and problem solving in relation to visual artifacts.
• Prerequisite: Graduate standing.

ARTG 5320 Statistics Basics for Designers (4 SH)
Offers design students an opportunity to obtain the necessary skills to collect, summarize, analyze, and interpret data. Introduces concepts and methods in statistical reasoning and analysis. Topics include data mining, comparison, assessment, and delivery.
• Prerequisite: Graduate standing.

ARTG 5330 Visualization Technologies (4 SH)
Introduces programming languages that allow computational analysis and digital delivery of dynamic information. Examines implications of environmental and personal sensor data sources, mobile collection and analysis of data, real-time networked data sets, and social use of shared data visualization tools.
• Prerequisite: Graduate standing.
• Repeatability: May be repeated once.

ARTG 5600 Experience Design Studio 1—Principles (4 SH)
Offers a context for a cohesive experience through interaction, movement, and understanding, which builds on previous knowledge of audiences and applications. Offers students hands-on project development of systems, artifacts, communication, environments, or service offerings focusing on the unique personal experience of the audience exposed to the semester-long project. Experience design is a holistic approach to design that investigates the human experience in specific situations to improve its quality, given an understanding of human goals, needs, and desires. Offers students an opportunity to develop competency in tools used to create the various elements that create the context for experiences in specific situations and events.
• Prerequisite: Graduate standing, also undergraduate seniors with permission of instructor.

ARTG 5610 Design Systems (4 SH)
Explores a systems-based perspective on our environment by addressing questions that are fundamental to design practice: What is a system, and what are the different types? How do we observe, analyze, and represent systems? What interactions can we have with systems and what are the different types of interaction? Explores structures and processes for the design of systemic relationships between people, artifacts, environments, and activities. Systems may be physical, virtual, social, or a combination. Through discussion, writing, diagramming, and project exercises, offers students an opportunity to learn principles of systems theory and explore the connection between design methods and systems thinking.
• Prerequisite: Graduate standing, also undergraduate seniors with permission of instructor.

ARTG 5620 Notational Systems for Experience (4 SH)
Examines theoretical foundations, concepts, and methods of visual notational systems used in the effective analysis and communication of existing experiences and in the envisioning of conditions for future experiences. Notational systems are sets of graphic signs and codes that denote or prescribe specific actions, forces, operations, events, or performances that occur over time. Students engage with concepts and models through readings, discussion, case study analyses, and speculative design projects. Evaluates the role that notational systems play in documenting, analyzing, and understanding the human goals, actions, behaviors, and perceptions key to experience and assesses their value in designing for agency and new experiences.
• Prerequisite: Graduate standing, also undergraduate seniors with permission of instructor; understanding a design process and knowledge of studio critique practices are recommended.
ARTG 6100 Information Design Studio 2—Dynamic Mapping and Models (4 SH)
Continues the exploration of data representations in a variety of media. Focuses on interactive and time-based techniques. Emphasizes computational methods of data collection, manipulation, and encoding.
• Prerequisite: ARTG 5100; information design and visualization students only.
• Repeatability: May be repeated once.

ARTG 6110 Information Design Theory and Critical Thinking (4 SH)
Examines various theoretical models of information visualization and delivery systems. Evaluates the concepts and effectiveness of the models through discussions and writing activities.
• Prerequisite: Information design and visualization MFA students only.

ARTG 6200 Information Design Studio 3—Synthesis (4 SH)
Continues the exploration of theories of information design and visualization through focused projects that are intended to lead to development of a thesis project.
• Prerequisite: ARTG 6100; information design and visualization students only.

ARTG 6310 Design for Behavior and Experience (4 SH)
Examines the potential of interfaces as mediators between information and users. Explores iterative prototyping and research methods to analyze patterns of behavior and implications of interface on effective communication. Utilizes observation, empathy, ethnography, and participatory design methods to offer students an opportunity to increase their understanding of audiences’ and stakeholders’ motivations and expectations.
• Prerequisite: Information design and visualization MFA students only.

ARTG 6320 Design of Information-Rich Environments (4 SH)
Explores methods of information organization, presentation, and navigation in physical space. Introduces concepts of wayshowing and embodiment and examines the bridging of physical and virtual spaces through the use of mobile and locative technologies. Encourages collaborative studio projects exploring interventions in public or urban environments and in exhibit-based learning environments.
• Prerequisite: Information design and visualization MFA students only.

ARTG 6330 Information Design Mapping Strategies (4 SH)
Examines the relationships between content and context through mapping methods. Emphasizes the impact of geographic information systems, evolving technologies, community mapping tools, globalization, and delivery systems.
• Prerequisite: Information design and visualization MFA students only.

ARTG 6900 Special Topics in Information Design (4 SH)
Explores focused research topics relevant to the graduate program curriculum.
• Prerequisite: Information design and visualization MFA students only.
• Repeatability: May be repeated up to 3 times.

ARTG 7100 Information Design Thesis Seminar (4 SH)
Examines emerging research and critical practices in information design and visualization. Offers students an opportunity to develop the visual and verbal expression of the thesis through writing, discussion, presentation, and critique.
• Prerequisite: Information design and visualization students only.

ARTG 7990 Thesis (8 SH)
Offers students an opportunity to develop and produce a written and project-based thesis that integrates and applies their accumulated knowledge to a specific real-world situation. Encourages student participation within a practice and research community consisting of classmates, advisor(s), and external professionals.
• Prerequisite: Information design and visualization students only.

ARTG 7996 Thesis Continuation (0 SH)
Offers students continuing thesis supervision by members of the department.
• Prerequisite: Information design and visualization students only.

ARTF 1000 Art and Design at Northeastern (1 SH)
Intended for freshmen in the College of Arts and Sciences. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Freshman standing.

ARTF 1102 Color 1 Foundation (1 SH)
Examines subtractive color. Introduces optical phenomena of color pigment, reflected color. Studies hue, value, and saturation and their implications for color interaction, legibility, and spatial illusion.

ARTF 1104 Color 2 Foundation (1 SH)
Focuses on the optical phenomena of color activity, legibility, and spatial illusion in traditional and electronic media as well as the differences between subtractive and additive color.
ARTF 1120 Observational Drawing (4 SH)
Focuses on developing an understanding of the structure of object and figure through freehand drawing. Offers students an opportunity to explore a wide range of materials, including wash, charcoal, and pencil.
• NUpath: Exploring creative expression and innovation.

ARTF 1121 Conceptual Drawing (4 SH)
Seeks to expand the student’s knowledge and skills through a mark-making process. Offers students an opportunity to begin to understand the relationship between form and meaning while relating the drawing process to broader concepts of communication.
• NUpath: Exploring creative expression and innovation.

ARTF 1122 2D Fundamentals: Surface and Drawing (4 SH)
Offers an opportunity to discover and research basic principles, language, and concepts inherent in two-dimensional visual systems. Offers students an opportunity to learn to think critically, analyze, and apply basic principles to design and art projects. In a studio workshop setting, three primary phases explore art, design, and photography.
• Corequisite: ARTF 1123.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

ARTF 1123 2D Tools (1 SH)
Introduces skills and software, such as Adobe Photoshop and Illustrator, used in creating and manipulating pixel- and vector-based images, in a technology workshop format.
• Corequisite: ARTF 1122.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

ARTF 1124 3D Fundamentals: Structure and Drawing (4 SH)
Continues ARTF 1122. Explores three-dimensional form. Examines principles including mass, volume, line, plane, and texture. Introduces basic materials and structure through constructing models and prototypes. Presents sequential exercises with simple eye/hand skills and form recognition. Explores complex projects that require an understanding of context, content, and developing original forms.
• Corequisite: ARTF 1125.
• NU Core: Arts level 1.

ARTF 1125 3D Tools (1 SH)
Introduces skills and software used in creating 3D forms with the computer. Explores basics of 3D modeling, surfacing, lighting, and rendering in this technology workshop.
• Corequisite: ARTF 1124.

ARTF 1140 Understanding Art (4 SH)
Offers an introduction to the characteristics of the visual arts including painting, sculpture, graphic arts, and architecture. Studies various examples of works of art as means of understanding style and techniques. Includes visits to museum collections and contemporary art galleries.
• Prerequisite: Not open to majors or selected combined majors in the Department of Art + Design.
• NU Core: Arts level 1.

ARTF 2220 4D Fundamentals: Sequence and Drawing (4 SH)
Explores time-based art and design in an introductory lecture/studio format. Introduces formal, narrative, and alternative concepts for creative time-based communication. Assignments investigate video, animation, and a mixture of media in a screen based context.
• Corequisite: ARTF 2221.
• NUpath: Exploring creative expression and innovation.

ARTF 2221 4D Tools (1 SH)
Introduces skills and software used in animating 2D and 3D images, graphics, and forms. Explores the basics of key framing, layering, parenting, 3D modeling, surfacing, and rigging in this technology workshop.
• Corequisite: ARTF 2220.

ARTF 2223 5D Fundamentals: Experience and Drawing (4 SH)
Explores the language of interactive experience as a compelling medium to communicate meaning. Examines how variables within the environment can change how we inhabit an experience physically, conceptually, and emotionally. Studies historical and contemporary examples of art and design projects designed as exchanges or experiences. Incorporates drawing as a means to understand the present and project potential future experiences.
• Corequisite: ARTF 2224.
• NUpath: Exploring creative expression and innovation.

ARTF 2224 5D Tools (1 SH)
Introduces skills and software used in creating basic Web-based content. This technology workshop introduces software using HTML and style sheets such as Adobe Dreamweaver.
• Corequisite: ARTF 2223.

ARTE 1135 Visual Literacy (4 SH)
Examines the ways we create, use, interpret, and analyze images within cultural contexts. Explores the power of visual imagery through readings, discussions, written assignments, and visual projects encouraging purposeful seeing.
• Prerequisite: Not open to Art + Design majors.
• NU Core: Arts level 1.
ARTE 1995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ARTE 2101 Introduction to Co-op (1 SH)
Offers students an opportunity to explore the basics of cooperative education through a careful exploration of aspects of preparation, activity, and reflection—the core of the co-op learning model.
Each week students are asked to delve into different areas of self-assessment, career exploration, goals setting, and skill building.
Covers résumé and cover letter writing, interviewing, self-marketing, and brand identity as well as portfolio basics and how to use the University’s online listing of jobs and other services.
Guests include professionals from Career Services and employers and alumni who seek to give students insights into various arts professions.
• Prerequisite: Restricted to selected Art + Design majors.

ARTE 2500 Art and Design Abroad: Studio (4 SH)
Offers an intensive studio course taken abroad and taught by an art and design faculty member. Exposure to regional artists, history, culture, museums, architecture, and physical geography provide focus of study and creative exploration.
• NU Core: Arts level 1.
• Repeatability: May be repeated without limit.

ARTE 2501 Art and Design Abroad: History (4 SH)
Offers an intensive history course taken abroad and taught by an art and design faculty member. Exposure to regional artists, history, culture, museums, and architecture provide a rich context for studying the history of art and design.
• NU Core: Arts level 1.
• Repeatability: May be repeated without limit.

ARTE 2995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ARTE 3901 Art and Design Special Topics (4 SH)
Offers an art and design course in which format and content are determined by the instructor.
• Repeatability: May be repeated once.

ARTE 3995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ARTE 4901 Special Topics in Art and Design Studio (4 SH)
Offers an art and design studio in which format and content are determined by the instructor.
• Prerequisite: Junior or senior standing; restricted to selected Art + Design majors and combined majors.
• Repeatability: May be repeated without limit.

ARTE 4902 Special Topics in Art and Design History (4 SH)
Offers a seminar in art and design history in which format and content are determined by the instructor.
• Prerequisite: Junior or senior standing; restricted to selected Art + Design majors and combined majors.
• Repeatability: May be repeated without limit.

ARTE 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field.
Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Prerequisite: Restricted to selected Art + Design majors and combined majors.
• Repeatability: May be repeated without limit.

ARTE 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ARTE 4970; restricted to selected Art + Design majors and combined majors.
• Repeatability: May be repeated without limit.

ARTE 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

ARTE 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

ARTE 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.

ARTE 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ARTE 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
ARTE 5901 Special Topics in Art and Design Studio (4 SH)
Offers an opportunity for the intensive study of specialized themes in areas of research in studio and aesthetics related to art and design. Instructor determines format and content.
* Prerequisite: Junior, senior, or graduate standing.

ARTE 6210 Theoretical Approaches to the Visual Arts (4 SH)
Examines a multitude of approaches to the study of art. The critical study of the visual arts is defined by the history of methodology and theoretical constructs. Topics include connoisseurship, style, psychoanalysis, feminism, Marxism, semiotics, and poststructuralism.

ARTE 6211 Art Criticism by Artists (4 SH)
Studies the writings of twentieth- and twenty-first-century artists about their art in relationship to their work. Considers artists ranging from Wassily Kandinsky to Robert Smithson to Adrian Piper as both critics of their work and as creators. Also considers how these roles interrelate.

ARTE 6961 Internship (1 to 4 SH)
Offers students an opportunity for internship work.
* Repeatability: May be repeated up to 4 times.

ARTE 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
* Prerequisite: Restricted to MFA students in interdisciplinary arts.
* Repeatability: May be repeated without limit.

ARTE 6966 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
* Repeatability: May be repeated up to 4 times.

ARTE 6976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
* Repeatability: May be repeated up to 4 times.

ARTE 6984 Research (1 to 4 SH)
Offers students an opportunity to conduct research under faculty supervision.
* Repeatability: May be repeated up to 4 times.

ARTE 7100 Thesis Proposal (4 SH)
Offers candidates an opportunity to select a topic and present a proposal for a topic of study/research to a faculty committee for approval. A definition of the scope of the project, the methodologies for the research, and the assumptions being questioned or analyzed are determined. The thesis research proposal must demonstrate the student’s ability to carry out sustained and independent research to develop critical and specialist knowledge of contemporary topics in a field related to public art. Research includes aspects of scholarship in some or all of the following: theory, semiotics, ontology, phenomenology, and social or critical approaches to cultural studies.
* Prerequisite: ARTD 5002; restricted to MFA students in interdisciplinary arts.

ARTE 7990 Thesis (4 SH)
Offers the candidate, working with a thesis advisor, an opportunity to continue to complete the research project defined and proposed in ARTE 7100. The research is carried out in an independent manner, with periodic presentations to the thesis committee. These presentations define the benchmarks for determination of successful progress in the project. The ultimate result is an exhibition, screening, performance, or other form of public display or presentation, together with a thesis paper or written corollary.
* Prerequisite: ARTE 7100; restricted to MFA students in interdisciplinary arts.

ARTE 7996 Thesis Continuation (0 SH)
Offers continued work on the thesis project.
* Prerequisite: ARTE 7990; restricted to MFA students in interdisciplinary arts.

ARTH 1100 Interactive Media and Society (4 SH)
Offers a critical historical survey of interactive media from analog to digital techniques and from physical to virtual spaces. Examines the social, ethical, and cultural impact of interactive media. Concludes with a study of current issues and directions in interactive media. Through weekly lectures, research projects, and critical analyses, offers students an opportunity to consider current and historical aspects of interactive media and design.
* NU Core: Arts level 1.
* Equivalent: IM 1110 and MMST 3500.
ARTH 1110 Global Art and Design History: Ancient to Medieval (4 SH)
Investigates the history of painting, sculpture, design, and related arts through a study of masterpieces from prehistoric times to the end of the Middle Ages. Offers students an opportunity to become familiar with specific works, styles, and terminology of art and design and to develop an ability to communicate about the visual arts.
• NU Core: Arts level 1.
• NUpath: Interpreting culture, understanding societies and institutions.

ARTH 1111 Global Art and Design History: Renaissance to Modern (4 SH)
Explores the evolving history of painting, sculpture, design, and related arts through a study of masterpieces from the Renaissance to the present. Offers students an opportunity to become familiar with specific works, styles, and terminology of art and design and to develop an ability to communicate about the visual arts.
• NU Core: Arts level 1.

ARTH 2210 Modern Art and Design History (4 SH)
Surveys modernist movements from early to mid-twentieth century. Emphasizes the reciprocal evolution of art and design within cultural and social context.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

ARTH 2211 Contemporary Art and Design History (4 SH)
Offers a study of contemporary culture in an art and design survey from mid-twentieth century to present. Presents a thematic approach to late-modern and postmodernist movements, focusing on interrelationships among media.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

ARTH 2212 Survey of the Still and Moving Image (4 SH)
Examines the history of still and moving images in relationship to other artistic, documentary, and journalistic practices.

ARTH 2213 Nineteenth-Century Art (4 SH)
Explores art from 1780 to 1900. Considers developments such as neoclassicism, romanticism, realism, impressionism, and symbolism in terms of major changes in society: industrialization, Parisian urbanism, photography, Japonisme, the status of women, and the institutions of art. Emphasizes French painting, but developments in Europe and the Americas are considered. Includes museum visits.

ARTH 2214 American Art (4 SH)
Surveys the history of American painting and sculpture. Explores the social and cultural forces as well as the aesthetic and intellectual concerns that shape the evolution of art in the United States. Includes visits to museums and galleries.

ARTH 2215 History of Graphic Design (4 SH)
Follows a chronological survey of graphic design from 4000 BC to the beginning of the twenty-first century, emphasizing work from 1880 to 2000, and the relationship of that work to other visual arts and design disciplines. Demonstrates how graphic design has responded to (and affected) international, social, political, and technological developments since 1450. Traces developments in the areas of typography and publication, persuasion, identity, information, and theory.

ARTH 2217 American Animation Film (4 SH)
Considers the history and influence of American animation as a once- and still-thriving form. Covers topics including the link between modernism and graphic-based animation, the paradigm shift from Disney to Warner Brothers and MGM during the “golden age” (1928–1958), the rise of underground comix and alternative animation of the 1960s–1970s, the status of animation in relation to live-action film (from avant-garde practices to slapstick comedy), the relationships between American and international animation, and the current revolution in CGI and television animation.
• Equivalent: CINE 1400.

ARTH 2220 Recitation for ARTH 2210 (0 SH)
Convenes at galleries and museums to experience, study, and discuss works of art.

ARTH 4500 Arts of the African Diaspora (4 SH)
Traces the historical development of the art forms and production practices of the African Diaspora, from traditional to contemporary styles in Africa, the Americas, and elsewhere in the African Diaspora. Emphasizes the study of art objects, the historical and social context in which aesthetic issues are shaped, and the impact of religion and external forces on creativity. Uses lectures, critiques, discussions, fieldwork, and hands-on interaction with art objects.
• Prerequisite: Junior or senior standing.
• NU Core: Comparative study of cultures.
• Equivalent: AFRS 4500 and ARTH 3410.
ARTH 5100 Contemporary Art Theory and Criticism (4 SH)
Introduces the major critical and philosophical approaches that have transformed the reception, interpretation, and production of contemporary art since the 1960s. Examines a range of key interpretive methodologies—including modernism, postmodernism, psychoanalysis, feminism, Marxism, poststructuralism and deconstruction, critical race theory, visual studies, and globalization—designed to provide practitioners with the means to critically frame their own art making within contemporary debates about the meaning and social functions of art.
• Prerequisite: Senior or graduate standing.

ARTH 5200 Issues in Contemporary Art (4 SH)
Introduces the major artists, movements, and issues that have redefined contemporary art since the late twentieth century. Examines, both critically and historiographically, topics such as conceptualism, earth art, appropriation, installation, street art, identity politics, activist art, performance, globalization, relational art, and new media. Offers an overview aimed at helping students negotiate the relationship between their own artistic practice and global art worlds.
• Prerequisite: Senior or graduate standing.

ARTH 5300 Postmodernism: Theory and Practice in the Visual Arts (4 SH)
Surveys the emergence and evolution of postmodernism’s challenge to modernism through the work of theorists, critics, and visual artists. Explores recent claims that our current globalized and digitized era has generated a new, “post-postmodern” stage of cultural production. Requires students to develop an original intensive research topic, analyze methods of presentation, and present the topic in written form.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing and (b) senior standing or graduate standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ARTH 5400 Contemporary Visual Culture (4 SH)
Explores the implications of the erosion of the traditional boundary between fine art and mass culture for artistic theory and practice as well as art’s place in an increasingly globalized world. Situates contemporary artistic practice within the broader context of visual culture—including film, television, advertising, architecture, and the Internet.
• Prerequisite: Senior or graduate standing.

ARTH 5500 Art and New Media: History and Theory (4 SH)
Surveys the impact of the emergence and evolution of new media technologies on the production, circulation, and criticism of art in the late twentieth century and in the twenty-first century. Topics include video art, multimedia installation, digital photography, and Internet art, as well as the critical and theoretical frameworks that inspired and responded to them.
• Equivalent: ARTH 6300.

ARTH 5902 Special Topics in Art and Design History (4 SH)
Offers an opportunity for the intensive study of specialized themes in areas of research in art history, aesthetics, or critical studies. Format and content are determined by the instructor in this elective in Art + Design history.
• Prerequisite: Senior or graduate standing.
• Repeatability: May be repeated once.

ARTH 6212 The History of the Avant-Garde (4 SH)
Examines the role of the artistic avant-garde from the mid-nineteenth century to the present as it relates to established artistic institutions and radical politics. Considers the most shocking and innovative art of the last century as defined by critical and public response. Explores theories of modernism as well as critiques of the avant-garde.

ARTH 6901 Special Topics in Contemporary Art (1 to 4 SH)
Offers an opportunity for the intensive study of specialized themes and topics in the area of contemporary art history and criticism, such as globalization, gender, identity politics, critical theory, and art in a museum context. Topics vary each time it is offered and are announced in the semester’s course listings. May be taken up to two times with unique topics.
• Repeatability: May be repeated up to 7 times for up to 8 total semester hours.

ARTH 6976 Directed Study (1 to 4 SH)
Offers directed study of a specific topic not normally contained in the regular course offerings but within the area of competence of a faculty member.
• Repeatability: May be repeated without limit.
ART, MEDIA ARTS (ARTD)

ARTD 2100 Narrative Basics (4 SH)
Explores narrative sequence and story development in a variety of story architectures and media combinations, including text, video, music, audio, and design. Uses lectures, in-class workshops, and collaborative projects to expose students to the critical role of narrative in society and interactive media, including games. Offers students an opportunity to develop an interactive media design document over the second half of the semester.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: IM 2100 and MMST 3300.

ARTD 2200 Interactive Narrative (4 SH)
Continues the study of narrative structures from ARTD 2100, emphasizing analysis and development of interactive and experimental new media applications. Offers students an opportunity to explore narrative issues in immersive multimedia and gaming, including dynamic characters and multiuser environments. Students work in teams to develop narrative continuity across multiple media, including alternate-reality games and other forms of multimedia experiences.
- Prerequisite: ARTD 2100 or IM 2100.
- Equivalent: IM 2200.

ARTD 2350 Photo Basics for Nonmajors (4 SH)
Offers a basic photography course that introduces students to the use of camera controls, computer-based image and file management systems, lighting, and final printing. Additionally, books on demand, slide shows, and image archiving are demonstrated and then explored by students. No previous experience is necessary. Does not fulfill major or minor requirements for students within the Department of Art + Design.
- Prerequisite: Not open to majors or selected combined majors in the Department of Art + Design.

ARTD 2360 Photo Basics (4 SH)
Offers an introductory lecture/lab photography class. Explores the technical and theoretical concepts throughout the history of photography. The lab component of the course covers processing, editing, and output of images. Culminates in a final project designed to demonstrate both technical and conceptual knowledge of the medium.
- Prerequisite: ARTF 1122.
- Corequisite: ARTD 2361.

ARTD 2380 Video Basics (4 SH)
Offers an introductory exploration into the moving image as an art form. Covers the fundamental technical and aesthetic aspects of contemporary video production. Emphasizes personal, experimental works from an individual point of view. Analysis of projects is directed toward the development of a personal voice.
- Prerequisite: ARTF 2220.
- Corequisite: ARTD 2381.

ARTD 2381 Video Tools (1 SH)
Introduces intermediate skills and software used in capturing, manipulating, and editing video and audio in this technology workshop.
- Corequisite: ARTD 2380.

ARTD 2370 Animation Basics (4 SH)
Offers an introductory studio course that explores the creative potential of animation. Exposes students to a variety of traditional animation processes and techniques through lectures, demonstrations, and hands-on assignments. Provides an historical survey of animation art through the twentieth century. Emphasizes using the computer to develop concepts creatively while learning the fundamental skills of constructing animated images and forms.
- Prerequisite: ARTF 1120 and ARTF 2220.
- Corequisite: ARTD 2371.
- NUpath: Exploring creative expression and innovation.

ARTD 2371 Animation Tools (1 SH)
Introduces intermediate skills and software used in creating 3D animation. Explores modeling, surfacing, lighting, key framing, and rigging in this technology workshop.
- Corequisite: ARTD 2370.

ARTD 3460 Photography 1 (4 SH)
Continues ARTD 2360, spending significant time on idea generation and research based on contemporary theoretical principles. Explores digital capture and image management in conjunction with project development. Requires a final project based on individual research and the establishment of a concise point of view.
- Prerequisite: ARTD 2360.
- NUpath: Exploring creative expression and innovation.

ARTD 3470 Animation 1 (4 SH)
Introduces the fundamentals of three-dimensional computer animation. Class lectures and demonstrations are followed by substantial hands-on exploration. Students gain fundamental skills for modeling, surfacing, and animating. Projects progress from creating simple geometric objects to realistic organic characters. Basic systems for animating are introduced and explored.
- Prerequisite: ARTD 2370.
ARTD 3471 Virtual Environment Design (4 SH)
Utilizes elements of story and game play in the design of both 2D and 3D environments, integrating architecture, landscape, and set dressing. Introduces real-time procedurally generated terrain and flora, asset optimization, and nonlinear path finding. Explores content ranging from historically accurate and contemporary hyperrealistic to stylized and fanciful.
• Prerequisite: ARTD 2370 and ARTF 1120.

ARTD 3472 Character Design for Animation (4 SH)
Focuses on the development of characters as they relate to game design and animation. Explores, through treatments and synopsis, theme-based character back story, rationale, and visual design. Integrates learning objectives of both 2D and 3D, optimized rigging, movement study, and accessory and prop design.
• Prerequisite: ARTD 2370 and ARTF 1120.

ARTD 3473 Animation for Games (4 SH)
Explores all areas of 3D game asset creation—animation, modeling, shading, effects, and their integration. Working in small groups, students have an opportunity to learn how to construct animated assets that work efficiently within a game programming environment. Encourages students to specialize in at least one area of asset creation.
• Prerequisite: ARTD 3470.
• Equivalent: GAME 3500.

ARTD 3480 Video: Sound and Image (4 SH)
Continues the study of video as an art form. Focuses on the dynamic relationship between sound and the moving image. Begins with audio exercises exploring various aspects of sound design that are integrated into an in-depth video production. Emphasizes the production of innovative video art with powerful visual imagery, complex editing rhythms, and creative sound design.
• Prerequisite: (a) ARTD 2380 or MSCR 1230 and (b) sophomore standing or above.
• NU Core: Mathematical/analytical thinking level 2.

ARTD 3485 Video Art (4 SH)
Constitutes an advanced video production and analysis course. Emphasizes the development of personal vision and building a working knowledge of contemporary video art techniques. Offers students an opportunity to expand conceptual ideas and visual language skills by interrogating concepts of time, movement, light, and space within their working process. Visual research and discussion supplement the studio work.
• Prerequisite: (a) ARTD 2380 or MSCR 1230 and (b) sophomore standing or above.

ARTD 4530 Media Arts Degree Project 1 (4 SH)
Explores the criticism and theory associated with digital art. Offers students an opportunity to apply this knowledge to research in one of the digital media (photography, animation, and video) in preparation for completion of their degree project.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing; restricted to selected Art + Design majors and combined majors.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ARTD 4550 Media Arts Degree Project 2 (4 SH)
Continues ARTD 4530 with intensive project research based on specific theoretical principles chosen by the student. Explores various photographic formats, digital scanning, and Web usage. Requires a final written theoretical and visual project for successful completion of the course.
• Prerequisite: ARTD 4530.

ARTD 4555 Media Arts Degree Project 3 (4 SH)
Continues ARTD 4550. Focuses on building comprehensive modeling, surfaceing, and animation skills. Students develop original content based on course objectives. Complex systems for creating realistic movement are introduced. Exposes students to compositing and animation processes through lectures, demonstrations, and hands-on assignments.
• Prerequisite: ARTD 4570.

ARTD 4570 Animation 2 (4 SH)
Continues ARTD 3470. Focuses on seamless integration of animated three-dimensional models with digital photographic backgrounds. Continued emphasis on building comprehensive modeling, surfaceing, and animation skills. Students develop original content based on course objectives. Complex systems for creating realistic movement are introduced. Exposes students to compositing and animation processes through lectures, demonstrations, and hands-on assignments.
• Prerequisite: ARTD 4570.

ARTD 4575 Animation 3 (4 SH)
Continues ARTD 4570. Focuses on building comprehensive modeling, animation, and compositing skills in this advanced studio course. Students explore creating special effects through seamless mixture of computer-generated imagery and digital video footage. Advanced compositing and lighting techniques are introduced and explored. Students create original characters using organic modeling and surfacing techniques. Exposes students to animation and compositing processes through lectures, demonstrations, and hands-on assignments.
• Prerequisite: ARTD 4570.
• NU Core: Mathematical/analytical thinking level 2.
ARTD 4577 Digital Sculpture and Model Making (4 SH)
Focuses on the potential of sculpture and model making as a means of creative expression and for the communication of visual ideas. Offers students an opportunity to develop formal and technical skills for digital sculpting and the application of those skills for creating tangible models. Explores traditional and digital modeling techniques and utilizes 3D scanning and 3D printing techniques for physical model construction. Examines the historic role of model making and prototyping in the development and creation of fine art, game art, animation, and product design.
• Prerequisite: ARTF 1124 or permission of instructor.

ARTD 4660 Studio Photography (4 SH)
Examines studio practices and lighting techniques. Offers students an opportunity to obtain a thorough understanding and working knowledge of contemporary practice in the photography studio. Includes comprehensive exercises and assignments with various types of lighting equipment.
• Prerequisite: ARTD 2360.

ARTD 4661 Alternative Photographic Processes (4 SH)
Focuses on analog-based conventional black-and-white photography. Explores, demonstrates, and uses nineteenth- and twentieth-century photographic processes to explore alternative delivery systems for creative and professional applications.
• Prerequisite: ARTD 2360.

ARTD 4670 Media Arts Degree Project 2 (4 SH)
Continues ARTD 4530. Offers students an opportunity to research and produce a final semester project and a written thesis.
• Prerequisite: ARTD 4530 and junior or senior standing; restricted to selected Art + Design majors and combined majors.
• NU Core: Capstone, experiential learning.
• NUpath: Demonstrating thought and action in a capstone.

ARTD 4682 Video in Context: Video and Social Change (4 SH)
Offers students an opportunity to apply and refine video production skills to develop an advanced project of broad interdisciplinary significance. Introduces students to established and emerging media genres, advanced research and analysis, and activist video practices for project development. This is a hybrid lecture/studio course that incorporates screening with guest directors to consider a variety of theoretical and practical approaches to societal change and to the potential of video arts for a politics of visual representation, critical analysis, and empowerment.
• Prerequisite: (a) ARTD 2380 or MSCR 1230 and (b) junior or senior standing.

ARTD 5001 Arts in the Public Sphere Seminar 1 (4 SH)
Examines a multitude of approaches to the creation and study of arts in the public sphere, including theory, methods, aesthetic debates, and professional practices as they have evolved in the field over time. Includes regularly scheduled critique, review, and defense of the students’ ongoing bodies of work, as well as group experiential learning projects that allow students to interact with leading practitioners, curators, and institutions in the field. The course paves the way toward the development of a thesis project and seeks to foster growth as practicing artists, designers, and professionals in the creative culture industry.
• Prerequisite: Senior or graduate standing; arts, media and design students only.

ARTD 5002 Arts in the Public Sphere Seminar 2 (2 SH)
Continues the study of arts in the public sphere from ARTD 5001.
• Prerequisite: ARTD 5001 and senior or graduate standing; arts, media and design students only.

ARTD 5101 Interactive Media Arts 1 (4 SH)
Examines in-depth the issues involved in new media performance and interactive technologies that are used in or mediate performances, artworks, or installations. Emphasizes the ways in which current art intersects with ideas in the larger cultural context. Introduces methods of creative research and thematic development that results in a unique individual and/or stylistic expression. Offers students an opportunity to develop an individual approach to the interactive media art form that results in original works of art. Introduces concepts and practices of scripted interactive media including, but not limited to, Processing, Flash, JavaScript, and hardware such as Arduino.
• Prerequisite: Senior or graduate standing; arts, media and design students only.

ARTD 5202 Photographic Media in Cultural Context (4 SH)
Examines the various approaches to contemporary photographic theory in conjunction with their portfolio work. Explores the many ways photography can be produced and experienced by investigating current cultural influences and technologies. Requires students to demonstrate an understanding of the various criteria used for making critical judgments about the visual arts, including the relationship of visual culture within a societal context. Using this individual approach to their photography, students are expected to develop a body of work that expresses their intent.
• Prerequisite: Senior or graduate standing; arts, media and design students only.
ARTD 5301 Independent Research Project 1 (4 SH)
Offers students an opportunity to independently create practice-based design of new media performance or experiences. Expect students to independently research interactive technologies used in contemporary-based artworks. Under faculty mentorship, students independently explore methods of creative research and thematic development that result in a unique individual and/or stylistic expression in original works of art. Includes student presentations of ongoing research and works in progress to faculty for assessment.

- Prerequisite: ARTD 5101 and graduate standing; arts, media and design students only.

ARTD 5582 Collaborative Video and Community Engagement (4 SH)
Offers students an opportunity to explore the process of collaborative video making with a focus on the ethics and social dynamics of civic engagement in this video production course. Expect students to participate in interactive team-based production labs that mix theoretical analysis and technical training. Examines different theories that inform conceptualizations of social justice and ethics. Explores different forms of authorship, video genres, and digital tools for collaboration ranging from crowdsourcing to remix platforms. Offers students an opportunity to produce reflection papers on the process of collaboration and engagement with diversity, as well as video art projects for organizations working on campus and in the Boston area.

- Prerequisite: (a) ARTD 2380 or MSCR 1230 and junior or senior standing or (b) graduate standing.
- NUpath: Engaging difference and diversity, employing ethical reasoning, integrating knowledge and skills through experience.
- Equivalent: ARTD 4582.

ARTD 6001 Arts in the Public Sphere Seminar 3 (2 SH)
Continues the study of arts in the public sphere from ARTD 5002.

- Prerequisite: ARTD 5002 and graduate standing; arts, media and design students only.

ARTD 6002 Arts in the Public Sphere Seminar 4 (2 SH)
Continues the study of arts in the public sphere from ARTD 6001.

- Prerequisite: ARTD 6001 and graduate standing; arts, media and design students only.

ARTD 6101 Interactive Media Arts 2 (4 SH)
Continues ARTD 5101. Focuses on further research and creative development of a thematic approach to interactive media and installation as an art form. Offers students an opportunity to continue to develop an individual approach and expression in the media art that results in original artworks, installation, or digitally mediated experiences. The course goals are to advance interactive media practices resulting in unique exploration in the creation of innovative systems, installations, or experiences. Continues the study of methods for creative research and thematic development that results in a unique individual and/or stylistic expression.

- Prerequisite: ARTD 5101 and graduate standing; arts, media and design students only.

ARTD 6201 Interactive Mobile Art Apps (4 SH)
Focuses on the creation of interactive art-based mobile apps and media. Drawn from a conceptual focus on interactive narrative and experiences, offers students an opportunity to explore mobile media as a vehicle for creative expression. Seeks to reinforce student knowledge of user-centric design processes and interaction strategies with the goal of understanding psychological and behavioral aspects of user experience as applied to conceptually oriented art and narrative projects. Surveys mobile apps in multiple environments, and introduces codebase libraries, resources, and methods for the creation of engaging interactive media content.

- Prerequisite: ARTD 5101 and graduate standing; arts, media and design students only.

ARTD 6301 Independent Research Project 2 (4 SH)
Continues ARTD 5301. Following through with creative and thematic development in practice-based research modality, offers students an opportunity to work independently to develop a creative project in an area related to public artworks that are interactive, audience- and viewer-responsive, or investigate how artworks define or alter public space. Under faculty mentorship, students work independently to develop and pursue a topic through to completion and presentation. The expectation is that realizable art, design, or media work; creative development; scholarly presentation; or other recognizable tangible result is achieved and presented to the faculty and to the public.

- Prerequisite: ARTD 5301 and graduate standing; arts, media and design students only.
ARTS 2330 Sculpture Basics (4 SH)
Offers a studio course with an in-depth exploration into the process of creating sculpture. Builds on the introductory experience of ARTF 1124, with more advanced 3D concepts, materials, tools, and techniques. Emphasizes personal exploration, concept development, and creative innovation. Exposes students to sculpture through lectures, demonstrations, critiques, and hands-on assignments.
- Prerequisite: (a) ARTF 1124 or permission of instructor and (b) sophomore standing or above.
- Repeatability: May be repeated up to 2 times.

ARTS 2340 Painting Basics (4 SH)
Presents an introductory studio course in the fundamental techniques of painting. Formal problems in the study of color, light, space systems, form, and composition establish the foundation for more individual creative expression. Uses critiques and slide lectures as needed.
- NUpath: Exploring creative expression and innovation.

ARTS 2341 Figure Drawing (4 SH)
Focuses on developing the student’s awareness of the structure of the figure as well as the emotive qualities of “figuration.” Students draw from a model in each class. They also develop drawings based on the political and social concerns of contemporary culture and the role of gender as seen through “image.”
- NUpath: Exploring creative expression and innovation.

ARTS 3449 Drawing in Mixed Media (4 SH)
Offers an upper-level course designed for students who want to explore the ever-changing discipline of drawing, which has now become a medium that stands on its own. Explores a range of media for generating drawings, including traditional techniques and computer-based media. Emphasizes open-ended application and interpretation of drawing as a medium. Requires students to attend lectures and exhibitions and keep a journal.

ARTS 4540 Art Degree Project 1 (4 SH)
Draws on a range of theoretical and critical texts that address current issues and methodologies in art. Offers students an opportunity to complete writing assignments and to visit local artist studios, galleries, and museums. Writing and discussions are designed to lead to identification of a focus for ARTS 4541.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) senior standing; art majors only.
- NU Core: Writing intensive in the major.
- NUpath: Exploring creative expression and innovation, writing intensive in the major.

ARTS 4541 Art Degree Project 2 (4 SH)
Introduces nontraditional art concepts in an intensive studio course. Includes categories of performance art, installation art, electronic art, multimedia, and kinetic art. Using their own frames of reference and experience, students contribute to a collaborative project and are responsible for keeping a journal that helps them formulate their ideas. Students reflect upon their co-op, internships, and other art-related experiences in a written essay that accompanies their final product.
- Prerequisite: ARTS 4540 and junior or senior standing; art majors only.
- NU Core: Capstone, experiential learning.
- NUpath: Exploring creative expression and innovation, demonstrating thought and action in a capstone.

ARTS 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

ARTS 4997 Thesis (4 SH)
Focuses on the production of a twenty- to thirty-page thesis. Students do individual research under the direction of a faculty member on art-historical topics appropriate to their personal and professional interests. Conceived for art majors who are completing the Bachelor of Arts degree and whose primary interest is in art history. Fulfills the Arts and Sciences experiential education requirement for art/art history.

ARTS 5100 Visual Ideation (4 SH)
Explores drawing in a variety of media that communicate critical and analytical thinking about arts in the public sphere. Offers students an opportunity to learn how to use drawing and visualization to communicate effectively in a variety of media, either on paper or in digital media. Students can use collage, photo, digital media, and freehand drawing to express ideas for larger environmental and public projects. (Drawing is the way that artists such as Christo propose large-scale projects and is a viable way to secure acceptance of an idea.)
- Prerequisite: Senior or graduate standing; arts, media and design students only.

ARTS 6000 Studio (4 SH)
Offers students an opportunity to be mentored by a faculty member while completing the studio art portion of the master’s degree.
- Prerequisite: Restricted to NU-only MFA students.
- Repeatability: May be repeated up to 4 times.
ARTS 7896 Studio Continuation (0 SH)
Continues Art + Design studio work under the supervision of a departmental faculty member. Culminates for the successful student in approval of a thesis exhibition and/or written corollary for master’s-level work.
• Prerequisite: ARTS 6000 or SMFA 6000; open to NU/SMFA and NU-only MFA students.
• Repeatability: May be repeated up to 2 times.

ARTS ADMINISTRATION AND CULTURAL ENTREPRENEURSHIP (AACE)

AACE 6000 Arts and Culture Organizational Leadership (3 SH)
Offers an overview and introduction to leadership knowledge areas, tools, and skills sets for the arts and culture sector. Key topics include issues and challenges in the management of arts-oriented organizations, leadership characteristics and techniques for arts and culture teams, balancing organizational priorities with artistic vision and values, board formation and management, audience outreach, and operational practices. Focuses on the administration of people and processes to communicate mission; realize goals; and effectively manage the creative resources, human resources, and financial challenges of nonprofit arts and cultural organizations.

AACE 6010 Planning for Arts and Cultural Organizations (3 SH)
Offers an overview and introduction to knowledge areas and primary skills sets for planning, launching, and sustaining arts and cultural organizations. Key topics include evaluating opportunities in the arts and culture sector; building effective vision, mission, and values for arts and culture initiatives in balance with civic and community contexts; smart approaches to arts and culture funding; developing sustainable and flexible strategic plans; and planning challenges for the contemporary strategic arts organization.

ASIAN STUDIES (ASNS)

ASNS 1150 East Asian Studies (4 SH)
Seeks to provide an understanding of the constituent characteristics that originally linked East Asia as a region and the nature of the transformations that have occurred in the region over the last two thousand years. Concentrates on China and Japan, and addresses Korea and Vietnam where possible. Also seeks to provide students with effective interdisciplinary analytical skills as well as historical, ethical, cultural diversity, and aesthetic perspectives.
• Cross-list: HIST 1150.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: HIST 1150.

ASNS 1151 Recitation for ASNS 1150 (0 SH)
Provides small-group discussion format to cover material in ASNS 1150.

ASNS 1160 Introduction to South Asian Studies (4 SH)
Takes a multidisciplinary approach in exploring the formation of contemporary South Asia, with a focus on Bangladesh, India, Pakistan, and Sri Lanka. Examines the history of the region, from dawn of the colonial era to present times, seeking to understand the roots of the region’s social, cultural, and political development.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Understanding societies and institutions.

ASNS 2245 The Asian-American Experience (4 SH)
Examines the impact of Asian immigrant communities on U.S. political, economic, social, and cultural life and their encounters with racial, political, and economic discrimination from the nineteenth century to the present.
• NU Core: Comparative study of cultures, social science level 1.
• Equivalent: HIST 1245.

ASNS 3422 Topics in Chinese Studies (4 SH)
Covers special topics in Chinese studies.
• Repeatability: May be repeated without limit.

ASNS 3444 Topics in Japanese Studies (4 SH)
Covers special topics in Japanese studies.
• Repeatability: May be repeated without limit.

ASNS 4900 Asian Studies Capstone Directed Study (4 SH)
Offers independent intensive reading and writing on key interdisciplinary issues in Asian studies under the direction of faculty members in Asian studies on a topic chosen in consultation with the instructor.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

ASNS 4910 Issues in Modern and Contemporary Asia (4 SH)
Offers intensive reading and writing on key interdisciplinary issues in Asian studies, such as oceanic trade, empire, postcolonialism, civil-military relations, religion and politics, food security, human rights, economic and social justice, and environmental degradation.
• Prerequisite: Junior or senior standing.
ASNS 4920 Asian Studies Capstone Seminar (4 SH)
Offers advanced reading, research, and writing on a major topic of broad interdisciplinary significance in Asian studies, such as pan-Asianism; medicine and disease in Asia; Asian interactions with the West; orientalism, anticolonialism, and nationalism in modern Asia; gender transformations and women’s movements in Asia; modern thought in East and South Asia.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

ASNS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

ASNS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ASNS 4970.
• Repeatability: May be repeated without limit.

ASNS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

ASNS 4992 Directed Study (1 to 4 SH)
Offers students an opportunity for special readings and research in asian studies.
• Repeatability: May be repeated without limit.

ASNS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

ASNS 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ASNS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

BEHAVIORAL NEUROSCIENCE (BNSC)

BNSC 1000 Behavioral Neuroscience at Northeastern (1 SH)
Introduces first-year and new transfer students to the major and the field of behavioral neuroscience and to the professional and academic resources available to students at Northeastern University. Acquaints students with their faculty, advisors, and fellow students; provides an initial orientation to undergraduate research, cooperative education, study abroad, and other experiential learning options; familiarizes students with academic support resources and leadership opportunities; provides grounding in the culture and values of the university community—in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Behavioral neuroscience majors only.
• Equivalent: BIOC 1000, BIOL 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

BIOCHEMISTRY (BIOC)

BIOC 1000 Biochemistry at Northeastern (1 SH)
Introduces first-year students to the major and the field of biochemistry and to the professional and academic resources available to students at Northeastern University. Acquaints students with their faculty, advisors, and fellow students; provides an initial orientation to undergraduate research, cooperative education, and other experiential learning options; helps develop the academic skills necessary to succeed; provides grounding in the culture and values of the university community; and assists in interpersonal skill development—in short, familiarizes students with the resources and skills needed to become a successful university student.
• Equivalent: BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

BIOC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

BIOC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: BIOC 4970.
• Repeatability: May be repeated without limit.
BIOC 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

BIOENGINEERING (BIOE)

BIOE 2000 Introduction to Engineering Co-op Education (1 SH)
Seeks to prepare students for the first co-op experience. Focuses on skills that provide a basis for successful co-op engagement including expectations and requirements, an introduction to professional credentials, résumé construction, self-assessment and goal setting, interviewing, professional and co-op ethics, issues of diversity in the workplace community, academic planning and decision making, and an introduction to career portfolios.
• Prerequisite: GE 1000 and sophomore standing or above; engineering students only.

BIOE 2060 Special Topics in Bioengineering (4 SH)
Focuses on topics of timely interest to students of science and engineering. Topic varies from semester to semester. When appropriate, the course takes advantage of unique opportunities afforded by visiting faculty and guests.
• Prerequisite: Restricted to students in the College of Engineering, the College of Computer and Information Science, Bouvé College of Health Sciences, and the College of Science.
• Repeatability: May be repeated up to 3 times.

BIOE 2350 Biomechanics (4 SH)
Designed to acquaint students with concepts of stress, strain, and constitutive laws as applied to problems in biomechanics. Introduces rigid body and deformable body mechanics. Focuses on basic foundations of solid mechanics using vectors and tensors. Illustrative examples from tissue and cell biomechanics are given where appropriate.
• Prerequisite: (a) BIOL 1111 or BIOL 1115 and (b) MATH 1342 and (c) PHYS 1151, PHYS 1161, or PHYS 1171; bioengineering students only.

BIOE 2355 Quantitative Physiology for Bioengineers (4 SH)
Introduces engineering and science students to core knowledge and understanding of physiological systems and processes. Focuses on quantitative analysis of human physiological systems. Topics include the physical and chemical foundations of physiology; coupled forces and flows; electrical, mechanical, and chemical potentials and their conjugated fluxes; and the physiology of excitable tissue. Examines cell structure, function, and homeostasis with a particular focus on membrane transport, osmotic pressure, cell signaling, and cellular energetics.
• Prerequisite: (a) MATH 2341 or GE 2361 (either may be taken concurrently) and (b) CHEM 1151, CHEM 1211, or CHEM 1217 and (c) PHYS 1155, PHYS 1165, or PHYS 1175 (any of which may be taken concurrently); restricted to students in the College of Engineering and the College of Science.

BIOE 2365 Bioengineering Measurement, Experimentation, and Statistics (4 SH)
Introduces the fundamentals of biomedical data acquisition and statistical analysis. Engineering statistics topics include descriptive statistics, probability distributions, hypothesis testing, analysis of variance, and experiment design. Applies these statistical topics by analyzing data obtained from laboratory exercises in BIOE 2366. Laboratory exercise topics include cell culture, mechanical testing, modeling medical imaging data, 3D printing, and bioprinting. Emphasizes using MATLAB software to analyze data on the computer.
• Prerequisite: (a) BIOL 1111 or BIOL 1115 (either of which may be taken concurrently) and (b) MATH 1342 (which may be taken concurrently) and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; restricted to students in the College of Engineering and in the College of Science.
• Corequisite: BIOE 2366.
• NU Core: Writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major.

BIOE 2366 Lab for BIOE 2365 (1 SH)
Offers associated laboratory exercises for BIOE 2365. Requires lab reports from all students.
• Corequisite: BIOE 2365.
BIOE 3000 Professional Issues in Engineering (1 SH)  
**Effective Spring 2017**

Offers students an opportunity to reflect on both academic and co-op experiences in the context of planning for the senior year and beyond. Topics include professional and ethical issues; resolving ethical conflicts; awareness of engineers as professionals in a diverse world; strengthening decision-making skills; career portfolios; and lifelong learning needs, goals, and strategies. Students reflect upon issues of diversity from their experience in the university and in their cooperative education placements. Explores the role of different work and learning styles and diverse personal characteristics in the workplace and the classroom. Professional issues include impact of the cultural context, both in the United States and around the world, on the client, government relations, and workplace.

- **Prerequisite:** Junior or senior standing; engineering students only.
- **NU Core:** Comparative study of cultures.

BIOE 3210 Bioelectricity (4 SH)

Discusses principles of circuits, signals, and systems in the context of operating principles of bioelectrical systems at multiple physiological scales. Offers students an opportunity to obtain the fundamental background required to interface biological systems with circuits and sensors for measurements. Covers fundamentals of structure and function of electrically active tissue including nerves, brain, and muscle, including heart.

- **Prerequisite:** BIOE 2355, BIOE 2365, and GE 2361; restricted to students in the College of Engineering and in the College of Science.

BIOE 3310 Transport and Fluids for Bioengineers (4 SH)

Covers the fundamental principles of processes and systems in which mass, energy, and momentum are transported in typical biological problems. Emphasizes momentum transport for incompressible and compressible fluids (fluid flow) and energy transport. The methods taught are relevant to the analysis of physiological systems, processing, and separation of biological materials.

- **Prerequisite:** (a) BIOE 2355 and (b) GE 2361, MATH 2321, or MATH 2341; restricted to students in the College of Engineering and in the College of Science.

BIOE 3380 Biomolecular Dynamics and Control (4 SH)  
**Effective Spring 2017**

Focuses on the principles of thermodynamics and kinetics applied to the analysis and design of biomolecular systems. Covers foundational topics—such as mass and energy balances, chemical equilibria, and enzyme kinetics—in a biological context. Introduces the role of feedback and feed-forward control in biomolecular networks, emphasizing basic analytical and computational methods, including the use of MATLAB, for analyzing how these regulatory structures affect the dynamics of small-scale, prototypical networks.

- **Prerequisite:** BIOE 2355 and GE 2361; restricted to students in the College of Engineering and in the College of Science.

BIOE 3380 Biomolecular Dynamics and Control (4 SH)  
**Effective Spring 2017**

Focuses on the principles of thermodynamics and kinetics applied to the analysis and design of biomolecular systems. Topics include mass and energy balances, entropy, chemical equilibria, enzyme kinetics and the effect of external fields (e.g., mechanical forces, electric potential) on biomolecular reaction equilibria and kinetics. In the latter portion of the course, these foundational concepts are applied to natural biomolecular networks and synthetic biocircuits with the purpose of analyzing their dynamical behavior and using feedback and feedforward control to design and affect their dynamics.

- **Prerequisite:** BIOE 2355 and GE 2361; restricted to students in the College of Engineering and in the College of Science.

BIOE 4790 Capstone Design 1 (4 SH)  
**Effective Spring 2017**

Offers students an opportunity to apply design principles to create a device or process to solve a relevant bioengineering problem. Teams develop, construct, and evaluate prototypes under real-world fiscal, regulatory, and safety conditions. Progress is monitored through a series of oral presentations in design gate review meetings. Requires a thorough written report and working prototype for course completion.

- **Prerequisite:** Senior standing; bioengineering majors only.
- **NU Core:** Capstone, writing intensive in the major.
- **NUpath:** Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.

BIOE 4970 Junior/Senior Honors Project 1 (4 SH)

Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.

- **Repeatability:** May be repeated without limit.
BIOE 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- Prerequisite: BIOE 4970.
- Repeatability: May be repeated without limit.

BIOE 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Engineering students only.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

BIOE 4992 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department under a chosen topic. Course content depends on instructor.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated without limit.

BIOE 5060 Special Topics in Bioengineering (4 SH)
Focuses on topics of timely interest to students of science and engineering. Topic varies from semester to semester. When appropriate, the course takes advantage of unique opportunities afforded by visiting faculty and guests.
- Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Engineering, the College of Computer and Information Science, Bouvé College of Health Sciences, and the College of Science.
- Repeatability: May be repeated once.

BIOE 5100 Medical Physiology (4 SH)
Designed to provide bioengineering students with a working knowledge of the integrated behavior of organs and systems in the human body. As such, the student is provided with a comprehensive and intense immersion in each physiological subsystem with the expectation that he or she display knowledge of each at the level equivalent to that of a second-year medical student following his or her exposure to physiology. The specific subsystems covered are muscle physiology, cardiovascular physiology with ECG interpretation, pulmonary physiology with gas exchange mechanics and ventilation/perfusion, renal physiology and water balance, regulation of pH, gastrointestinal physiology, temperature regulation and energy balance, endocrine systems, and reproductive systems. The course does not cover neurophysiology.
- Prerequisite: BIOL 1117 or equivalent and senior or graduate standing.

BIOE 5235 Biomedical Imaging (4 SH)
Effective Spring 2017
Presents the foundations of modern medical imaging, including imaging principles, imaging mathematics, imaging physics, and image-generation techniques. Includes X-ray, ultrasound, computed tomography, and magnetic resonance imaging.
- Prerequisite: Junior, senior, or graduate standing; restricted to students in the Bouvé College of Health Sciences, the College of Engineering, and the College of Science.

BIOE 5250 Design, Manufacture, and Evaluation of Medical Devices (4 SH)
Covers engineering design challenges intrinsic to the development of biomedical devices, including clinical evaluation, manufacture, and testing of medical devices and the constraints that FDA regulations place on these processes. Topics include quality systems, design control, cybersecurity concerns, the role of standards in global device regulation, and the design process. Students are asked to form teams and to carry out a semester-long conceptual design project to develop a design overview, design plan, design input specifications, and verification test procedures for a novel medical device.
- Prerequisite: Junior, senior, or graduate standing; restricted to students in the Bouvé College of Health Sciences, the College of Engineering, and the College of Science.

BIOE 5320 Advanced Biomedical Measurements and Instrumentation (4 SH)
Offers a comprehensive analysis of the principles underlying biomedical instrumentation, including ECG, EEG, CAT scanning, MRI imaging, and other biomedical laboratory tools. Includes associated laboratory exercises within the course material.
- Prerequisite: (a) BIOE 2365 and junior or senior standing or (b) graduate standing; engineering students and science students only.
BIOE 5380 Advanced Biomolecular Dynamics and Control (4 SH)

Effective Spring 2017

Applies the foundational principles of thermodynamics and kinetics to the analysis and design of biomolecular systems. Briefly reviews mass and energy balances, chemical equilibria, and enzyme kinetics. Emphasizes more advanced topics, such as the effect of external fields (e.g., mechanical forces, electrical potential) on biomolecular reaction equilibria and kinetics, the spatiotemporal dynamics of reactions in the context of mass transport, and the effect of spatial compartmentation on biomolecular propagation of information. Examines the role of feedback and feedforward control in biomolecular networks, focusing on analyzing how these regulatory structures affect adaptation and oscillatory behavior of small- and large-scale networks.

• Prerequisite: Junior, senior, or graduate standing; intended for students in the College of Engineering and in the College of Science; students from other disciplines are invited to enroll—requires prior knowledge of differential and integral calculus, systems of ordinary differential equations and linear algebra, coding in Matlab, and familiarity with chemical kinetics and thermodynamics.

BIOE 5410 Molecular Bioengineering (4 SH)

Introduces the fundamentals of molecular biology underpinning applications in molecular, cellular, and tissue engineering. Emphasizes core concepts, quantitative analyses, high-throughput advanced “-omics” techniques, and multiscale systems approaches. Explores the experimental logic and techniques used to study molecular biology and develop quantitative models.

• Prerequisite: (a) CHEM 2311, MATH 1342, either BIOL 1111 or BIOL 1115, and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5420 Cellular Engineering (4 SH)

Analyzes the techniques that form the foundation of molecular cell engineering, including recombinant DNA, cloning and genomics, prokaryotic and eukaryotic gene regulation and single-cell gene expression, structure, dynamics of gene regulatory networks, metabolism and cellular energetics, cell structure, cytoskeleton and cellular motors, synthetic gene circuits, and metabolic engineering.

• Prerequisite: (a) BIOE 5410 and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5430 Principles and Applications of Tissue Engineering (4 SH)

Applies the principles of biology and biomedical engineering to the creation of artificial organs for transplantation, basic research, or drug development. Requires integration of knowledge of organic chemistry, cell biology, genetics, mechanics, biomaterials, nanotechnology, and transport processes to create functional organs. Reviews basic cell culture techniques, structure function relationships, cellular communication, natural and artificial biomaterials, and the basic equations governing cell survival and tissue organization.

• Prerequisite: (a) BIOE 5410 and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5435 Principles and Applications of Tissue Engineering (4 SH)

Effective Spring 2017

Applies the principles of biology and biomedical engineering to the creation of artificial organs for transplantation, basic research, or drug development. Requires integration of knowledge of organic chemistry, cell biology, genetics, mechanics, biomaterials, nanotechnology, and transport processes to create functional organs. Reviews basic cell culture techniques, structure function relationships, cellular communication, natural and artificial biomaterials, and the basic equations governing cell survival and tissue organization.

• Prerequisite: (a) BIOE 5410 and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5440 Physiological Fluid Mechanics (4 SH)

Analyzes biofluids and their mechanics, including cardiovascular fluid mechanics. Examples are taken from biotechnology processes and physiologic applications, including the cardiovascular, respiratory, ocular, renal, musculoskeletal, and gastrointestinal systems. Topics include dimensional analysis, particle kinematics in Eulerian and Lagrangian reference frames, constitutive equations and Newtonian/non-Newtonian biofluid models, flow and wave propagation in flexible tubes, and oscillatory and pulsatile flows.

• Prerequisite: (a) BIOE 2355 and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5460 Biomedical Engineering Principles and Applications (4 SH)

Applies the principles of biology and engineering underlying the design and use of biomedical instrumentation. Topics include design of a broad range of instrumentation and monitoring devices, sensors, and integrated systems.

• Prerequisite: (a) BIOE 2350, BIOE 2365, and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5500 Principles and Applications of Tissue Engineering (4 SH)

Examines the role of feedback and feedforward control in biomolecular networks, focusing on analyzing how these regulatory structures affect adaptation and oscillatory behavior of small- and large-scale networks.

• Prerequisite: Junior, senior, or graduate standing; intended for students in the College of Engineering and in the College of Science; students from other disciplines are invited to enroll—requires prior knowledge of differential and integral calculus, systems of ordinary differential equations and linear algebra, coding in Matlab, and familiarity with chemical kinetics and thermodynamics.

BIOE 5610 Design of Biomedical Instrumentation (4 SH)

Investigates the principles of biology and engineering underlying the design and use of biomedical instrumentation. Topics include design of a broad range of instrumentation and monitoring devices, sensors, and integrated systems.

• Prerequisite: (a) BIOE 2350, BIOE 2365, and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.

BIOE 5620 Biomaterials (4 SH)

Offers a broad overview of the field of biomaterials (materials used in medical devices that interact with living tissues). Introductory lectures cover biomaterials and their translation from the laboratory to the medical marketplace. Discusses important biomaterials terminology and concepts. Emphasizes material structure-property-function-testing relationships and discusses specific materials used in medical devices and drug delivery. Concludes with introductions to topics in the field, such as biomaterials-tissue interactions, tissue engineering, and regulatory requirements. Considers principles of device design as related to the selection and application of biomaterials.

• Prerequisite: (a) CHEM 2311, MATH 1342, either BIOL 1111 or BIOL 1115, and junior or senior standing or (b) graduate standing; restricted to students in the College of Engineering and in the College of Science.
BIOE 5850 Design of Implants (4 SH)
**Effective Spring 2017**
Studies the use of cell-matrix control volumes; stress analysis in design processes; anatomical fit, shape, and size of implants; biomaterials; surgical implantation procedures; testing for safety and efficacy; and design of clinical trials. Covers applications to orthopedic devices, soft tissue implants, artificial organs, and dental implants.

*Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Engineering and the College of Science.*

BIOE 6000 Principles of Bioengineering (1 SH)
Covers the fundamentals of bioengineering research topics and methodology for master’s-level bioengineering students. Internal and external speakers discuss general topics in bioengineering, including the medical device qualification and regulatory environment, tissue engineering, cell engineering, mechanobiology, drug delivery, bioimaging, neuromotor control, and effective design of experiments. Each student is expected to read, critically evaluate, and present research in a peer-reviewed bioengineering journal article.

*Prerequisite: Bioengineering students only.*

BIOE 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.

*Prerequisite: ENCP 6000 or ENCP 6100.*

*Repeatability: May be repeated without limit.*

BIOE 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.

*Prerequisite: Engineering students only.*

*Repeatability: May be repeated without limit.*

BIOE 7000 Principles of Bioengineering (4 SH)
Designed to introduce new graduate bioengineering students to the fundamentals of bioengineering research topics and methodology. Includes outside speakers to discuss general topics in bioengineering. Examples of course topics include the medical device qualification and regulatory environment, tissue engineering, cell engineering, mechanobiology, drug delivery, bioimaging, neuromotor control, effective design of experiments, writing research proposals for the National Institutes of Health (NIH) and how to evaluate and write a peer-reviewed journal article, etc. Expects students to read, critically evaluate, and present the research in a bioengineering journal article. Students are then expected to extend their article into a hypothesis-driven proposal in NIH format with an oral defense of the proposal.

*Prerequisite: Bioengineering PhD students only.*

BIOE 7001 Biomaterials (4 SH)
Introduces biomaterials science. Reviews the design of medical implants, artificial organs, and engineered matrices. The development of modern day biomaterials is tracked by introducing the student to first-, second-, and third-generation biomaterials. Students are guided from the earliest ad-hoc materials to advanced tissue-engineered constructs. Examines the challenges of implantation of materials, including developing an understanding of the material design requirements and an understanding of the host response. Covers regulatory standards for the design of materials for use in vivo. Studies the molecular and cellular interactions with biomaterials designed to act as scaffolds for later implantation into host systems.

*Prerequisite: Engineering students only.*

BIOE 7100 Special Topics in Biomedical Imaging and Signal Processing (4 SH)
**Effective Spring 2017**
Offers various topics of interest in biomedical imaging and signal processing for advanced study depending on the interests of the faculty and students.

*Prerequisite: Restricted to students in the College of Engineering, the College of Science, and Bouvé College of Health Sciences.*

*Repeatability: May be repeated up to 2 times.*

BIOE 7200 Special Topics in Cell and Tissue Engineering (4 SH)
**Effective Spring 2017**
Offers various topics of interest in cell and tissue engineering for advanced study depending upon the interests of the faculty and students.

*Prerequisite: Restricted to students in the College of Engineering, the College of Science, and Bouvé College of Health Sciences.*

*Repeatability: May be repeated up to 2 times.*

BIOE 7300 Special Topics in Biomechanics (4 SH)
**Effective Spring 2017**
Offers various topics of interest in biomechanics for advanced study depending upon the interests of the faculty and students.

*Prerequisite: Restricted to students in the College of Engineering, the College of Science, and Bouvé College of Health Sciences.*

*Repeatability: May be repeated up to 2 times.*

BIOE 7374 Special Topics in Bioengineering (4 SH)
Offers topics of interest to the staff member conducting the course for advanced study.

*Prerequisite: Graduate standing or permission of instructor.*

*Repeatability: May be repeated without limit.*
BIOE 7390 Seminar (0 SH)
Presents topics of an advanced nature by staff, outside speakers, and students in the graduate program. This course must be attended every semester by all full-time graduate students.
• Prerequisite: Bioengineering students only.
• Repeatability: May be repeated without limit.

BIOE 7400 Special Topics in Biomedical Devices (4 SH)
Effective Spring 2017
Offers various topics of interest in biomedical devices for advanced study depending upon the interests of the faculty and students.
• Prerequisite: Restricted to students in the College of Engineering, the College of Science, and Bouvé College of Health Sciences.
• Repeatability: May be repeated up to 2 times.

BIOE 7890 Master's Project (4 SH)
Offers analytical and/or experimental work leading to a written report and a final short presentation by the end of the semester.
• Prerequisite: Bioengineering students only.

BIOE 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated for up to 16 total semester hours.

BIOE 7990 Thesis (4 SH)
Offers analytical and/or experimental work conducted under the auspices of the department.
• Prerequisite: Bioengineering students only.
• Repeatability: May be repeated once.

BIOE 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: Bioengineering students only.

BIOE 8960 Exam Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Bioengineering students only; intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
• Repeatability: May be repeated once.

BIOE 8986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

BIOE 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of program requirements for PhD candidacy.

BIOE 9984 Doctoral Research (1 to 8 SH)
Investigates doctoral research topics under supervision of an individual faculty member.
• Prerequisite: Bioengineering PhD students only.
• Repeatability: May be repeated up to 15 times for up to 16 total semester hours.

BIOE 9985 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

BIOE 9990 Dissertation (0 SH)
Offers theoretical and/or experimental work conducted under the auspices of the department. Must be taken in two consecutive semesters.
• Prerequisite: PhD candidacy in bioengineering.
• Repeatability: May be repeated once.

BIOE 9996 Dissertation Continuation (0 SH)
Offers continued dissertation work conducted under the supervision of a departmental faculty member.
• Prerequisite: BIOE 9990 completed twice; bioengineering students only.
• Repeatability: May be repeated without limit.

BINF 6200 Bioinformatics Programming (4 SH)
Focuses on the fundamental programming skills required in the bioinformatics industry. Perl is the main programming language used. Topics include string operations, file manipulation, regular expressions, object-oriented programming, data structures, testing, program design, and implementation. Includes substantial out-of-classroom assignments.
• Prerequisite: BINF 6309 or BIOL 6309.
• Equivalent: BIOL 6200.
BINF 6308 Bioinformatics Computational Methods 1 (4 SH)
Offers the first semester of a two-semester sequence on the use of computers in bioinformatics research. Offers students an opportunity to work with current methods and computational algorithms used in contemporary sequence analysis. Teaches practical skills necessary to manage and mine the vast biological information being generated and housed in public databases. Emphasizes the use of Perl as the primary computer language and requires students to learn and understand basic computer logic and syntax, including an introduction to scalars, arrays, hashes, decision statements, loops, subroutines, references, and regular expressions. A focus on fundamental skills, including the command line interface found in the Linux operating system, is designed to prepare students for second-semester applications.
• Equivalent: BIOL 6308.

BINF 6309 Bioinformatics Computational Methods 2 (4 SH)
Designed to build upon the core topics covered in BINF 6308, i.e., use of the computer as a tool for bioinformatics research. Builds upon the Perl language fundamentals covered during the first semester but requires students to apply these fundamentals to a semester-long project. The project includes protein family analysis, multiple sequence analysis, phylogeny, and protein structure analysis. Additionally, students have an opportunity to learn to build, load, connect, and query custom MySQL databases, parse command line flags, and build Perl objects.
• Prerequisite: BINF 6308 or BIOL 6308.
• Equivalent: BIOL 6309.

BINF 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.
• Equivalent: BIOL 6964.

BINF 7385 Bioinformatics Seminar (2 SH)
Discusses current issues and research topics in bioinformatics. Requires student presentations.
• Repeatability: May be repeated without limit.
• Equivalent: BIOL 7385.

BIOLOGY (BIOL)

BIOL 1000 Biology at Northeastern (1 SH)
Introduces first-year students to the major and the field of biology and to the professional and academic resources available to students at Northeastern University; acquaints students with their faculty, advisors, and fellow students; provides an initial orientation to undergraduate research, cooperative education, and other experiential learning options; helps develop the academic skills necessary to succeed; provides grounding in the culture and values of the university community; and assists in interpersonal skill development—in short, familiarizes students with the resources and skills needed to become a successful university student.
• Prerequisite: Biology majors only.
• Equivalent: BIOC 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

BIOL 1101 Principles of Biology 1 (4 SH)
Focuses on the basic architecture of cells, cellular organelles, and their molecular components; information and heredity; and mechanisms of evolution.
• Corequisite: BIOL 1102.
• NU Core: Science/technology level 1.
• Equivalent: BIOL 1111 and BIOL 1115.

BIOL 1102 Lab for BIOL 1101 (1 SH)
Accompanies BIOL 1101. Covers topics from the course through various experiments.
• Corequisite: BIOL 1101.
• Equivalent: BIOL 1112 and BIOL 1116.

BIOL 1103 Principles of Biology 2 (4 SH)
Continues BIOL 1101. Focuses on the evolution of structural and functional diversity of organisms; the integrative biology of multicellular organisms; and ecological relationships at the population, community, and ecosystem levels.
• Prerequisite: BIOL 1101 or BIOL 1111.
• Corequisite: BIOL 1104.
• Equivalent: BIOL 1113.

BIOL 1104 Lab for BIOL 1103 (1 SH)
Accompanies BIOL 1103. Covers topics from the course through various experiments.
• Corequisite: BIOL 1103.
• Equivalent: BIOL 1114.
BIOL 1107 Foundations of Biology (4 SH)
Introduces evolutionary principles, cellular structure and function, genetic transmission, energy pathways, and physiology. Covers current topics in biology and evaluates and discusses current scientific literature. Explores the interdisciplinary nature of biology. Offers students an opportunity to prepare for the topical inquiries in biology courses.
• Prerequisite: Freshman standing; restricted to selected majors and combined majors in the College of Science. Coreq BIOL 1108.
• NU Core: Science/technology level 1.

BIOL 1108 Lab for BIOL 1107 (1 SH)
Accompanies BIOL 1107. Includes various lab experiments that emphasize evolutionary principles, cellular structure and function, genetic transmission, energy pathways, and physiology.
• Corequisite: BIOL 1107.

BIOL 1111 General Biology 1 (4 SH)
Explores basic principles of biology with a focus on those features shared by all living organisms and seen through the lens of evolutionary theory. Through lectures, readings and discussion, offers students an opportunity to understand how the scientific method has been and is used to address biological questions. Central topics include recent advances in cell anatomy and physiology, including the interplay between organelles, membrane transport, and cell-signaling; energy transfer through cells and through the biosphere; cellular reproduction and cancer; heredity and human genetic disorders; and protein synthesis and biotechnology. Explores the societal implications of such topics as biopharmaceuticals, ocean acidification, climate change, human diseases, epigenetics, cancer, and cloning.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: BIOL 1101 and BIOL 1115.

BIOL 1112 Lab for BIOL 1111 (1 SH)
Accompanies BIOL 1111. Offers students an opportunity to collect quantitative data through hands-on experimentation as well as simulations. Data is analyzed statistically and presented in written form.
• Corequisite: BIOL 1111.
• NUpath: Analyzing and using data.
• Equivalent: BIOL 1102 and BIOL 1116.

BIOL 1113 General Biology 2 (4 SH)
Continues BIOL 1111. Examines the evolution of structural and functional diversity of organisms; the integrative biology of multicellular organisms; and ecological relationships at the population, community, and ecosystem levels.
• Prerequisite: BIOL 1101, BIOL 1107, BIOL 1111, or BIOL 1115.
• Corequisite: BIOL 1114.
• NUpath: Engaging with the natural and designed world.
• Equivalent: BIOL 1103.

BIOL 1114 Lab for BIOL 1113 (1 SH)
Accompanies BIOL 1113. Covers topics from the course through various experiments.
• Corequisite: BIOL 1113.
• Equivalent: BIOL 1104.

BIOL 1115 General Biology 1 for Engineers (4 SH)
Introduces basic molecular and cellular biology principles and concepts. Offers students an opportunity to begin to apply chemical and engineering principles to further an understanding of selected physiological processes and biological systems. Topics include protein structure and function, cellular organization, energetics, information management, molecular transport, signaling, and motility.
• Prerequisite: Engineering students only.
• Corequisite: BIOL 1116.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: BIOL 1101 and BIOL 1111.

BIOL 1116 Lab for BIOL 1115 (1 SH)
Accompanies BIOL 1115. Covers topics from the course through various experiments.
• Prerequisite: Engineering students only.
• Corequisite: BIOL 1115.
• Equivalent: BIOL 1102 and BIOL 1112.

BIOL 1117 Integrated Anatomy and Physiology 1 (4 SH)
Introduces students to integrated human anatomy and physiology. Focuses on structure and function of cells and tissues. Presents the anatomy and physiology of skin, bones, muscles, blood, and the nervous system.
• Corequisite: BIOL 1118.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

BIOL 1118 Lab for BIOL 1117 (1 SH)
Accompanies BIOL 1117. Covers topics from the course through various experiments.
• Corequisite: BIOL 1117.
BIOL 1119 Integrated Anatomy and Physiology 2 (4 SH)
Continues BIOL 1117. Presents the structure and function of the human endocrine, reproductive, cardiovascular, respiratory, urinary, and digestive systems as well as the regulation of metabolism and body temperature.
• Prerequisite: BIOL 1117.
• Corequisite: BIOL 1120.
• NUpath: Engaging with the natural and designed world.

BIOL 1120 Lab for BIOL 1119 (1 SH)
Accompanies BIOL 1119. Covers topics from the course through various experiments.
• Corequisite: BIOL 1119.
• NUpath: Analyzing and using data.

BIOL 1121 Basic Microbiology (4 SH)
Focuses on how to identify, control, and live with bacteria and viruses. Emphasizes the mechanisms of disease production, natural host defense systems, and medical interventions.
• Corequisite: BIOL 1122.
• NU Core: Science/technology level 1.

BIOL 1122 Lab for BIOL 1121 (1 SH)
Accompanies BIOL 1121. Covers topics from the course through various experiments.
• Corequisite: BIOL 1121.

BIOL 1141 Microbes and Society (4 SH)
Introduces the unseen world of microorganisms. Students analyze how the growth and behavior of this diverse group of organisms affect many aspects of human society including agriculture and food preparation; drug development and manufacture; liquid and solid waste management; genetic engineering; geochemical cycles; and health and disease.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

BIOL 1143 Biology and Society (4 SH)
Offers an overview of how biology weaves its way across a broad spectrum of complex societal issues. Introduces students to the biological mechanisms and processes responsible for genetic inheritance, energy transfer, evolution, and population dynamics, providing a framework within which students may critically interpret and discuss important biological information provided in public forums. Seeks to empower students to make informed choices at the policy and personal levels. Offers students an opportunity to acquire an understanding of the basic principles of biology and apply the scientific process to the analysis of contemporary issues. Using a thematic approach, covers a wide range of issues including the reemergence of plagues, biological weapons and security, the environment, and human health and wellness.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: BLGY 1143.

BIOL 1147 The Human Organism (4 SH)
Introduces the structure and function of the human body. Emphasizes the principles of biological and physical science as they relate to life processes in health and disease.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

BIOL 1149 Biology of Human Reproduction (4 SH)
Studies sexual and reproductive function in the human male and female, that is, sexual development, coitus, fertilization, pregnancy, birth, and lactation. Discusses the methods of controlling fertility and sexually transmitted diseases. Analyzes factors affecting reproduction and sexuality in human population.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

BIOL 2297 Inquiries in Behavioral and Evolutionary Biology (4 SH)
Focuses on the latest developments in the field. Offers students an opportunity to explore both scientific practice and progress through readings, discussion, and projects. Offers students an opportunity to expand and deepen their understanding of fundamental biological principles at the behavioral, ecological, and evolutionary levels.
• Prerequisite: (a) BIOL 1101, BIOL 1107, or BIOL 1111 and (b) freshman standing; restricted to selected majors and combined majors in the College of Science.
BIOL 2299 Inquiries in Biological Sciences (4 SH)
Focuses on the latest developments in the field. Offers students an opportunity to explore both scientific practice and progress through readings, discussion, and projects and to expand and deepen their understanding of fundamental biological principles at the cellular and molecular level.
• Prerequisite: (a) BIOL 1101, BIOL 1107, or BIOL 1111 and (b) freshman standing; restricted to selected majors and combined majors in the College of Science.
• NUpath: Engaging with the natural and designed world.

BIOL 2300 Lab for BIOL 2299 (1 SH)
Accompanies BIOL 2299. Offers various lab experiments that emphasize student inquiry.

BIOL 2301 Genetics and Molecular Biology (4 SH)
Focuses on mechanisms of inheritance, gene-genome structure and function, and developmental genetics and evolution. Examples are drawn from the broad spectrum of plants, animals, fungi, bacteria, and viruses. Topics and analytical approaches include transmission genetics, molecular biology and gene regulation, DNA molecular methods, quantitative and population genetics, bioinformatics, genomics, and proteomics.
• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 1115, BIOL 2297, BIOL 2299, EEMB 2290, ENV 2400, or EEMB 2400 and (b) CHEM 1151, CHEM 1211, or CHEM 1217.
• Corequisite: BIOL 2302.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world.

BIOL 2302 Lab for BIOL 2301 (1 SH)
Accompanies BIOL 2301. Reinforces and extends concepts presented and practiced in the accompanying lecture course through the application of scientific investigation methods and data analysis.
• Corequisite: BIOL 2301.
• NUpath: Analyzing and using data.

BIOL 2309 Techniques in Biology: An Inquiry-Based Lab (4 SH)
Offers an inquiry-based, intensive laboratory experience in which students have an opportunity to design and conduct independent research projects, applying approaches and techniques used in cell and molecular biology. Offers students an opportunity to present their results in professional formats.
• Prerequisite: BIOL 2301; restricted to students in the College of Science.
• NUpath: Exploring creative expression and innovation, analyzing and using data, writing intensive in the major.

BIOL 2319 Cell Biology (4 SH)
Introduces physiological control systems including transport processes, cellular basis of nerve function, action of chemical messengers and regulators, and principles of cellular contraction and motility.
• Prerequisite: (a) BIOL 2301 and (b) CHEM 2311 or CHEM 2315 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: BIOL 2320.
• NU Core: Writing intensive in the major.

BIOL 2320 Lab for BIOL 2319 (1 SH)
Accompanies BIOL 2319. Covers topics from the course through various experiments.
• Corequisite: BIOL 2319.

BIOL 2321 Microbiology (4 SH)
Introduces morphological, ecological, and biochemical consideration of representative groups of bacteria. Introduces virology and microbial genetics; host-parasite relationships, prokaryotes of medical significance; and physical and chemical controls of microbial growth.
• Prerequisite: (a) BIOL 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: BIOL 2322.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

BIOL 2322 Lab for BIOL 2321 (1 SH)
Accompanies BIOL 2321. Covers topics from the course through various experiments.
• Corequisite: BIOL 2321.

BIOL 2323 Biochemistry (4 SH)
Covers structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways.
• Prerequisite: (a) BIOL 2301 and (b) CHEM 2313 or CHEM 2317 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: BIOL 2324.
• Equivalent: BIOL 3611.

BIOL 2324 Lab for BIOL 2323 (1 SH)
Accompanies BIOL 2323. Covers topics from the course through various experiments.
• Corequisite: BIOL 2323.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: BIOL 3612.
BIOL 2327 Human Parasitology (4 SH)
Examines the general biology, life cycles, modes of transmission, and pathogenesis of major parasites on global human health. Explores a number of important diseases, along with the diverse protozoans, worms, and arthropods responsible for them.
• Prerequisite: BIOL 1101, BIOL 1107, BIOL 1111, or BIOL 1115.

BIOL 3401 Comparative Vertebrate Anatomy (4 SH)
Examines the morphology and phylogeny of the vertebrates.
• Prerequisite: BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, or EEMB 2290.
• Corequisite: BIOL 3402.

BIOL 3401 Comparative Vertebrate Anatomy (4 SH)
Effective Spring 2017
Examines the morphology and phylogeny of the vertebrates.
• Prerequisite: BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, or EEMB 2290.

BIOL 3402 Lab for BIOL 3401 (1 SH)
Accompanies BIOL 3401. Covers topics from the course through various experiments.
• Corequisite: BIOL 3401.

BIOL 3403 Animal Behavior (4 SH)
Examines the evolution of animal behavior. Topics include how behaviors have evolved, the adaptive function of behavior, and the relative roles of genes and the environment in the development of behavior. Behaviors from feeding and reproductive strategies to communication and social behavior are considered. Implications for human behavior are considered.
• Prerequisite: BIOL 2301 or PSYC 3458.

BIOL 3405 Neurobiology (4 SH)
Introduces the cellular and molecular functioning of the nervous system, the organization of neurons into circuits, the processing of information, and the generation of motor output.
• Prerequisite: BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or PSYC 3458.

BIOL 3407 Molecular Cell Biology (4 SH)
Integrates molecular biology and biochemistry in the cellular context. Emphasizes the organization and replication of genomes, the regulation of gene expression, the structures and function of organelles, and the mechanisms of signal transduction.
• Prerequisite: BIOL 2323.

BIOL 3409 Current Topics in Biology (4 SH)
Examines selected topics in biology. Topics vary each semester.
• Repeatability: May be repeated without limit.

BIOL 3601 Neural Systems and Behavior (4 SH)
Reviews major experimental approaches and key concepts used in behavioral neurobiology. Begins with a look at its history. Topics covered include spatial orientation and sensory guidance, neuronal control of motor output, neuronal processing of sensory information, sensorimotor integration, neuromodulation, circadian rhythms and biological clocks, behavioral physiology of large-scale navigation, neurobiology of communication, and cellular mechanisms of learning and memory.
• Prerequisite: (a) BIOL 3405 or PSYC 3458 and (b) sophomore standing or above; restricted to selected majors and combined majors in the College of Science.

BIOL 3603 Mammalian Systems Physiology (4 SH)
Designed to familiarize students with fundamental principles in mammalian physiology. Emphasizes major organ systems integration. Where applicable, explores and uses human physiology to reinforce principles in physiology and build upon these principles by analyzing how major organ systems effectively network for proper organismal function. Initially covers the physiological principles of energy and metabolism in mammals, including human adaptation for basic energy requirements, and then delves into basics of membrane transport. Evaluates roles for organ systems integration in the respiratory, cardiovascular, gastrointestinal, hemopoietic, renal, and reproductive systems.
• Prerequisite: BIOL 2301 (may be taken concurrently) and sophomore standing or above.

BIOL 3605 Developmental Neurobiology (4 SH)
Covers the cellular, molecular, and genetic processes that guide neural development. Focuses on how nerve cells are generated, patterned, and connected with one another to regulate animal behavior. Topics include cell differentiation, tissue patterning, neural plasticity, and cognitive development.
• Prerequisite: BIOL 2301 (may be taken concurrently) and sophomore standing or above.

BIOL 3607 Current Trends in Reproductive Sciences (4 SH)
Introduces current trends in the field of reproductive sciences, spanning basic human reproduction, infertility, and potential horizons in medicine. Surveys topics in basic research that have the most promise to make an impact in the field of women’s health. Emphasizes human health but includes animal models in the analysis.
• Prerequisite: BIOL 2301 (may be taken concurrently) and sophomore standing or above.
BIOL 3609 Developmental Biology (4 SH)
Focuses on organismal development at cellular, molecular, and anatomical levels. Topics include gametogenesis, fertilization, cleavage, gastrulation, organogenesis, and metamorphosis. Invertebrates and vertebrates provide descriptive and experimental models. Laboratory work emphasizes echinoderms, amphibians, birds, and mammals.
• Prerequisite: BIOL 2301.
• Equivalent: BIOL 5577.

BIOL 3611 Biochemistry (4 SH)
Covers structure and function of biomolecules, central concepts of bioenergetics and thermodynamics, enzyme kinetics and regulation, and metabolic pathways.
• Prerequisite: (a) BIOL 2301 and (b) CHEM 2313 or CHEM 2317 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: BIOL 3612.
• Equivalent: BIOL 2323.

BIOL 3612 Lab for BIOL 3611 (1 SH)
Accompanies BIOL 3611. Covers topics from the course through various experiments.
• Corequisite: BIOL 3611.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: BIOL 2324.

BIOL 4701 Biology Capstone (4 SH)
Integrates and assesses the concepts and skills obtained from the entire biology curriculum, including experiential and classroom-based components. Requires reflection by students on their various educational experiences, extensive research of scientific questions related to these experiences, and development of an original research proposal. Offers students an opportunity to hone communication skills through formal and informal presentations, class discussion, and critique.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

BIOL 4705 Neurobiology of Cognitive Decline (4 SH)
Introduces the neuroanatomical and cognitive sequelae of brain aging and neurodegenerative disease. Covers molecular and cellular processes that damage neurons, animal models, and brain imaging. Explores higher-level manifestations of damage to, for example, memory, language, and reward systems.
• Prerequisite: BIOL 3405 or PSYC 3458.

BIOL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

BIOL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: (a) BIOL 4970, BIOL 4991, or BIOL 4992 and (b) junior or senior standing; science students only.
• NUpath: Integrating knowledge and skills through experience.

BIOL 4991 Research (4 SH)
Offers independent laboratory research work on a chosen topic under the direction of members of the department. Course content depends on instructor.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

BIOL 5100 Biology Colloquium (1 SH)
Offers a series of colloquia in biological research by invited experts on current topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BIOL 5306 Biological Clocks (4 SH)
Examines the expression of endogenously generated twenty-four-hour (circadian) rhythms in eukaryotic life, emphasizing theoretical foundations as well as current research strategies for understanding how biological clocks work. Presents analytic principles essential for understanding biological rhythmicity in any organism at any level of organization. Emphasizes strategies used to understand the concrete mechanisms underlying biological rhythmicity.
• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5307 Biological Electron Microscopy (4 SH)
Presents techniques of electron microscopy applied to biological materials. Discusses specimen preparation, fixation, thin-sectioning, staining, operation of the microscopes, photographic techniques, and interpretation of electron micrographs. Requires student seminars and project.
• Prerequisite: Junior, senior, or graduate standing.
BIOL 5308 Lab for BIOL 5307 (1 SH)
Designed for graduate and advanced undergraduate students with no formal training in electron microscopy. Offers students an opportunity to acquire a thorough working knowledge of transmission and scanning electron microscopy by having each student process specimens from living tissue through the production of electron micrographs. This involves standard specimen preparation protocols including fixation, embedding, ultramicrotomy, staining, critical point drying, and sputter coating, as well as the independent operation of state-of-the-art electron microscopy equipment.

• Prerequisite: Junior, senior, or graduate standing.

BIOL 5499 Plant Biotechnology (4 SH)
Designed as an introductory course on plant biotechnology for upper-level undergraduates and first-year graduate students. Using examples from current research, offers students an opportunity to review the technology used to modify and improve economically important plants for sustainable agriculture as well as for the production of pharmaceutical and medicinal products. Specific topics include principles of plant heredity and genetics (molecular biology), plant breeding and improvement, hormones and growth regulators, gene isolation, plant tissue culture and transformation, plant-based pharmaceutical production, and stress tolerance and improvement. The course consists of weekly lectures, laboratory demonstrations, and review sessions of recent literature.

• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5533 Vertebrate Microanatomy (4 SH)
Deals with the structure and function of cells, tissues, and organs in vertebrate animals at light and electron microscopic levels.

• Prerequisite: (a) BIOL 2301, CHEM 1214, and junior or senior standing or (b) graduate standing.
• Corequisite: BIOL 5534.

BIOL 5534 Lab for BIOL 5533 (1 SH)
Accompanies BIOL 5533. Seeks to enable the student to identify microscopically the structures of cells, tissues, and organs in vertebrate animals at light and electron microscopic levels.

• Corequisite: BIOL 5533.

BIOL 5541 Endocrinology (4 SH)
Explores the endocrine regulation of physiological systems, emphasizing current research. Lectures provide background, followed by analysis of primary literature and case studies. Topics include growth, reproduction, nutrient utilization, stress, and environmental endocrine disruption. Emphasizes humans but includes material on other animals, including invertebrates.

• Prerequisite: (a) BIOL 2319 and junior or senior standing or (b) BIOL 2323 and junior or senior standing or (c) BIOL 3405 and junior or senior standing or (d) graduate standing.

BIOL 5543 Stem Cells and Regeneration (4 SH)
Explores the biological basis of embryonic, adult, and induced pluripotent stem cells toward an understanding of their roles in development, homeostasis, and regeneration, as well as their therapeutic potential. The study of stem cells is a rapidly advancing area in biology and biomedicine. Although the biological basis of stem cells is a major focus, the course aims to put this knowledge into a biomedical context.

• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing; restricted to students in the College of Science.

BIOL 5549 Microbial Biotechnology (4 SH)
Offers readings and seminar-style discussion from the current literature on important inventions and practical applications in biotechnology, with a focus on drug discovery.

• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5553 Biology of Muscle: Molecules to Movements (4 SH)
Examines the biology of skeletal muscle and movement in an integrated fashion. Considers the biochemical, physiological, and structural properties of skeletal muscle that adapt it to diverse mechanical functions. Examines the structure and function of the contractile proteins and their assembly into sarcomeres. Considers the regulation of these elements through excitation-contraction coupling. Reviews the metabolic machinery that supplies the energy for contraction, with emphasis on the regulatory systems that link energy supply and demand and the overall efficiency of contraction. Presents the architectural organization of muscle fibers and connective tissue elements to form mechanical linkages to the skeleton. This information is integrated by analyzing the function and performance of skeletal muscle during movement. Considers locomotor systems including swimming, flying, running, and jumping.

• Prerequisite: (a) BIOL 4551 and junior or senior standing or (b) graduate standing.

BIOL 5569 Advanced Microbiology (4 SH)
Focuses on how microorganisms develop, exchange, and regulate genes, and survive in various environments. Emphasizes experimental design and proof, particularly as related to genetic exchange, gene regulation, single and multicellular development, and cell-cell communication.

• Prerequisite: (a) Either BIOL 2321 or BIOL 2323 and junior or senior standing or (b) graduate standing.
BIOL 5571 Microbial Ecology (4 SH)
Focuses on the fundamental role of microbial communities in the function of the biosphere. Surveys the diversity of microorganisms, their ecological strategies, and interactions in aquatic and soil communities, deep sea vent and subsurface rock environments, extreme conditions of Antarctic ice, and boiling springs.
- Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.
- Corequisite: BIOL 5572.

BIOL 5572 Lab for BIOL 5571 (1 SH)
Accompanies BIOL 5571. Covers topics from the course through various experiments.
- Prerequisite: Junior, senior, or graduate standing.
- Corequisite: BIOL 5571.

BIOL 5573 Medical Microbiology (4 SH)
Emphasizes host-parasite interactions: virulence, toxins, natural flora, and immunological responses; characteristics of the common bacterial, rickettsial, and protozoal infections in humans; and epidemiology, pathology, vaccines, and chemotherapy.
- Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5581 Biological Imaging (4 SH)
Illustrates imaging principles and techniques and their application to biological problems. Topics vary and may include microscopic and macroscopic approaches in areas such as cellular and neurobiology, ecology, and biochemistry.
- Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5583 Immunology (4 SH)
Provides an overview of the structure and function of genes, proteins, and cells involved in the generation of the immune response. Emphasis is on molecular immunology and immunogenetics.
- Prerequisite: (a) BIOL 2323 and junior or senior standing or (b) graduate standing.

BIOL 5585 Evolution (4 SH)
Discusses history of evolutionary theory and lines of evidence. Emphasis is on mechanisms of speciation. Introduces and discusses current evolutionary topics.
- Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.

BIOL 5587 Comparative Neurobiology (4 SH)
Presents a cellular approach to structure and function of the nervous system. Topics include neuronal anatomy, phylogeny of nervous systems, electrophysiology of membrane conductances, synaptic transmission, integration in nerve cells, neuronal networks, sensory systems, motor systems, sensory-motor integration, development and regeneration of neuronal connectivity, and fundamentals of neurotechnology for biomedics. Focuses on the development of these concepts from the primary research literature. A term project involves the design of a simple nervous system for a hypothetical animal.
- Prerequisite: (a) BIOL 3405 and junior or senior standing or (b) PSYC 3458 and junior or senior standing or (c) graduate standing.

BIOL 5591 Advanced Genomics (4 SH)
Intended for those familiar with the basics of genetics, molecular and cellular biology, and biochemistry, all of which are required to appreciate the beauty, power, and importance of modern genomic approaches. Introduces the latest sequencing methods, array technology, genomic databases, whole genome analysis, functional genomics, and more.

BIOL 5593 Cell and Molecular Biology of Aging (4 SH)
Covers the recent scientific discoveries that have transformed our understanding of the process of aging. Examines in-depth the current understanding of the molecular mechanisms that control life span in model organisms, including yeast, worms, flies, and mice. Discusses dietary interventions and pharmacological approaches that extend the life span and delay the onset of age-related diseases. Covers potential applications of the new science of aging to improve human health. Requires students to read, discuss, present, and report on primary research papers from the literature. Perreq. (a) BIOL 2323 and junior or senior standing or (b) graduate standing.

BIOL 5601 Multidisciplinary Approaches in Motor Control (4 SH)
Studies the field of human motor control, or motor neuroscience. Offers students an opportunity to obtain a fundamental understanding of the processes underlying the acquisition and control of sensorimotor behavior. The systems approach connects a variety of disciplines ranging from neurophysiology, to engineering, to neurorehabilitation. Reviews a selection of approaches with emphasis on motor learning. Focuses on early behavioral approaches, more recent neurophysiological and imaging approaches, and rehabilitation. Discusses selected representative papers, including seminal historical papers and more recent studies reflecting the current discussion in the field.
- Prerequisite: Junior, senior, or graduate standing; restricted to selected majors and combined majors in the College of Science.
BIOL 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BIOL 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BIOL 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BIOL 6200 Bioinformatics Programming (4 SH)
Focuses on the fundamental programming skills required in the bioinformatics industry. Perl is the main programming language used. Topics include string operations, file manipulation, regular expressions, object-oriented programming, data structures, testing, program design, and implementation. Includes substantial out-of-classroom assignments.
• Prerequisite: BIOL 6309.
• Equivalent: BINF 6200.

BIOL 6299 Molecular Cell Biology for Biotechnology (3 SH)
Integrates biochemistry and molecular biology in the cellular context. Includes the organization and replication of genomes, principles and methods for genetic manipulation, the regulation of gene expression, and the structure and function of organelles. Emphasizes protein synthesis, including translation, post-translational modifications, and translocations of proteins within the cells and secretion.
• Prerequisite: Restricted to biotechnology students in the College of Science and in Bouvé College of Health Sciences.

BIOL 6301 Molecular Cell Biology (4 SH)
Integrates biochemistry and molecular biology in the cellular context. Emphasizes the organization and replication of genomes, the regulation of gene expression, the structure and function of organelles, and the mechanisms of signal transduction.
• Prerequisite: BIOL 6300; biotechnology, biology, and pharmaceutical sciences students only.

BIOL 6303 Neurobiology and Behavior (4 SH)
Offers a lecture course that aims to provide a comprehensive overview of behavioral neurobiology, with special emphasis on a neuroethological approach. At the end of the course, the successful student should have a contemporary understanding of the historical development of the behavioral sciences, the major ethological and neurobiological concepts, and the principal mechanisms that govern behavior in animals and humans.
• Prerequisite: Biology, bioinformatics, and marine biology students only or permission of instructor.

BIOL 6308 Bioinformatics Computational Methods 1 (4 SH)
Offers the first semester of a two-semester sequence on the use of computers in bioinformatics research. Offers students an opportunity to work with current methods and computational algorithms used in contemporary sequence analysis. Teaches practical skills necessary to manage and mine the vast biological information being generated and housed in public databases. Emphasizes the use of Perl as the primary computer language and requires students to learn and understand basic computer logic and syntax, including an introduction to scalars, arrays, hashes, decision statements, loops, subroutines, references, and regular expressions. A focus on fundamental skills, including the command line interface found in the Linux operating system, is designed to prepare students for second-semester applications.
• Equivalent: BINF 6308.

BIOL 6309 Bioinformatics Computational Methods 2 (4 SH)
Designed to build upon the core topics covered in BIOL 6308, i.e., use of the computer as a tool for bioinformatics research. Builds upon the Perl language fundamentals covered during the first semester but requires students to apply these fundamentals to a semester-long project. The project includes protein family analysis, multiple sequence analysis, phylogeny, and protein structure analysis. Additionally, students have an opportunity to learn to build, load, connect, and query custom MySQL databases, parse command line flags, and build Perl objects.
• Prerequisite: BIOL 6308.
• Equivalent: BINF 6309.

BIOL 6381 Ethics in Biological Research (2 SH)
Discusses ethical issues relevant to research in the biological sciences. Requires student presentations.
BIOL 6399 Dynamics of Microbial Ecology (4 SH)
Explores state-of-the-art research on microbial biology of the environment and human body. Focuses on molecular diversity of microbial species and microbial discovery, microbial dynamics across time and space, microbiology of extreme environments, microbial ecology in the genomics age, host-microbe interactions in the human body, and translation of basic microbiology into practice. Emphasizes how new concepts in microbial biology, such as signal-based regulation and cell individuality, may change the current views on organization and function of microbial communities in nature.
• Prerequisite: Biology, biotechnology, and bioinformatics students only or permission of instructor.

BIOL 6401 Research Methods and Critical Analysis in Molecular Cell Biology (4 SH)
Encompasses biochemical and cell biological approaches to understanding cell structure and function, including membranes, organelles, vesicle trafficking, cytoskeleton, cell cycle, and signaling. Structured activities integrate critical analysis of recently published literature and methods. Offers students an opportunity to prepare for the professional practice of molecular cell biology.
• Prerequisite: Biology graduate students only or permission of instructor.

BIOL 6405 Prokaryotic Cell and Molecular Biology (4 SH)
Provides in-depth discussion about fundamentally important cellular processes in prokaryotic systems—such as replication, transcription, and translation—and the corresponding regulatory mechanisms. Also discusses molecular mechanisms of gene regulation and bacterial pathogenesis, using selected examples and mechanisms of prokaryotic cell signaling, and advanced and high-throughput techniques used in prokaryotic molecular and cell biology.
• Prerequisite: Restricted to students in the College of Science.

BIOL 6407 Biochemistry for Molecular Biologists (4 SH)
Focuses on the interface between molecular biology, molecular genetics, and biochemistry. Concentrates on biochemical problems that molecular biologists are likely to find in their research. Includes examples of prokaryotic and eukaryotic (whenever available) systems. Experimental approaches are discussed for all topics. Seeks to enable students to develop a deep understanding of concepts in biological systems through reading and discussion of the primary literature.
• Prerequisite: Restricted to students in the College of Science.

BIOL 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.
• Equivalent: BINF 6964.

BIOL 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

BIOL 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

BIOL 7243 Embryonic Stem Cells and Regeneration (4 SH)
Explores the biological basis for an understanding of embryonic stem cells and regeneration and their potential for curing a variety of diseases. Covers both theoretical and methodological topics. Student presentations and discussions constitute a large portion of the course.

BIOL 7303 Structural Biology (4 SH)
Offers in-depth analysis of principles and current literature of protein and/or cell structure and function.
• Prerequisite: BIOL 6300 or BIOL 6301.

BIOL 7304 Genome Structure and Function (4 SH)
Describes the structure and function of DNA, that is, nucleic acid chemistry, chromatin structure and its regulation, replication, and repair. Emphasis is on the importance of contemporary methodology in studying genomes from different organisms.
• Prerequisite: BIOL 6300 and BIOL 6301.

BIOL 7305 Advanced Immunology (2 SH)
Presents, critically reviews, and discusses current concepts in immunological research within the context of the field of immunology.
• Prerequisite: BIOL 5583.

BIOL 7306 Research Problem Solving (2 SH)
Discusses experimental design and analysis. Requires student presentations.
• Repeatability: May be repeated without limit.

BIOL 7382 Topics in Biochemistry Cell and Molecular Biology (2 SH)
Offers selected advanced topics in the area of biochemistry, cell, and molecular biology; topics vary from year to year. Requires student presentations.
• Prerequisite: BIOL 6300 and BIOL 6301.
• Repeatability: May be repeated without limit.
BIOL 7384 Topics in Integrative Biology (2 SH)
Offers selected advanced topics in the areas of ecology, systematics, evolution, physiology, and marine biology; topics vary from year to year. Requires student presentations.
• Repeatability: May be repeated without limit.

BIOL 7385 Bioinformatics Seminar (2 SH)
Discusses current issues and research topics in bioinformatics. Requires student presentations.
• Prerequisite: Biology students only.
• Repeatability: May be repeated without limit.
• Equivalent: BINF 7385.

BIOL 7399 Research Problem Solving, Ethics, and Communication Skills (4 SH)
Focuses on research problem-solving skills, including formulation of hypotheses; experimental design, execution, and analysis; and research ethics. Offers instruction in scientific writing, including daily record keeping, grants and papers, and oral communication skills. Discusses the use and misuse of statistics and discusses responsibility to the public.
• Prerequisite: Biology students only or permission of instructor.

BIOL 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

BIOL 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

BIOL 7990 Thesis (1 to 4 SH)
Offers thesis supervision by members of the department.
• Repeatability: May be repeated without limit.

BIOL 7996 Thesis Continuation (0 SH)
Offers continuing thesis supervision by members of the department.

BIOL 8420 Biological Lab Rotation 1 (4 SH)
Offers experience in biology research in a faculty research laboratory. Intended only for students who have not yet chosen a lab in which to carry out dissertation/thesis work.

BIOL 8421 Biological Lab Rotation 2 (4 SH)
Offers a second semester of research experience in a different laboratory than that for BIOL 8420. Intended only for students who have not yet chosen a lab in which to carry out thesis work.

BIOL 8506 Bioinformatics Graduate Co-op Tutorial (1 SH)
Designed to complement learning during or after graduate co-op placement. Offers students an opportunity to participate in activities to integrate academic learning and experiential learning including written reflections and oral presentations.
• Prerequisite: Approved graduate co-op.
• Repeatability: May be repeated without limit.

BIOL 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

BIOL 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

BIOL 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

BIOL 8982 Readings (1 to 4 SH)
Offers readings from current literature on an area of interest to students and faculty.
• Repeatability: May be repeated without limit.

BIOL 8984 Research (1 to 4 SH)
Focuses on research methods and their application to a specific problem under the direction of a graduate faculty member.
• Repeatability: May be repeated without limit.

BIOL 8986 Research (0 SH)
Offers the student the opportunity to conduct full-time research.
• Repeatability: May be repeated without limit.

BIOL 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

BIOL 9984 Research (1 to 4 SH)
Focuses on research methods and their application to a specific problem under the direction of a graduate faculty member.
• Repeatability: May be repeated without limit.

BIOL 9990 Dissertation (0 SH)
Offers theoretical and experimental research for the PhD degree.
• Repeatability: May be repeated once.

BIOL 9996 Dissertation Continuation (0 SH)
Offers dissertation supervision by members of the department.
• Repeatability: May be repeated without limit.
BIOTECHNOLOGY (BIOT)

BIOT 5040 Fundamentals of Biochemistry for Biotechnology (4 SH)
Covers the fundamentals of biochemistry for biotechnology applications, including protein structure and function, DNA technologies, bioenergetics, and biosynthesis.
• Prerequisite: Restricted to biotechnology students or by permission of instructor.

BIOT 5050 Organic Chemistry for Biotechnology (4 SH)
Offers an introduction to organic chemistry that seeks to prepare students for the MS in biotechnology program. Explores the nature of and the biological aspects of organic compounds. Covers the fundamentals of the structure, nomenclature, properties, and reactions of carbon compounds. Also introduces the chemistry of biological molecules, including amino acids, proteins, carbohydrates, and lipids, as well as spectroscopic structure determination known as nuclear magnetic resonance (NMR).
• Prerequisite: Chemical principles 2/general chemistry 2 with lab; restricted to biotechnology students or by permission of instructor.

BIOT 5120 Introduction to Biotechnology (3 SH)
Provides an interdisciplinary, state-of-the-art introduction to biotechnology to students of the Master of Science in Biotechnology program. Covers the molecular foundations of biotechnology, molecular microbiology, receptor pharmacology, drug development processes, biotech process development and scale-up, drug approval and regulatory affairs, genomics, microarray analysis, proteomics, computational biology, molecular modeling, analytical biotechnology, and bioterrorism and biotechnology.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: IDSC 5120.

BIOT 5130 Team Skills in Biotechnology (2 SH)
Focuses on project management and leadership skills in the biotechnology industry. Emphasizes professional etiquette, teamwork, and team leadership in a diverse, multidisciplinary workplace. Also offers students an opportunity to develop their technical communication skills (scientific writing, public speaking, and technical presentations).
• Prerequisite: Junior, senior, or graduate standing.

BIOT 5145 Basic Biotechnology Lab Skills (1 SH)
Introduces selected key skills and techniques central to life sciences research. Combines hands-on training in basic laboratory skills with lecture and live demonstration. Laboratory exercises highlight the importance of precision/accuracy in dispensation of liquids and in the preparation of solutions and standards, documentation and record keeping, and maintaining a safe and sterile work environment while performing scientific research.
• Prerequisite: Junior, senior, or graduate standing; biotechnology students only.

BIOT 5219 The Biotechnology Enterprise (2 SH)
Exposes students to a broad spectrum of concepts and issues that are common to biotechnology companies. Provides an overview of innovation, intellectual property, planning, government regulation, and strategic alliances. Introduces biotechnology entrepreneurship; management; and the legal aspects of science, technology, and research in the biotechnology context.
• Prerequisite: Junior, senior, or graduate standing; restricted to students in biotechnology, bioinformatics, and regulatory science of biopharmacy.
• Equivalent: MGMT 6219.

BIOT 5220 The Role of Patents in the Biotechnology Industry, Past and Future (1 SH)
Covers the basics of patenting and the application of patents to the biotechnology industry, including the controversial area of gene patents.

BIOT 5225 Managing and Leading a Biotechnology Company (3 SH)
Effective Spring 2017
Covers managing projects and personnel in a technology-based organization. Such activities are best carried out by those who combine the technical knowledge of their industry with the insight into the best practices for working with groups of highly educated, and often very experienced people. The biotechnology industry is strongly dependent on the concept that knowledge is always shared and ownership is collective. As the fundamental organizational mantra is teamwork, the principles of managing in this environment are key to achieving important goals. How to accomplish this and make decisions that drive innovation and success have common threads with other technology-based industries, but with the added complexity of the scientific challenges facing the biotechnology industry. Restricted to students in the Bouvé College of Health Sciences and in the College of Science or by permission of the program office.

BIOT 5226 Biotechnology Entrepreneurship (3 SH)
Effective Spring 2017
Biotechnology by its very nature is an innovative multidisciplinary industry. This is especially true for the biopharmaceutical industry in which the process of discovering new drugs and new drug targets requires novel approaches to solving difficult questions about disease processes and human health. This course focuses on the essential nature of innovation in the biotech industry, exposes students to the basics of creating startup organizations, explains the key role of business planning in enterprise creation, describes means for assessing risks, making choices from available options and how to measure success. Various business models, outsourcing work and establishing strategic partnerships are examined. Restricted to students in the Bouvé College of Health Sciences and in the College of Science or by permission of the program office.
BIOT 5227 Economics and Marketing for Biotechnology Managers (3 SH)
*Effective Spring 2017*
Provides a foundation for making financial decisions in the biotechnology industry. Examines accounting methods, forecasting, corporate valuation, exit strategies and drug pipeline economics. Introduces concepts for marketing pharmaceutical products. Restricted to students in the Bouvé College of Health Sciences and in the College of Science or by permission of the program office.

BIOT 5330 Drug Safety and Immunogenicity (3 SH)
Introduces the fundamental molecular interactions involved in immunological responses as well as in measuring and testing in a research and regulated environment. Other drug-safety-related topics include adventitious agents (viruses, microorganisms, mycoplasma) and risk factors such as product-related substances (aggregates and post-translationally modified variants), endotoxins, DNA, host-cell proteins, process contaminants such as antibiotics, and the means of testing and removing these through validated processes.

BIOT 5560 Bioprocess Fundamentals (3 SH)
Focuses on the fundamental principles and elements in the process of manufacturing biopharmaceuticals. Covers kinetics of enzymatic reactions; selected microbial and cell metabolism and relevant control mechanisms; kinetics of cell growth, cell death, substrate consumption, and product formation; mathematical modeling and representation of bioprocesses; examples of industrial bioprocesses to illustrate types and operations of upstream and downstream unit operations and mass transfers in fermentation systems—the affecting factors and the impact on process development and scale-up. Also includes an overview of economic considerations. Emphasizes bioprocesses for recombinant protein production.
*Equivalent: CHEM 5560.*

BIOT 5631 Cell Culture Processes for Biopharmaceutical Production (3 SH)
Covers the principles and concepts involved in the development of mammalian and other types of cell culture processes for the manufacturing of biopharmaceutical products such as monoclonal antibodies and recombinant proteins. Topics include protein expression and clone generation, batch and perfusion processes and media development, bioreactor operations and scale-up, and innovations in cell culture processes. Regulatory concepts include quality assurance in a cGMP environment.

BIOT 5635 Downstream Processes for Biopharmaceutical Production (3 SH)
Addresses the development of recombinant protein purification processes in biotechnology. Provides an overview of the scientific principles, engineering strategies, and unit operations facilities involved in scalable protein purification processes. Also discusses viral clearance and inactivation strategies; cGMP considerations; and technological advances to improve effectiveness and efficiency, such as membrane-based disposable systems.

BIOT 5640 Drug Product Processes for Biopharmaceuticals (3 SH)
Covers the development and implementation of the drug product manufacturing process for biopharmaceuticals. Focuses on biologic products, specifically proteins. Covers the workflow required for the development and implementation of the production process with the scientific and engineering principles highlighted. Topics include the preformulation process for early stage product development, the selection of formulation compatible with the targeted product presentation, optimization of formulations to meet stability and usage objectives, the design of a scalable process for production, large-scale process equipment and operations, process scale-up considerations, and regulatory compliance issues for drug product manufacturing facilities and operations.
*Prerequisite: CHEM 5620 or permission of instructor.*

BIOT 5700 Molecular Interactions of Proteins in Biopharmaceutical Formulations (3 SH)
Offers an up-to-date survey and review of the research and understanding of the molecular interactions of proteins in biopharmaceutical formulations, including both liquid and solid formats, during the process of drug product manufacturing. Focuses on protein-protein interactions, protein-excipients (e.g., stabilizers, surfactants) interactions, and protein at interface surfaces interactions that are critical and impactful on the stability and integrity of therapeutic proteins of interest. Emphasizes understanding the mechanistic aspect of the interactions; the approaches, methods, and techniques employed to study these phenomena; and measures considered to modulate such interactions to enhance the performance of the biopharmaceutical formulations.
*Prerequisite: CHEM 5620 or permission of instructor.*

BIOT 6214 Experimental Design and Biometrics (2 SH)
Explores the principles of experimental design and statistical analysis. Emphasizes research in the molecular and biological sciences and biotechnology. Topics include probability theory, sampling hypothesis formulation and testing, and parametric and nonparametric statistical methods.
*Equivalent: PHSC 6214.*
BIOT 6400 Pre-co-op Experience (0 SH)
Offers students an opportunity to gain necessary skills and practical experience in order to prepare for graduate co-op.
- Prerequisite: Restricted to students in biotechnology and in regulatory science of biopharmacy.

BIOT 6411 Biotechnology Co-op Reflection Seminar (1 SH)
Designed to complement learning during or after graduate co-op placement. Students participate in activities to integrate academic learning and experiential learning, including written reflections and weekly reports that do not have to include company confidential information.
- Prerequisite: Restricted to students in biotechnology and in regulatory science of biopharmacy.

BIOT 6500 Professional Development for Co-op (0 SH)
Introduces the cooperative education program. Offers students an opportunity to develop job-search and career-management skills; to assess their workplace skills, interests, and values and to discuss how they impact personal career choices; to prepare a professional résumé; and to learn proper interviewing techniques. Explores career paths, choices, professional behaviors, work culture, and career decision making.
- Prerequisite: Biotechnology and bioinformatics students only.

BIOT 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- Prerequisite: Restricted to students in biotechnology and in regulatory science of biopharmacy.
- Repeatability: May be repeated without limit.

BIOT 7245 Biotechnology Applications Laboratory (3 SH)
Presents a laboratory course in biotechnology with a focus on cutting-edge instrumentation that is currently used in the field. Directs special attention at the practical aspects of laboratory work in this field, for example, techniques in sample preparation, procedures for protein analysis, and new bioinformatic approaches. Focuses on the emerging field of chemiproteomics, which is the study of the interaction of small molecules with the proteome, that is, the full complement of proteins expressed in an individual cell or organism. Exposes the student to hands-on experience with modern instrumentation, such as mass spectrometry and high performance liquid chromatography.
- Equivalent: IDSC 7245.

BIOT 7300 Special Topics in Biotechnology (1 to 3 SH)
Presents selected topics of current importance in biotechnology.
- Repeatability: May be repeated up to 5 times for up to 6 total semester hours.

BIOT 7303 Special Topics in Biopharmaceutical Regulatory Science (3 SH)
Presents selected topics of current importance in biotechnology and biopharmaceutical regulatory science.
- Repeatability: May be repeated up to 2 times.

BUSN 0100 American Society and Management (0 SH)
Introduces students to the values and practices that guide business in the United States while previewing the attitudes and behaviors of managers and employees. Seeks to develop an understanding of the context of U.S. business.

BUSN 0200 Managerial Economics (0 SH)
Features the primary economic concepts that govern business. Emphasizes the meaning and use of major economic principles in the business setting.

BUSN 0300 Accounting Principles (0 SH)
Features the essentials of accounting concepts and terms. Accounting is the international language of business. In this respect, it provides the foundation upon which all future business courses build.

BUSN 0400 Introduction to Marketing (0 SH)
Presents the concepts of marketing, which are central to business success. Features the basic concepts of marketing products, such as pricing, promotion, and placement, through case analysis.

BUSN 0500 Quantitative Business Methods (0 SH)
Provides participants the opportunity to acquire mathematical and statistical knowledge that serves as preparation for quantitative analysis. Emphasizes practical applications of sound data and analytical techniques.
- Prerequisite: Junior or senior standing.

BUSN 0945 Managerial Skills Workshop (0 SH)
Designed as a noncredit course to address student preparation deficiencies in the areas of accounting, economics, or statistics, as appropriate. Students who fail the mandated assessment of preenrollment preparation in one or more of these areas may be required to successfully complete this course. Seeks to help students review and develop their skills in the relevant areas prerequisite to the full-time MBA program.
- Prerequisite: Business majors and combined majors only.
- Repeatability: May be repeated without limit.
BUSN 1100 Introduction to Planning for Business Co-op and Careers (1 SH)
Offers students an opportunity to develop the skills and knowledge necessary to be successful in the professional world of work and to navigate their career. It is the first step in preparing for co-op job search in the D’Amore-McKim School of Business (DMSB). Offers students an opportunity to complete a self-assessment to determine their skills and interests within business; to learn about the various concentrations, career paths, and co-ops within DMSB; to learn to use myNEUCOOL, the search tool for finding available co-op positions; to develop a draft résumé for review; and to select a concentration for the upcoming semester’s co-op placement search.
- **Prerequisite:** Business majors and combined majors only.

BUSN 1101 Experiential Entrepreneurship (4 SH)
Blends theoretical principles with real-life application. Introduces the fundamentals of launching, growing, and managing a business venture in today’s dynamic and increasingly global environment. Examines concepts within multiple academic disciplines and from multiple perspectives—including marketing, technology, finance, accounting, information systems, people, and culture—and then applies them to new ventures within varied types of organizations. Offers students an opportunity to develop an entrepreneurial skill set and mind-set through the development of the critical thinking, innovative decision making, problem solving, and team building needed for any business, large or small. Note: This course does not satisfy the NU Core experiential learning requirement.
- **Prerequisite:** Business majors and general studies students only.

BUSN 1102 Personal Skill Development for Business (1 SH)
Offers first-year students in the D’Amore-McKim School of Business (DMSB) an opportunity to achieve a better understanding of themselves as students and as future professionals. Explores self-analysis, leadership traits and styles, diversity and cultural awareness, professionalism, emotional intelligence, and ethics. Encourages students to draw connections among classroom education, extracurricular activities, and practical experiences and to identify how each component fits into the pursuit of their individual goals.
- **Prerequisite:** Open only to first-year DMSB students.

BUSN 1103 Professional Development for Business Co-op (1 SH)
Introduces students to the Cooperative Education Program and provides them with an opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, professional behaviors, work culture, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEU in the job-search and referral process. Presents co-op policies, procedures, and expectations of the Department of Cooperative Education and co-op employers.
- **Prerequisite:** BUSN 1100; business majors and combined majors only.

BUSN 1110 Fundamentals of Business (4 SH)
Designed to familiarize students with the contemporary world of business. Introduces legal, political, ethical, and social citizenship foundations and theories that businesses and nonprofit organizations are built upon. Exposes students to the various business disciplines and the role these disciplines play in an organization. Covers several quantitative fundamentals and tools for ethical and socially responsible business decision making. Integrates critical issues affecting the world of business from both a national and international perspective. Offers nonbusiness students an opportunity to develop basic business literacy within an ethical context. Also functions as a foundational, “cornerstone” course for those considering minoring in business.
- **Prerequisite:** Not open to business majors.
- **NUpath:** Understanding societies and institutions, employing ethical reasoning.
- **Equivalent:** MGMT 2110.

BUSN 1201 Living and Working in the United States (4 SH)
Offers international students an opportunity to transition to living and working in the United States. Covers U.S. social and academic culture from a college student’s point of view. Emphasizes surviving and thriving in the business classroom and taking advantage of the student organizations available on campus. Also covers the culture of job searching in the United States, including reading the job description, company research, self-marketing, communication (small talk, safe and unsafe topics, etc.), interviewing basics, and accepting a position. Addresses the culture of business organizations and professional expectations. Course activities include role-playing, peer partnering, and site visits.
- **Prerequisite:** Freshman or sophomore standing.
BUSN 1944 Freshman/Sophomore Internship (1 SH)
Offers students an opportunity for internship work.
• Prerequisite: Freshman or sophomore standing; business administration students only.
• Repeatability: May be repeated up to 2 times.

BUSN 3201 D’Amore-McKim School of Business Global Leadership (1 SH)
Offers students an opportunity to mentor international and out-of-region freshman students in the D’Amore-McKim School of Business, learn and practice strategies to assist their mentees’ transition to a culturally and educationally different environment, and to acquire appropriate techniques of providing guidance and direction in this realm, to reflect on their experience as mentors, and to consider how effective global leadership includes an understanding of cultural differences and transitions in a global educational and business world. Does not count toward degree.
• Prerequisite: Sophomore standing or above; business students only.
• Repeatability: May be repeated once.

BUSN 3944 Junior/Senior Internship (1 SH)
Offers students an opportunity for internship work.
• Prerequisite: Junior or senior standing; business administration students only.
• Repeatability: May be repeated up to 2 times.

BUSN 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee.
• Prerequisite: Admission to Co-op MBA program.
• Repeatability: May be repeated without limit.

BUSN 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BUSN 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

BUSN 6200 Career Management (0 SH)
Required for the Co-op MBA program. Begins with an introduction to the career planning process and to the services of the MBA Career Center. Topics include résumé writing, videotaped practice interviewing, job search strategies, interview preparation, salary negotiation, marketing communication, and visa issues for international students seeking employment in the United States. May include additional topics depending on student interest.
• Prerequisite: Admission to Co-op MBA program.

BUSN 6201 Managerial Effectiveness (1 SH)
Opens the full-time MBA program and offers students an opportunity to begin to identify the skills they need to develop to become effective managers. Assesses student capabilities in both qualitative and quantitative management skills, based partly on program prework, to form the foundation for developing an individualized plan to improve students’ portfolio of abilities. Covers communications, business analysis, interpersonal effectiveness, and ethics and values.

BUSN 6202 Leadership and Planning for Growth (1 SH)
Bridges the first and second years of the full-time MBA program, helping students reflect on their development over their first year in key managerial skills while preparing for leadership roles in their organizations. Focuses on teaching students the process of developing strategic plans for growth and effectively leading growth initiatives for their organizations. Teaches students to convert strategic plans into business models, financial plans, and investment strategies. Focuses on how to apply managerial skills in leading and implementing these plans. Introduces the Business Plan Project that continues in ENTR 6208.
• Prerequisite: BUSN 6201 and 25 semester hours of MBA core curriculum.
BUSN 6203 Understanding Sustainability Strategies (1 SH)
Introduces students to the skills necessary to operate in the emerging environment of sustainability-focused management. Includes the fundamental elements of sustainability and the frameworks to analyze sustainability challenges. Also examines case studies of firms meeting these challenges.

BUSN 6204 Persuasive Communication with B2B Customers (1 SH)
Introduces concepts in the field of personal selling in a business-to-business (B2B) environment. Exposes students to a process developed to help them better understand personal selling by providing solutions and understanding the role of relationship development. Seeks to provide students with a better understanding of the visual, verbal, and nonverbal communication involved in B2B sales presentations. Identifying and qualifying prospects, use of persuasive communication, and the role of ethics in the selling process are also introduced.

BUSN 6205 Emotional Intelligence: Your Key to Success (1 SH)
Introduces students to the various definitions of emotional intelligence (EI), which has emerged in the popular business press as a set of competencies assembled under four categories: self-awareness, social awareness, self-management, and relationship management. Covers the measuring of EI; EI and performance (job performance, team performance, and leadership); and activities and exercises that may lead to improving one’s emotional intelligence.

BUSN 6206 Intellectual Property for Global Business (1 or 1.5 SH)
Introduces the nature and function of various types of intellectual property (IP) available internationally. Examples may include patents, copyrights, trademarks/trade dress, and trade secrets/know-how. The course also introduces students to the opportunities for strategic use of IP assets for competitive advantage in an international or multinational business.

BUSN 6207 Developing Critical Skills in Real Time (2 SH)
Seeks to provide students with the opportunity to develop their personal management and leadership skills during and throughout their course of study. Utilizing assessments and other data collection techniques for increasing personal insight, the goal of the course is to target areas for development through the practice and application of activities and exercises.

BUSN 6208 Competition in Global Markets (1 SH)
Employs a business simulation in which students compete by applying their knowledge of accounting, marketing, finance, operations, quantitative methods, and economics to advance their firm in a globally competitive industry. Designed as a capstone activity, the course serves to integrate the functional disciplines of business in a practical, hands-on manner by providing students a “live” example of their programmatic content. Offers students the opportunity to gain a better understanding of the consequences of their actions in an uncertain and highly competitive international environment by developing multifaceted strategies and tactics for their companies.

BUSN 6209 Negotiations for Conflict Resolution (1.5 SH)
Focuses on conflict resolution. Covers the basic elements (strategies and styles) of negotiation. Uses short lectures, role-playing, and simulations to offer opportunities for students to develop their skills and gain feedback. Managers today find themselves negotiating numerous times every week. This occurs every time that two or more people are in a situation where their goals and interests differ. In addition to what we formally think of as negotiation (contracts, clients, customers), managers also engage in less formal negotiations—with bosses, subordinates, peers, group members, suppliers, etc. Each class focuses on practicing negotiation skills in a role-play. Also covers mediation, where a third party helps to resolve a conflict.
* Prerequisite: Online MBA students only.

BUSN 6210 Field Consulting Project (3 SH)
Offers an interdisciplinary project course in which teams of students work with host organizations on current problems, learning how to understand and analyze the problem, and offer recommendations. A faculty adviser supervises and provides guidance to the teams. Projects involve a broad variety of host organizations—large and small, for-profit and nonprofit, manufacturing and service—and the project report and presentation typically extend to an analysis of the host organization’s industry, identification of organizational problems and opportunities, and formulation of actionable recommendations. Students also develop teamwork and communications skills in a real-world setting.
* Prerequisite: Admission to Co-op MBA program.

BUSN 6211 Building Agility in Projects and Organizations (1 SH)
Exposes students to the business rationale for using agile principles. Discusses the philosophies and culture that need to be incorporated into the agile business. Presents the core foundation of agility and a model for developing an agile business.
BUSN 6212 Patenting Life (and Death): Aids, Africa, and the High Cost of Lifesaving Medicines (1 SH)
Examines the question of whether multinational companies who discover, develop, patent, and market medicines to treat AIDS have a legal, ethical, or business obligation to make those drugs affordable for sick and dying people in Africa and other developing countries. Includes concepts of fiduciary duty, stakeholders, and corporate social responsibility in the framework.

BUSN 6213 Current Crisis: Hot Topics in Economics and Finance (1.5 SH)
Explores the current economic and financial crisis by examining the numerous and complex interdependencies that exist in the world’s economies. Focuses on the market forces and outcomes that arise from decisions by individuals, businesses, and governments, emphasizing the role of finance. History provides an extensive list of market and institutional failures—financial and otherwise—from which, through better understanding, we emerge stronger and more successful. Analyzes where we are, how we got here, and where we may be headed.
• Prerequisite: Online MBA students only.

BUSN 6214 Business for Global Good: Impact Investing in Emerging and Frontier Markets (1 SH)
Exposes students to the field of emerging market entrepreneurship, with a focus on microenterprise development in the poorest communities in the world. Offers students an opportunity to learn about the growing field of microfinance and its impact in stimulating business development in desperately poor communities.
• Prerequisite: Business administration students only.

BUSN 6215 Transparent Pricing Strategies in the Service Industries (1 SH)
Introduces pricing strategy for service industries, such as the hotel or airlines, where prices vary by demand. These industries face unique pricing challenges, as unsold “goods” result in immediate loss on the income sheet. Uses selected real-world case studies to discuss constraints and costs, the impact of the Internet and pricing transparency, the effect of deregulation and continuous price wars, pricing strategy options, and to examine the overall consequences of these strategies for both firms and consumers.
• Prerequisite: Business administration students only.

BUSN 6216 Make Innovation Easy (1 SH)
Offers students an opportunity to develop the capability to both craft an innovation strategy and to create a culture of innovation. Exposes students to new ways to craft an innovation strategy through the application of a set of diagnostic questions that help companies identify where their organization needs to focus its innovation efforts, the problems innovations are attempting to solve, and the knowledge that is needed to generate these innovations. Uses a mixture of lecture, small-group discussions, readings, short cases, and interactive exercises.
• Prerequisite: Business administration students only.

BUSN 6217 Assessing International Trade and Sovereign Risk Potential (1.5 SH)
Reviews the major factors that drive the assessment of risk and potential return of foreign locals/countries. Nearly all foreign expansion begins with an assessment of the market potential of the foreign market and/or riskiness of operating in, or with, foreign-based firms. While these assessments are idiosyncratic, they all tend to contain a number of common elements that are introduced in this course.
• Prerequisite: Online MBA students only.

BUSN 6218 The Twenty-First-Century Leader: Managing Your Communication (1.5 SH)
Uses exercises, group projects, and presentations to practically apply theories of communication to everyday situations. Technology has dramatically changed the pace and ways we communicate, but with all the variety and speed of electronic communications, the need for competency in face-to-face communication is still the most critical skill leaders must have to successfully maneuver in organizations and influence others. This is a highly interactive class.
• Prerequisite: Online MBA students only.

BUSN 6219 Fraud: Examining the Role of Opportunity, Incentives, and Rationalization (1 SH)
Focuses on why and how fraud flourish within organizations. Offers students an opportunity to analyze and discuss the role of opportunity, incentives, and rationalization (i.e., “the fraud triangle”) in the demise of various corporations.
• Prerequisite: Business students only.

BUSN 6220 Designing Effective Organizations (1 SH)
Focuses on one of the answers to why some organizations are more effective than others—organization design. Addresses what the components of an organization are (e.g., the work, the structure, the reward system, the renewal systems, etc.); some of the design choices of each component; and the impact of organizational design on organizational effectiveness. Uses a variety of instructional techniques, including small-group discussion, case studies, videos, and lecture/discussion, and is highly interactive.
BUSN 6221 Occupational Fraud and Abuse (1 SH)
Provides an overview of both the pervasiveness and the causes of fraud/white-collar crime in our society; examines the types of fraud and fraud schemes that affect business enterprises; explores methods of fraud detection, investigation, and prevention; and helps increase one’s ability to recognize potential fraud and develop a “fraud-risk-management” philosophy. Fraud and abuse can be categorized into employee fraud (misappropriation of assets) and management fraud (fraudulent financial reporting). Occupational fraud and abuse cost U.S. organizations an estimated $400 billion annually. The average organization loses more than $9 a day per employee. Approximately 6 percent of total annual revenue of businesses is lost to employee fraud alone. Although employee fraud occurs more often, management fraud is four times more costly. Recent corporate scandals support these statistics.

BUSN 6222 Business Ethics in the Global Economy (1 SH)
Focuses on current international business ethics topics and ethical decision making with an eye toward the global business arena. Includes both theoretical and practical approaches that should facilitate a deeper understanding of the moral issues that managers face today. Covers moral philosophy perspectives, the legal dimension, ethical issues in business, developing an effective ethics program (and a code of ethics), and international and cross-cultural business ethics. Emphasizes recent research findings and salient examples from industry in order to create a current and colorful view of the state of business ethics. Discusses and debates controversial issues, such as insider trading and child labor, from a variety of perspectives.

BUSN 6224 E-Business Revolution and the New Economy (1 SH)
Looks at e-business and the new economy after the dot-com crash. The idea of the “new economy” is being promoted widely but few people know clearly what is meant, how much (or little) empirical support there is for this notion, or what it means in practical business terms. This course covers the following subjects: the new economy and how much empirical support there is for it; the dot-com crash; the essentials of e-business; the e-business experience—what works and what doesn’t; the e-economics of the new economy; impacts on business in the future.

BUSN 6225 Online Marketing Research (1 SH)
Explores current industry best practices in conducting quantitative surveys using the Internet. The Internet has transformed how marketing research is conducted and reported and offers the promise of better, faster, and cheaper collection and delivery of survey data and findings. Includes an overview of the online research market, best practices in online research, and online reporting and analysis.

BUSN 6226 Financial Forecasting (1 SH)
Offers practical insights on how to predict two important economic and financial variables; namely, exchange rates and stock market indices. Discusses the latest findings from specialist academic journals, which form the underpinnings of the different forecasting techniques. Examines exchange rates and stock markets separately and considers different approaches to forecasting these variables. Pays particular attention to the developments in these markets in the late 1990s and implications of these for forecasting equity returns.

BUSN 6227 Chipping The Stock Market (1 SH)
Combines theory and practice as it seeks to unravel for students mysteries that cloud perceptions of market activities. Many investors have lost faith in traditional investing philosophies; yet, investing remains an essential activity in a modern productive economy. Even with the recent market turnaround, investors remain uncomfortable returning to former methods. Chipping, a modern investing theory, approaches the market from a new direction and offers investors a new way to invest. Seeks to give students greater personal confidence about the stock market and a better understanding of the market’s underpinnings. Students read Chipping: How to Survive Market Turbulence and Hit a Hole-in-One and are assigned the task of developing an investment portfolio in the first ten trading days after the first week’s class session.

BUSN 6228 Residential Real Estate Analysis (1 SH)
Designed to focus on residential real estate investing, especially as a homeowner. In the last decade, the residential real estate market has been the best investment for individual investors. In the Greater Boston metropolitan area, the return on housing has significantly outpaced the national average that brought the median sale price of single-family homes to $415,800 by the third quarter of 2002. Investments made in a personal residential property easily become the largest investment for a household; therefore, investors should understand the process and valuation of residential real estate investing. Introduces the analytical process of investing in the housing market, including the analysis of current market conditions, mortgage financing, and valuation. Offers students a hands-on experience of investing through a simulated investment project.

BUSN 6229 Intellectual Board Games and Business Strategy (1 SH)
Takes two of the best and most-played intellectual board games, chess and Go, and exposes the student to a study of the relationship between intellectual games and business strategy. Using games as a metaphor to study business behavior and business strategy is quite common, though typically done at a superficial level. Provides students with the opportunity to learn how to play Go; to understand its strategic and tactical thinking; and to compare chess, Go, and business strategy. Studies Microsoft’s tactics and strategy as viewed from tactical and strategic principles learned from the games.
BUSN 6230 Evolution of the Internet as a Marketing Medium (1 SH)
Discusses current issues in electronic marketing/e-business. Explores recent trends such as continuing e-business and Internet marketing activities beyond the bursting of the dot-com bubble. Examines how firms currently use the Internet to improve marketing strategy and enhance customer relationships. Investigates the role of trust in Internet marketing strategies and identifies factors that influence customer perceptions of trust. Presents ways in which trust can be built in e-business relationships with customers and business partners.

BUSN 6231 Issues in Corporate Governance (1 or 1.5 SH)
Examines conflicts over control and governance of the corporation from a finance perspective. These conflicts often precipitate dissident shareholder actions such as proxy fights, hostile takeover attempts, and securities litigation, each of which are key concerns of top-level managers. Because stock market prices are critical to understanding virtually all conflicts regarding corporate control, part of this course covers efficient market theory and the assumptions that underlie it. The final part of the course focuses on using principles developed in the first part to analyze issues surrounding actual proxy fights, court cases, hostile takeovers, and current public policy debates. Includes specific issues of current interest: poison pills, dead hand provisions, executive salaries, and binding proxy votes.

BUSN 6232 Business Environment of Latin America (1 SH)
Focuses on a variety of important managerial issues in Latin America. Familiarizes students with economic, cultural, and political issues that are somewhat unique to the countries that comprise Latin America. Emphasizes international strategic maneuvering within Latin America. Geared toward the development of a more in-depth understanding of the issues that international managers face when expanding operations into this part of the world. Specific topics include economic development; cultural and historical perspectives of select countries (probably Chile, Ecuador, and Honduras); corruption patterns; strategies for entering certain markets; the political/legal dimension; and language/dialect differences.

BUSN 6233 Doing Business in Russia (1 SH)
Traces the evolution of Russia’s business conditions from the economic reforms introduced by President Gorbachev in the mid-1980s to those currently being implemented by President Putin. The Russian business landscape underwent dramatic changes during the country’s transition from a centrally planned to a market-oriented economy. The decade of wild capitalism is over and President Putin’s top priorities are economic growth, investment, and entry into the World Trade Organization. Emphasizes the current economic and business environment, including reforms and legislation in taxation, corporate governance, and investment opportunities. Draws course materials primarily from publications on Russian management, including case studies of U.S. and Russian companies, empirical studies of the business environment and managerial decision making, and analyses of the progress in corporate governance and protection of shareholders’ rights.

BUSN 6234 Diagnosing and Resolving Conflicts (1 SH)
Focuses on understanding the nature of conflict, mostly interpersonal conflict, and provides practice in dealing with conflict situations. Conflict is an inevitable, ubiquitous, and necessary part of organizational life, but there is also much evidence that conflict often produces harmful results. This one-credit course seeks to give students the skills to make sure conflict results in a positive outcome. Given the current business trends toward workforce diversity, globalization, and flatter decentralized organizations, how managers form different organizations and how cultures deal with conflict are increasing predictors of organizational success.

BUSN 6235 Retailing in the New Millennium (1 SH)
Uses a one-day crash course format to look at the current state of affairs to understand what is happening in retailing today. Analyzes why some of the age-old leaders are failing, which retailers are succeeding and why, and the impact (or lack thereof) of e-retailing on the industry—and, more important, the lessons e-retailing have taught us. Seeks to give students a clearer and deeper understanding of what it takes to succeed in retailing today and why so many historical retailers seem unable to make the transition. Focuses on marketing orientation and positioning in the marketplace, as opposed to a traditional retail operations focus. Students apply these concepts to a separate retailer, critically assessing this retailer’s performance and future potential.

BUSN 6236 Project Management (1 SH)
Explores the challenges associated with planning, organizing, operating, and controlling in a project environment. Projects are unique, onetime occurrences and, as such, require different managerial perspectives. Examines skills and techniques essential to project management. Combines class discussion with hands-on work in the computer lab.
BUSN 6237 Open Source Business (1 SH)
Focuses on the managerial aspects of open source software, rather than on the technical aspects. Open source software is also known as free software. The course title presents the paradox central to this course. For-profit firms invest in open source software, which is by its very nature available at no charge. (Indeed, many prefer that the software be described as “free” rather than as “open source.”) Why do firms such as IBM and Red Hat make these investments? Related to the managerial issue of profitability are issues such as intellectual property, human motivation, and freedom itself.

BUSN 6238 New Venture Finance (1 SH)
Describes how to present a credible story to potential financiers, the practices used to judge the financiability of a venture, the characteristics of successful deals, and the potential sources of funding. Finding money to launch a new venture without giving away too large an interest is a daunting task for the entrepreneur. This is particularly true in today’s economy. Yet even in times such as these, there are a variety of ways to secure the funds necessary to undertake a new venture. Involves readings and case discussion. Angel financiers and venture capitalists may join the discussion, providing participants with an opportunity to interact with those who make funding decisions.

BUSN 6239 Strategic Human Resources Management (1 SH)
Focuses on the strategic side (as opposed to the administrative side) of human resource management. Covers some basic principles of selection, training, and compensation and illustrates some “best-practices” companies that use HRM for competitive advantage.

BUSN 6240 Systems Thinking in Business (1 SH)
Looks at the business environment from a systems approach where all market components are closely linked but also coevolving. Today’s business managers face a world that is more dynamic and more uncertain than ever before. Utilizes the “Beer Game,” a management flight simulator that focuses on the dynamics of the supply chain and the managerial decisions that affect the overall supplier-manufacturer-customer relationship, so that managers may experience the long-term consequences of their actions. Also focuses on complexity theory based on the recent explorations in adaptive and emergent systems as an offshoot of chaos theory. Covers the effects of social networks on the marketplace, the concept of increasing returns (as opposed to diminishing returns), and the role of network externalities in the diffusion of new products.

BUSN 6241 Manager as Mediator (1 SH)
Covers the role of the mediator, basic steps and principles of mediation, dealing with difficult emotional conflicts that arise in mediation, and ethical dilemmas in mediation. Increasingly, organizations are trying to resolve difficult conflicts through mediation and are asking managers to develop their mediation skills. Conflicts are common in today’s organizations, especially with various “rights” being supported by both the courts and other kinds of pressure. Organizations are also becoming flatter, which adds to the potential for conflict as hierarchy decreases in importance. The costs of unresolved conflicts can be immense in terms of loss of organizational and individual effectiveness, dysfunctional behavior, and costly and painful litigation.

BUSN 6242 Great Companies (1 SH)
Reviews what the experts have said about what it takes to be considered a great company and what enables a company to achieve this greatness. Analyzes, through case studies, a few highly admired (great) companies. Students study how they do it; i.e., what organizational practices seem to account for their success. Gives students the opportunity to clarify their view of what defines and makes a great company and to increase their knowledge of the principles and practices of some great companies.

BUSN 6243 Nonprofit Financial Management (1 SH)
Focuses on the similarities and differences between traditional businesses and not-for-profit entities. Covers restricted funds, accounting for grants and pledges, application of time-value-of-money discounts to “long-term” current assets, budgeting, specialized financial reporting for contracts and grants, and specialized financial reporting for state and federal oversight, such as the Uniform Financial Report in Massachusetts.

BUSN 6244 Advanced Strategic Sourcing (1 SH)
Provides students with the opportunity to learn quick and easy ways to negotiate effective supply agreements and how to reduce the total cost of their supply chains. Effective strategic sourcing agreements help businesses manage their supply chains and also involves selecting the sources of supply aligned to corporate strategies and marketing requirements. This course explores how strategic alliances can be excellent ways to outsource activities that are not core competencies to the firm. Offers students the opportunity to learn how to manage a supply base strategically and how to select quality suppliers for their supply chain.
BUSN 6245 Globalization: Threats and Opportunities (1 SH)
Designed to help students understand the complex forces shaping the emerging global business environment. The rapid globalization of markets and production is transforming business, creating new market opportunities and new threats. But, as the impact of globalization spreads throughout regions, countries, and industries, a backlash is growing in the form of protests, protectionism, and criticism of multinational business. Will globalization deepen the divide between winners and losers, or will it result in greater benefits to all? How should these globalization processes be regulated or governed? The course explores the function and future of governance institutions such as the World Trade Organization and the International Monetary Fund, various attempts at regulating foreign direct investment and international capital flows, and controversies over foreign outsourcing. Also explores criticisms of globalization.

BUSN 6246 Financial Analysis and Modeling with Excel (1 SH)
Combines financial topics and financial analysis methods with basic and intermediate-level Excel tools. Taught in the computer lab, this is a hands-on course. A basic understanding of Excel’s features plus previous course work in accounting and finance are highly recommended due to the intensive nature of the course.

BUSN 6247 Effective Leadership Skills (1 SH)
Offers students the opportunity to learn practical and proven techniques for influencing people and creating personal power. Leadership skills are key to career advancement in business. Analyzes how charismatic leaders create their influence and power, the guidelines for successfully transforming organizations, and the characteristics of truly effective leadership. Covers ten specific techniques to improve students’ competence as leaders.

BUSN 6248 Greening the Global Economy with Sustainable Business (1 SH)
Exposes students to the responsibilities of business to the natural environment in a globalizing economy. Challenges students to consider if it’s possible for companies to be both ecologically responsible and globally competitive, how managers should respond to pressure from activists and governments to become more environmentally responsible, and how “industrial ecological” concepts can be incorporated into business practices. Ecologically responsive and responsible management is emerging as one of the most significant business challenges of the twenty-first century.

BUSN 6249 Expanding the Panama Canal (1 SH)
Designed for students with an interest in finance, economics, and supply chain management who wish to learn about one of the wonders of the modern world—the Panama Canal. Built in the early 1900s by President Theodore Roosevelt, the Panama Canal was an engineering marvel. It opened up major trade routes between countries that border on the Pacific and Atlantic oceans. The canal put some transportation out of business; now new modes are competing with the canal. As world trade continues to grow, the canal is considering expanding at a cost of $10 billion to handle larger ships. The course focuses on the history/background of the canal, the world trade outlook and impact on the Panama Canal, and the economic benefits and costs of expansion.

BUSN 6250 Comprehensive Industry Analysis: Medical Devices Industry (1 SH)
Provides a comprehensive industry analysis of the medical device industry. Examines the interaction and interdependence of business functions to obtain a comprehensive view of the operations of one or more companies within this growing industry. Using a basic business-planning outline, students explore the focus of the medical devices industry (the problem), the products and services offered within the industry (the solution to the problem), the market, and the companies that serve the market. Gives students the opportunity to see how the five major business disciplines (sales/marketing, operations, finance, development, and human resources) function within the industry. Sales/industry trade association representatives and company representatives appear as guest speakers.

BUSN 6251 The Dynamics of Pricing (1 SH)
Designed to teach the strategy and tactics of pricing. There are many business courses that teach about managing innovation, lean manufacturing, finance and accounting, and advertising and promotion. Yet, if firms fail to price their products and services properly, the consequences to their profitability are severe. This course explores why pricing is often ineffective and presents the discipline of strategic pricing. Examines how costs affect pricing decisions and how to price for profit. Analyzes the impact of pricing decisions on customers and the competition.

BUSN 6252 International Management: Insights from Fiction (1 SH)
Combines two approaches to help students develop skills in cross-cultural management—short stories from around the world paired with readings in international management. The stories and readings are drawn from Professor Puffer’s 2004 book, International Management: Insights from Fiction and Practice. Doing business internationally requires a broad set of managerial skills and a clear understanding of other cultures. Covers culture shock, repatriation, the meaning of work and personal values, power and authority, and building an international team. Uses management readings as an analytical framework in which to discuss the stories.
BUSN 6253 Fraud and Society: The Law and the Reality (1 SH)
Provides an overview of basic fraud theory, the U.S. legal system, and the law related to fraud. Fraudulent behavior is not unique to business enterprises. Studies and statistics support the fact that anyone is a potential victim of a variety of fraud schemes. No one is held harmless. Consumer-related fraud includes some of the most costly “crimes” facing individuals and society. Examines the methodology of the most common fraud schemes.

BUSN 6254 Strategy for Not-for-Profits (1 SH)
Designed to serve as a primer on how not-for-profit organizations operate. There are more than 1.8 million not-for-profit organizations in the United States employing 6.6 million individuals. These organizations produce a tremendous amount of revenue and come in many forms, representing diverse interests. It is important to know how they operate, since students entering the business world may interact with these organizations in a number of important ways. The interaction may be as employees, as members of the board of directors, as gift givers, and as members. 
- Prerequisite: Limited to MBA students in business administration, finance, marketing, and supply chain management; MSF students; and graduate certificate students in business administration.

BUSN 6255 Contemporary Management of Risk in Projects (1 SH)
Teaches students how to assess and manage risk in projects. Provides students with the opportunity to learn to become aware of risk, to understand how risk affects human behavior, to develop a risk-management plan, to use quantitative analysis to manage risk, and to understand how to make decisions in the face of uncertainty.

BUSN 6256 Social Entrepreneurship (1 SH)
Examines the growing area of social entrepreneurship, or the process of creating and managing new nonprofit ventures focused on improving social conditions, especially among the world’s most needy population. Many estimate that the fastest-growing employment sector around the world is the nonprofit and nongovernment sector, comprised of organizations that are organized to solve social problems that governments and the for-profit sector have failed to address, or ignore. In addition to case discussions, students create a microlending enterprise to address an unmet social need outside the United States. Based on the merits of the proposal, funding is sought in follow-up to the course.

BUSN 6257 High-Commitment Organizations (1 SH)
Explores how organizations can be designed and run to create conditions of high commitment—and high performance. Most people would rather work and invest in organizations where employees care about what happens; i.e., they act more like owners and less like hired hands. Organizations show great variation in the extent to which they achieve this high commitment. The difference stems from the choices—e.g., in purpose, culture, rewards, structure—that companies make. Gives students the opportunity to experience the contrasting impacts of low- and high-commitment organizations, to understand the organizational factors that affect commitment, and to learn the organizational design choices that lead to high commitment.

BUSN 6258 Europe in the Global Economy (1 SH)
Introduces the institutions, policies, and competitive practices of the European Union (EU) in the wider context of the global economy, emphasizing the Euro crisis and its global impact. The EU is now the largest and wealthiest single market in the world. As such, the structure and dynamics of the EU present significant challenges and opportunities for global managers, who must understand its different governance and regulatory, competitive, and cultural systems. The crisis in the common currency has far-reaching implications, not just for the EU but for the entire global economy. Covers the European business context in an instructive contrast to the “American model” of capitalism.

BUSN 6259 East Asia, Globalization, and the New Economy (1 SH)
Develops an overview of the East Asian business scene: how it got there, where it is today, and where it is likely to go in the future. Explores the business opportunities that are being created in this part of the world. Topics include what kind of businesses (or business linkages for U.S. firms) are appropriate to East Asian countries, which countries are most suitable for each kind of business, how the trend to offshoring impacts East Asia (and possibly its competition with India), and what the requirements and barriers are for building businesses related to the East Asian scene.

BUSN 6260 Blogging and Business (1 SH)
Covers blogging and business. Weblogs, or blogs, are identified by Harvard Business Review as one of the “breakthrough ideas for 2005.” Blogs have been prominent in many other mainstream media sources, and blogging has business potential in many senses because it is a channel through which firms can communicate with stakeholders. Firms that do so include Microsoft, Boeing, Stonyfield Farm, and many others. Reviews the business issues around the use of blogs. Gives students the opportunity to start their own blogs.
BUSN 6261 Global Sourcing (1 SH)
Provides students with an opportunity to learn quick and easy ways to identify and locate the best source of supply on a global basis. More and more companies are sourcing globally, with some companies outsourcing an entire portion of their operations. Global sourcing also involves selecting the sources of supply aligned to international corporate strategies and marketing requirements. Explores how strategic alliances can be excellent ways to outsource activities that are not core competencies to the firm. Focuses on how to manage a supply base strategically and how to select quality suppliers for a supply chain.

BUSN 6262 Business Lies, and the Big Fat Liars Who Tell Them: Setting Your Ethical Compass (1 SH)
Offers students an opportunity to gain a greater appreciation for the pressure and stress around corporate and individual performance in growing companies, especially public ones, and how that pressure can often lead otherwise virtuous people to pursue paths that often lead to their demise.

BUSN 6263 Working Capital Management (1 SH)
Highlights the critical areas in the management of the “current” portion of the balance sheet. Current Assets and Current Liabilities. Includes discussion of cash balances and cash flows, accounts receivable and credit management, inventory management, accounts payable and vendor relations, short-term financing, and cash conversion cycles in today’s market environment.

BUSN 6264 Real Life of Consumers: Qualitative Marketing Research (1 SH)
Introduces students to qualitative research. Includes how to distinguish it from quantitative research; an overview of the social science fundamentals of qualitative research, predominantly from anthropology and sociology; and examples of key qualitative data collection methods. Gives students the opportunity to learn to conduct qualitative interviews and observations as the basis of qualitative data analysis.

BUSN 6265 Brand in the Hand: An Introduction to Mobile Marketing (1 SH)
Examines how the mobile platform is evolving into an innovative medium for marketing activities. Provides students with an opportunity to investigate how firms are currently using mobile devices for marketing. Presents examples of innovative “Brand in the Hand” marketing in the United States and in the global arena and compares consumer response to mobile marketing established in emerging markets.

BUSN 6266 Negotiations: Developing Your Negotiation Skills (1 SH)
Covers the basic elements of negotiations. Uses short lectures, role-playing, and simulations to provide a number of situations for students to develop their skills.

BUSN 6267 Big-Picture Sustainability: The Science and Politics of American Energy (1 SH)
Examines contemporary issues in the science and politics of U.S. energy. Begins by reviewing scientific findings on energy use and environmental impacts. Discusses how key stakeholders are reacting to emerging concerns about peak oil, environmental pollution, and global warming.
• Prerequisite: Business students only.

BUSN 6268 Varieties of Global Capitalism (1 SH)
Designed to acquaint students with several distinctive varieties of market-based institutions and the business-government relationships they support. Examines the Nordic style of welfare capitalism; the German style of corporatism; the worker-manager codetermination of the Japanese style of tight cooperation between the “Iron Triangle” of business, finance, and government; and the Indian and Chinese models, which are transforming from heavy state control to a mixed economy.

BUSN 6269 Information Quality for Global Managers (1 SH)
Discusses how information quality is defined, measured, analyzed, and improved through the lenses of various areas such as management information systems, philosophy, and organizational learning. Exposes students to different perspectives from different disciplinary areas and how they are used to frame and solve information quality problems differently in the entire information production process. Also introduces students to state-of-the-art assessment and measurement concepts, techniques, and tools.

BUSN 6270 Management Skills Development Seminar (1 SH)
Offers students the opportunity to assess their individual management skills and to initiate actions toward building management skills to a higher level of competence. Provides students with the opportunity to undertake a 360-degree skill-assessment process that will lead to the crafting of personal development plans. Enables students, over the course of the term, to implement these plans. Uses learning teams to provide mutual support to the student in management skills assessment and analysis, developmental planning, and tracking progress against actions and accomplishments.

BUSN 6271 Decision Making and Its Impact on Organizations (1 SH)
Combines a historical look back at decisions that changed the business world irrevocably with current topical decisions that are impacting the international business world today. Offers students an opportunity to explore how decisions are made, the structural and interpersonal issues that either impede or support effective decision making, and the steps organizations must take to overcome the challenges created by ineffective decisions.
• Prerequisite: Students in selected MBA, MFA, and certificate programs only.
BUSN 6272 Mastering Business Intelligence to Manage Global Business Organizations (1 SH)
Explores the role of business intelligence (BI) processes within the enterprise, how they work, their associated costs, and their implications for business success. Exposes students to the decision-making process that is grounded in the data generated by the enterprise as supplemented by intelligence drawn from competitors and the marketplace as a whole.
• Prerequisite: Students in selected MBA, MFA, and certificate programs only.

BUSN 6273 Sustainability in Innovation (1 SH)
Focuses on different types of strategies firms have taken for sustainable innovation. Introduces the concept of designing products for the triple bottom line—people, planet, profit. Offers students an opportunity to design product ideas and formalize corporate strategy for sustainable innovations. Working in teams, students present the product ideas in class.
• Prerequisite: Students in selected MBA, MFA, and certificate programs only.

BUSN 6274 Social Media Marketing (1 SH)
Examines social media marketing (SMM) strategies across business-to-business (B2B) and business-to-consumer (B2C) environments from both the company as well as the consumer perspective. Discusses the elements of online social media “ecosystems,” successful SMM strategies from both large and small companies, the importance of integrating SMM with other forms of marketing communications, and ways to measure results and return on SMM.
• Prerequisite: Students in selected MBA, MFA, and certificate programs only.

BUSN 6275 Ethical Issues in the BRICs (1 SH)
Focuses on corruption, bribes, and favors in the BRIC countries of Brazil, Russia, India, and China. Topics include the scope and nature of these ethical issues, how they affect doing business in those countries, and how Western firms handle these issues while abiding by the U.S. Foreign Corrupt Practices Act and international standards of business conduct.
• Prerequisite: Students in selected MBA, MFA, and certificate programs only.

BUSN 6277 Mastering the Art of Public Speaking (1 SH)
Studies the characteristics of effective presentations. Exposes students to the mechanics of planning, preparing, and practicing presentations. Introduces students to a variety of public-speaking scenarios and specific formats for particular situations. Offers students an opportunity to practice giving presentations, which will be video-recorded for feedback and coaching purposes.
• Prerequisite: Students in selected MBA, MSF, and certificate programs only.

BUSN 6278 National Strategies in the Global Economy (1.5 SH)
Employs a comparative model for understanding how nations position themselves to compete effectively. Exposes students to various frameworks for analyzing national competitiveness and country risk, primarily in emerging markets. Uses in-depth country case studies to compare the policies and strategies of a range of nations at different levels of economic development and to consider the implications for business responses to these challenges and opportunities.
• Prerequisite: Online MBA students only.

BUSN 6280 How Executives Shape and Lead Innovation and Enterprise Growth (3 SH)
Focuses on different types of innovation (technical, market, business model, and organizational), the role of executive leadership, and enterprise growth in technology-intensive industries. Offers students an opportunity to apply a strategic management framework to industry leaders through case studies. Students are then asked to apply the framework to the future growth of their own organizations and the career path they seek in that growth. Seeks to help students successfully begin the excursion through the High Tech MBA program.
• Prerequisite: MS-in-innovation students only.

BUSN 6281 Venturing with Northeastern Entrepreneurs, Investors, and Corporate Executives (3 SH)
Offers an intensive residency that brings together Northeastern alumni/ae and/or current students who are entrepreneurs, investors, or corporate executives who have successfully delivered disruptive innovations across multiple industry sectors. Introduces students to entrepreneurship concepts for both the startup and corporate context. Working in industry teams, students have an opportunity to identify new product, service, and business-model innovation opportunities and explore startup and corporate pathways to develop and market these opportunities.
• Prerequisite: High-technology students only.
• Equivalent: BUSN 6282.

BUSN 6282 Integration Residency (0 SH)
Focuses on business planning, strategy, negotiations, and communications for new venture proposals. During this short, intensive residency, students present and defend their business plans developed in MGMT 6281. Involves presentation and evaluation of each group’s plan by other groups. Judging groups allocate “funds” to deserving proposals.
• Equivalent: BUSN 6281.

BUSN 6283 Defending and Evaluating Business Plans (6 SH)
Follows up BUSN 6281, in which business plan ideas were developed, and MGMT 6281, in which written business plans were developed by teams. This course involves teams defending their business plans and also evaluating business plans of other teams, as they compete for limited theoretical funding for their projects.
BUSN 6284 Managing Change from Where You Sit (1 SH)
Focuses on supervisors and managers and how to motivate employees to alter their patterns of behavior. Offers students an opportunity to acquire the conceptual and behavioral tools necessary to help manage the required changes from all levels of the organization.
• Prerequisite: Business students only.

BUSN 6285 Managing in a Crisis (1 SH)
Examines the various types of crises common to today’s businesses, as well as their risk exposure, and identifies and discusses those steps necessary to prevent some crises from occurring. Examines the multitude of factors and forces to be considered when implementing an effective crisis management program.
• Prerequisite: Business students only.

BUSN 6286 Leading Responsibly in the Global Economy (1 SH)
Focuses on capabilities/knowledge in the area of responsible global leadership. Includes a strong practitioner emphasis designed to introduce students to a number of key factors when taking on leadership roles or engaging in activities with individuals from different cultures. Assesses traditional leadership approaches in light of global business situations. Reviews some of the actions that highly regarded global firms have taken to strengthen their positions with local communities, governments, and NGOs, which can often be their largest critics.
• Prerequisite: Business students only.

BUSN 6287 Strategic Decision Making in Times of Uncertainty (1 or 1.5 SH)
Examines concepts, approaches, and tools for understanding, analyzing, and managing uncertainty. In today’s competitive landscape, uncertainty is inherent in any strategic decision. The nature and level of uncertainty varies across different types of decisions and different industry environments. Despite this variation, companies typically use a uniform approach to making strategic decisions. This course uses a case-based approach to focus on defining and analyzing uncertainty, including understanding different levels of uncertainty, as well as identifying the key drivers of uncertainty. Discusses various tools and techniques to develop strategic alternatives to manage uncertainty and identify possible solutions for common types of strategic decisions. Key concepts include strategic analysis, real options, discovery-driven planning, game theory, and scenario planning.
• Prerequisite: Business students only.

BUSN 6288 Arts-Based Learning for Managers (1 SH)
Discusses how arts-based learning can contribute to learning and development of organization managers and leaders as well as contribute to organization learning and development. Offers students an opportunity to participate in theatrical improvisation, ensemble performance, conducting, rehearsal, and practice methodologies as found in the creative arts. Discusses these practical experiences in the context of how and why increasing numbers of corporate leaders are bringing artists and artistic processes into their companies with the goal of stimulating management education and leadership development outside the traditional confines of the four walls of a classroom.
• Prerequisite: Business students only.

BUSN 6289 Financial Statement Analysis (1 SH)
Builds on ACCT 6200 or ACCT 6208. Covers some of the more complex and highly relevant financial reporting topics, including mergers and acquisitions, fair value, pensions and executive share-based compensation, off-balance sheet transactions, cash flow statements, and advanced issues related to revenue recognition. In addition, exposes students to a framework for identifying key questions asked by analysts that may be referred to as “accounting land mines.”
• Prerequisite: ACCT 6200 or ACCT 6208; business students only.

BUSN 6292 Introduction to Qualitative Interviewing (1 SH)
Exposes students to qualitative marketing research as well as the practice of designing and conducting one of the most popular qualitative data collection methods—interviewing. Includes discussion distinguishing qualitative from quantitative research, situations where qualitative research is important, selecting appropriate formats, and introducing the method of qualitative interviewing.

BUSN 6294 Early Stage Intellectual Property Decisions (1 SH)
Introduces the different functionality and potential value of four types of intellectual property (IP) assets (utility patents, copyrights, trademarks, and trade secrets) and IP strategies, with a focus on new ventures. Early stage decisions about IP have a direct impact on costs, funding, development, and competitive position. Covers which type of IP best matches the venture’s development and launch objectives; how IP asset development can support (or undermine) the business plan; what priorities influence early stage decisions; when a trade secret strategy is more effective than patents; and how IP assets can help a startup to bridge the “valley of death.” Offers students an opportunity to evaluate and prioritize potentially available IP assets and develop an early stage IP plan for a new venture.
• Prerequisite: Business students only.
BUSN 6302 Talent Management (1 SH)
Addresses all components of talent management with a particular emphasis on motivating and developing employees. Companies are realizing that the way in which they manage their talent—in other words, their effectiveness in attracting, selecting, developing, motivating, and retaining their talent—is key to organizational effectiveness. Discusses some of the fundamental choices that companies face in each area and explores some of the companies with the best talent management systems. Uses lecture, discussion, and case discussion, supported by videos, as the primary format.
• Prerequisite: Business students only.

BUSN 6303 Global Managers—Legal and Ethical Challenges (1 SH)
Focuses on recent international conventions and national laws, with reach beyond domestic borders, that are changing the legal and normative environment in which domestic and global business is conducted. Concentrates on managerial behavior in global business organizations. Introduces students to different forms of corruption in developed and emerging markets, discusses their effects on society, and introduces the most relevant international legal standards and sanctions. Uses case studies and recent legal cases to highlight the business risks and consequences of noncompliance on individuals and organizations.
• Prerequisite: Business students only.

BUSN 6304 Career Management for Working Professionals (1 SH)
Seeks to provide working professional students with the tools and strategies they need to advance their careers. Job search techniques are critical skills, and this course addresses key tools needed to support job searches: résumés, cover letters, networking profiles, etc. Offers students an opportunity to learn about successful networking, job search strategy, and interviewing. Includes interactive exercises and individual feedback.
• Prerequisite: MBA students only.

BUSN 6305 Social Media Has Changed Marketing (1 SH)
Focuses on social media and how they are being used in business. Uses case studies of various companies to explore how they are using social media. Introduces students to a repeatable social-media methodology and exposes them to a variety of social-media platforms, which may include Facebook, LinkedIn, Twitter, Pinterest, and others.
• Prerequisite: Business students only.

BUSN 6306 Creativity Skills for Leadership (1 SH)
Addresses the nature of creativity and covers several popular creativity techniques. Topics may include the definition of creativity, myths and theories of creativity, popular creativity techniques, and their application. Offers students an opportunity to obtain an understanding and insight into their own creativity and to assess and evaluate their creativity as well as that of others.
• Prerequisite: Business students only.

BUSN 6307 Strategy and Technological Change (1 SH)
Introduces students to “disruptive technology” and how it differs from a “sustaining technology.” Analyzes why accepted principles of good management are inappropriate in the face of disruptive technologies. Examines why firms struggle in adapting to these technologies, even after they recognize and attempt to incorporate these changes, and how firms can learn to manage disruptive innovation.
• Prerequisite: Business students only.

BUSN 6308 Mobile Marketing Research (1 SH)
Explores the why, when, and how of conducting mobile marketing research by introducing a variety of qualitative and quantitative mobile methods. Given the increase in social media and mobile technologies, companies are beginning to embrace mobile platforms to conduct marketing research. Seeks to identify the evolving best practices of mobile marketing research by utilizing current literature, discussing a mobile survey research case, and developing a mobile research proposal. Examines ethical guidelines from associations’ codes of ethics and applies them to the course work.
• Prerequisite: Business students only.

BUSN 6309 The Reality of the Merger and Acquisition Process: What to Expect (1 SH)
Introduces the mergers and acquisitions (MandA) process and a variety of aspects of MandA, including identification of objectives, hidden agendas, cultural differences, organization, business model, and communications. Offers students an opportunity to learn the various components involved in a merger and what a merger might represent for both parties, the one overtaking and the one being acquired. Examines traditional and academic strategic frameworks and how they work in actual MandA processes.
• Prerequisite: Business students only.

BUSN 6310 Strategic Human Resources Practices for Managers (1 SH)
Focuses on three core management responsibilities where human resources (HR) skills are critical: implementing organizational change, challenges and opportunities of performance management, and developing and retaining key contributors. Targeted toward managers in all parts of an organization and offers them an opportunity to enhance their critical HR skills and practices in managing their organizations.
• Prerequisite: Business students only.
BUSN 6311 Financial Statement Analysis (1 SH)
Covers financial reporting, financial statement analysis, and the three major approaches to business (entity) valuation. Reviews the components of the financial statements and primary Securities and Exchange Commission (SEC) filings and evaluates how to assess the quality of information in those statements. Exposes students to approaches used to leverage the information provided to evaluate company strategies and competitive and risk profiles and to engage in entity-level valuation. Also includes an overview of issues and approaches related to intangible asset valuation.
* Prerequisite: Business students only.

BUSN 6312 Competing in and with China and India (1 SH)
Explores the implications of the global economic shift toward emerging economies. Covers frameworks to understand why some U.S. firms have reworked their global strategies more effectively than others. May also address challenges in gaining market share, serving base-of-the-pyramid customers, offshoring the value chain, and tapping into the innovation potential of these locations. Offers students an opportunity to explore implications for personal career development in an effort to help them better prepare for the different world ahead.
* Prerequisite: Business students only.

BUSN 6313 Issues in Franchising (1 SH)
Covers key issues that are relevant to the development, management, and operation of franchise businesses from the perspective of both a franchisor and franchisee. Discusses topics that relate to franchising, including the history of franchising and its growth and importance to industry and the economy as well as key topics that relate to franchisees and franchisors.
* Prerequisite: Business students only.

BUSN 6314 Practicing “Leaderful” Development in Organizations and Networks (1 SH)
Designed to give students some practical background and experience in engaging in leaderful development in an organization or network. Covers the background of standard leadership development and how its practice has shifted in recent years from “leader development” to “leadership development.” Exposes students to the prospective shift from “leadership development” to “leaderful development,” acknowledging that leadership can be available not only to everyone in the organization but can arise as a collective social interaction. Students should have access to a place of work or a volunteer or community organization requiring interaction with others.
* Prerequisite: Business students only.

BUSN 6315 How Credit and Liquidity Precipitate a Financial Crisis (1 SH)
Asks students to conduct an intensive, focused review of up to five transformative financial events in the modern era of American history. These events—such as the 1913 creation of the Federal Reserve System in the aftermath of the 1907 financial panic and banking crisis—are used to illustrate and explain key factors and attributes of the financial system, its institutions, and the responses of private and government decision makers to financial crises. The development of analytical frameworks for students to organize and analyze information about recent financial events is a central theme of the course.
* Prerequisite: Business students only.

BUSN 6316 The Role of Multinational Natural-Resource Companies in the Global Economy (1 SH)
Examines various issues regarding the role of multinational natural-resource companies (MNCs) from a stakeholder perspective, including MNCs, workers, governments, suppliers, customers, and the natural environment. Many students may work in various business functions in sectors dependent upon natural resources (e.g., electronic device manufacturing, auto manufacturing, investments), and this course is designed to expose them to, and may create an understanding of, the key role played by MNCs.
* Prerequisite: Business students only.

BUSN 6317 Global Sourcing of Information Management Personnel and Services (1 SH)
Exposes students to the various options available today in sourcing information technology services, call center and backroom processing operations, and technical staffing. In considering each of these options, students are asked to consider their operational, managerial, and cost implications. Then, as a field exercise, students are asked to explore and analyze sourcing options within their own organizations and to reflect upon the benefits and risks associated with these choices.
* Prerequisite: Business students only.

BUSN 6318 The Team Clinic (1 SH)
Presents the fundamentals of teams and team skills through cases and articles. Emphasizes, through exercises and role-plays, the “how-tos” of teams. Offers students an opportunity to practice giving and receiving feedback, setting goals, agreeing on team norms, managing teams as teams, and other essential components of effective teams.
* Prerequisite: Business students only.
BUSN 6319 Power and Politics: Getting Things Done in Organizations (1 SH)
Addresses two interrelated forms of politics: (1) organizational—focused on achieving business goals—and (2) office politics—focused on achieving individual career goals. Offers students an opportunity to learn concrete ideas and strategies for enhancing their ability to achieve their organization’s business objectives while also advancing their own personal career aspirations.
• Prerequisite: Business students only.

BUSN 6320 Business Analytics Fundamentals (1 SH)
Introduces the key concepts of data science and data analytics as applied to solving data-centered business problems. Emphasizes principles and methods covering the process from envisioning the problem; applying data science techniques; deploying results; and improving financial performance, strategic management, and operational efficiency. Includes an introduction to data-analytic thinking, application of data science solutions to business problems, and some fundamental data science tools for data analysis.
• Prerequisite: Business students only.

BUSN 6321 Just Because We Can Doesn’t Mean We Should: Why Some Smart Products Are Dumb Ideas (1 SH)
Examines the trend of smart products. Discusses and reviews the pros and cons of both technology-led and human-centered innovation while examining the need to borrow from both perspectives to create a successful innovation. A major component of the course is to discover, discuss, and dissect examples of smart products found on crowd-funded websites to help illustrate the importance of having both technology-led and consumer-led elements when creating a new idea.
• Prerequisite: Business students only.

BUSN 6322 U.S. Healthcare Reform—Past, Present, and Future (1 SH)
Focuses on the current state of healthcare reform in the United States, with an examination of the historical factors that led to the current legislation. Analyzes evolving issues around implementation; state responses; provider, payer, and employer strategies; and the impact on employees, as well as possible unintended consequences. Evaluates the impact on the Triple Aim initiative (cost, quality, and access).
• Prerequisite: Business students only.

BUSN 6324 Predictive Analytics for Managers (1 SH)
Presents the concepts of correlation and simple linear regression analysis as well as multiple regression analysis. Offers students an opportunity to build multiple regression models and use them in forecasting and analyzing data. Exposes students to nonlinear regression models, reading and analyzing output tables, and using statistical software tools.
• Prerequisite: Business students only.

BUSN 6325 The Moral and Social Dimensions of Business Leadership and Decision Making (1 SH)
Offers students a different context in which to examine the ideas of corporate social responsibility and business ethics. Course objectives include understanding how strategic business decisions are made within public and private governance structures, considering the impact of growing wealth and income inequality, and evaluating alternative decision-making models that elevate moral ideals. Examines morally courageous business and civic leaders and their hallmark decisions in order to consider the challenges and opportunities in transferring best practices from the civic arena to the business sector.
• Prerequisite: Business students only.

BUSN 6326 Introduction to Big Data and Digital Marketing Analytics (1 SH)
Introduces the emerging phenomenon of big data and digital marketing analytics. Offers students an opportunity to learn how marketing analytics on big data can help in understanding customer behavior and in creating digital marketing strategy. Examines how marketers are collecting and using big data and applying marketing analytics tools on new media, such as social networks, and on new devices, such as mobile phones, to create successful digital marketing strategies. Examines current trends and issues that firms face in implementing marketing analytics on big data. Presents examples of best practices in digital marketing analytics, and explores how consumers and marketers can benefit from big data. Also examines consumer privacy issues that arise in big data analytics.
• Prerequisite: Business students only.

BUSN 6327 Managing and Working in a Virtual World (1 SH)
Introduces students to the significant base of knowledge that already exists about the effects of virtuality on work. Presents a framework of virtual work skills that, while solidly grounded in academic research, are delivered using a practical, experiential approach. The framework includes two categories: individual work skills for all virtual workers and managerial skills and processes for those who are managing/leading virtual workers.
• Prerequisite: Business students only.
BUSN 6328 How Macroeconomic Events Will Shape the Supply Chain of the Future (1 SH)
Explores how some of the unprecedented macroeconomic events currently roiling global markets will reshape the supply chain of the future. Offers students an opportunity to study the impact of past macroeconomic events and to learn to project how today’s events are likely to change the way global business is conducted in the future. Events include the decline of oil prices, depreciation of the euro and yen, zero/negative interest rates, the eventual return of interest rates to historical norms, demographic shifts in both the developed world as well as China, rising consumer delivery expectations driven by Amazon Prime, and the crumbling U.S. infrastructure/transportation gridlock.
* Prerequisite: Business students only.

BUSN 6330 Innovation, Product Line Strategy, and Product Platforms (1 SH)
Reviews innovation theory and methods, including customer segmentation, user-centered design, and platform innovation. Explores the application of these frameworks to next-generation products, systems, and services.

BUSN 6331 Rapid Design and Development (1 SH)
Explores innovation from an ecosystem perspective and from the perspective of lean design and development, both for startups and established corporations. Examines the design and cost engineering of product-line architectures for innovation, the incorporation of subcontractors, and open-source innovation, as well as prototyping and user-testing processes. Exposes students to the rapid creation of the minimum viable products for new systems and services.

BUSN 6332 Agile Finance (1 SH)
Exposes participants to basic financial intelligence in a context of defining a business model for innovation projects. Emphasizes revenue modeling and resource planning. Introduces different types of business models for product, software/systems, and services and the distinguishing factors of each. Seeks to provide participants with skills to develop financial projections and accompanying financial statements for innovation initiatives.

BUSN 6333 Lean Business Model Design for New Ventures (1 SH)
Studies the contemporary “lean” (i.e., experimental, non-commitment) approaches to designing viable business models for high-growth new ventures. The theoretical part of the course covers the introductory topics in the modern understanding of business models: their essence and role in securing competitive advantage, key components and design of business models, technology commercialization through sustaining business models, and key approaches for business model validation. The practical part of the course allows students to apply the acquired theoretical knowledge to the cases of designing and validating the business models of new ventures.
* Prerequisite: Business students only.

BUSN 6334 Social Media Marketing: Principles and Strategies (1 SH)
Examines the most important issues facing marketers today in relation to the changing media landscape and the rise of social media. Social media gives customers a voice, connects them to each other as well as companies, and crosses geographical boundaries. Focuses on understanding this context and how to leverage it for strategic business and marketing gains. Through a combination of lectures, case discussions, team and individual exercises, and a miniproject on social media evaluation, the course covers main principles and strategies related to social media on how and where social media can add value and provide opportunities to engage and manage customers.
* Prerequisite: Business students only.

BUSN 6339 Innovation Workshop: New Product Development and Intellectual Property (3 SH)
As the importance of intellectual property (IP) grows, managers and lawyers need to understand IP opportunities and risks and to collaborate effectively during new product development (NPD) in order to establish valid IP assets and effective IP strategies. This course for MBA and JD students will address the legal and business challenges of integrating NPD processes with IP asset development and IP risk management, with an emphasis on establishing and exploiting IP assets for competitive advantage and clearing or minimizing the risk of IP infringement. Students will collaborate on proposals for managing the development of a next generation product to assure timely launch and strategic IP positioning, including developing plans for identifying potential IP assets and defining the team, resources, critical stages and decision points.
* Equivalent: BUSN 7579, LAW 7579, and LW 7579.

BUSN 6945 Washington Campus Seminar (3 SH)
Offers a weeklong educational residency in Washington, D.C., where students meet with members of Congress, current and former executive branch officials, senior civil servants, business executives, lobbyists, representatives of the media, and special-interest groups. Offers students an opportunity to understand how Washington works, how legislative and regulatory changes impact their business futures, and what new business opportunities may evolve as the result of federal policy priorities and decisions. The residency seeks to offer unparalleled insight into the process of government, with the goal of enabling top business leaders to contribute ethically and effectively to the policy debate, influence policy outcomes, and leverage their understanding of policy trends to developing new business opportunities.
* Prerequisite: Business students only.
BUSN 6950 MBA Skills Workshop (0 SH)
Continues the full-time MBA orientation program. Offers students an opportunity to develop the management skills necessary to become effective managers, including communication skills, qualitative and quantitative business analysis, and ethics and values.
  • Prerequisite: Full-time MBA students only.

BUSN 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

BUSN 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
  • Prerequisite: Business students only.
  • Repeatability: May be repeated up to 5 times.

BUSN 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
  • Repeatability: May be repeated without limit.

CARDIOPULMONARY AND EXERCISE SCIENCES (EXSC)

EXSC 1120 Introduction to Exercise, Fitness, and Health (4 SH)
Explores the fundamental role of exercise and fitness in health. Introduces principles of exercise and various components of fitness and wellness. Discusses the development of basic exercise prescription for cardiorespiratory endurance, muscular strength, and endurance and flexibility. Includes discussions on a wide range of research topics, including advances and innovations in health and fitness and practices that lead to more healthful living.

EXSC 4500 Exercise Physiology 1 (4 SH)
Introduces exercise physiology. Covers the muscular, neuromuscular, cardiovascular, ventilatory, endocrine, and metabolic responses to acute exercise and the physiological adaptations to chronic exercise and physical activity. Basic concepts related to physical fitness, body composition, weight control, and training principles are discussed.
  • Prerequisite: Junior or senior standing.

EXSC 4501 Lab for EXSC 4500 (1 SH)
Accompanies EXSC 4500. Offers experiments in the exercise physiology laboratory that introduce concepts related to the lecture content of the course and include techniques such as strength testing, ergometry, graded exercise testing, indirect calorimetry, and body composition assessment.
  • Prerequisite: Junior or senior standing.

EXSC 5200 Cardiopulmonary Physiology (3 SH)
Offers students an opportunity to gain an understanding of physiological principles of the cardiopulmonary system. This advanced course covers (1) the structure and functional operation and regulation of the cardiopulmonary system; (2) disease-associated physiological changes and cardiopulmonary dysfunction; (3) exercise-induced acute responses and physiological adaptations of the system and their applications to chronic cardiopulmonary diseases. Encourages students to integrate their knowledge of exercise and physical activity with cardiopulmonary health and fitness, as well as cardiopulmonary disease prevention and treatment.
  • Prerequisite: (a) EXSC 4500 and junior or senior standing or (b) graduate standing; restricted to graduate students in exercise science and undergraduate students minoring in exercise science.

EXSC 5210 Physical Activity and Exercise: Prescription, Measurement, and Testing (3 SH)
Studies the general principles of physical activity and exercise prescription, measurement, and testing. Offers students an opportunity to learn the fundamental concepts and techniques to measure physical activity, exercise, and related testing procedures through a hands-on approach. Topics include the use of questionnaires and activity monitors to measure physical activity; measurement of body composition, fitness, muscular strength, and endurance; and clinical exercise testing. The fundamental concepts of exercise prescription and use of measurement techniques taught in this course are applicable to careers in physical therapy, exercise physiology, and as a physician assistant.
  • Prerequisite: (a) EXSC 4500 or equivalent undergraduate course or permission of instructor and (b) senior or graduate standing.

EXSC 5220 Advanced Exercise Physiology (3 SH)
Covers the advanced study of concepts, principles, and research in the field of exercise physiology. Discusses advanced concepts in the muscular/neuromuscular, cardiovascular, ventilatory, endocrine, and metabolic responses to exercise and exercise training. Specific study of the physiological control mechanisms regulating these systems are also addressed during periods of rest, acute exercise, and following chronic exercise training.
  • Prerequisite: (a) EXSC 4500 and junior or senior standing or (b) graduate standing.
  • Equivalent: EXSC 6220.
EXSC 5230 Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease (3 SH)
Seeks to provide a foundation for understanding the benefits of physical activity and exercise and the detrimental effects of physical inactivity and sedentary behavior on musculoskeletal health. Studies the function/dysfunction of the musculoskeletal systems resulting in common/uncommon disorders and the prevalence, etiology, and benefits of physical activity/exercise. Students apply previously learned exercise physiology principles, such as exercise prescription and neural and motor control adaptations, to physical activity and exercise. Discusses key physiological mechanisms underlying common/uncommon musculoskeletal disorders. Examines the preventive and beneficial effects of physical activity and exercise endorsed by the American College of Sports Medicine.
- Prerequisite: (a) EXSC 4500 and junior or senior standing or (b) graduate standing; restricted to graduate students in exercise science and to undergraduate students minoring in exercise science.
- Equivalent: EXSC 6233.

EXSC 5976 Directed Study (1 to 4 SH)
Offers independent course work under the direction of members of the department on chosen topics. Requires submission of a written proposal to the program adviser prior to the intended semester.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

EXSC 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

EXSC 6202 Electrocardiography (3 SH)
Covers intermediate and advanced electrocardiography, including cardiac electrophysiology, lead systems, dysrhythmia recognition and treatment, axis, infarction, ischemia, hypertrophy, and the effects of cardiovascular drugs and exercise on the EKG. Students review case studies based upon exercise testing and cardiac rehabilitation scenarios.
- Prerequisite: EXSC 2301 or or basic knowledge of electrocardiography; Bouvé students only.

EXSC 6222 Exercise in Health and Disease (3 SH)
Studies the role of exercise in health and disease, including acute and chronic effects of exercise on individuals with cardiovascular, pulmonary, metabolic, and immunology diseases and disorders. Also explores exercise prescriptions, training guidelines, and therapeutic benefits of exercise intervention and rehabilitation for individuals with heart disease, vascular disease, chronic obstructive pulmonary disease, diabetes, obesity, renal failure, cancer, and immunological disorders.
- Prerequisite: EXSC 6220; Bouvé students only.

EXSC 6263 Research Design and Methodology (3 SH)
Covers research and evaluation methods and techniques commonly used in healthcare and exercise science including problem selection, literature review, instrumentation, methodology, statistical analyses, and the writing of research reports and articles. Includes the interpretation of published research and intensive practice of scientific writing techniques, application of statistical analyses, and application of research methodologies.
- Prerequisite: EXSC 3400 or graduate standing; Bouvé students only.

EXSC 6300 Internship in Exercise Science (3 SH)
Offers students an opportunity to obtain practical experience and to synthesize, integrate, and apply skills and knowledge learned in the exercise science curriculum in a professional environment. Field experiences are an important part of graduate education programs in exercise science. The student is expected to complete a minimum of 300 hours of supervised experience in a research or practice setting.
- Prerequisite: EXSC 5200, EXSC 5210, and EXSC 5220; exercise science students only.

EXSC 6400 Applied Research Methods (3 SH)
Studies how to conduct scientific research in exercise science. Offers students an opportunity to propose a research project and design appropriate methodology to complete the project. Includes discussions on developing research hypotheses, comparing study designs, selecting appropriate statistical analyses, and managing data collection. Incorporates interpretation of published research to support the proposed research. Students present their own research plans through scientific writing.
- Prerequisite: Exercise science students only.
EXSC 6401 Clinical Exercise Physiology Internship 1 (3 SH)
Provides a supervised internship experience in a clinical exercise physiology program or a clinical exercise-testing laboratory, providing care to individuals with chronic cardiovascular, pulmonary, metabolic, or musculoskeletal diseases. Affords students the opportunity to participate in clinical exercise testing, exercise prescription and programming, and/or exercise leadership under the supervision of a clinical exercise physiologist. Requires students to present relevant case studies during weekly seminar discussions.
• Prerequisite: 3.000 GPA and B– or better in all professional courses in the first-year curriculum in clinical exercise physiology.

EXSC 6402 Clinical Exercise Physiology Internship 2 (3 SH)
Continues EXSC 6401. Provides a supervised internship experience in a clinical exercise physiology program or a clinical exercise-testing laboratory, providing care to individuals with chronic cardiovascular, pulmonary, metabolic, or musculoskeletal diseases. Affords students the opportunity to participate in clinical exercise testing, exercise prescription and programming, and/or exercise leadership under the supervision of a clinical exercise physiologist. Requires students to present relevant case studies during weekly seminar discussions.
• Prerequisite: EXSC 6401 and 6402; clinical exercise physiology majors only.

EXSC 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

EXSC 7990 Thesis 1 (3 SH)
Provides initiation to scholarly investigation. Requires students to submit a written research proposal, which includes the first three chapters of the thesis (introduction, review of literature, and methods and procedures) for approval by a thesis committee and to present an oral proposal at a seminar.
• Prerequisite: Bouvé students only.
• Repeatability: May be repeated once.

EXSC 7991 Thesis 2 (3 SH)
Continues EXSC 7990.
• Prerequisite: EXSC 7990; Bouvé students only.

EXSC 7996 Thesis Continuation (0 SH)
Offers continuation of thesis work with data collection, statistical analysis, presentation of results, discussion, and recommendations for further study. Culminates in an approved written thesis.

CHEMICAL ENGINEERING (CHME)

CHME 2000 Introduction to Engineering Co-op Education (1 SH)
Offers students an opportunity to prepare for their first co-op experience. Focuses on preparation skills including resumé construction, interviewing techniques, networking, and job selection using the Northeastern online database. Facilitates a basis for successful co-op engagement including expectations and requirements, self-assessment and goal setting, professional behaviors and values, and decision making during the job search process and while on the job.
• Prerequisite: GE 1000; engineering students only.

CHME 2308 Conservation Principles in Chemical Engineering (4 SH)
Examines the applications of fundamental laws of mass and energy conservation to chemical and physical processes. Emphasizes material and energy balances on chemical processes. Offers students an opportunity to develop skills in applying chemistry, physics, and mathematics to CHEM 1211 or identify and solve chemical engineering problems.
• Prerequisite: CHEM 1151 or CHEM 1211.
• Equivalent: CHME 2306.

CHME 2310 Transport Processes 1 (4 SH)
Covers the fundamental principles of processes in which mass, energy, and momentum are transported. Emphasizes momentum transport for incompressible and compressible fluids (fluid flow) and energy transport. The concepts are continued in CHME 3312 with emphasis on heat and mass transport with separation processes. The methods taught are relevant to the analysis of engineering processes in a number of industries including chemical, pharmaceutical, food, energy, biotechnology, and materials.
• Prerequisite: MATH 2321, MATH 2341 (may be taken concurrently), and CHME 2308; chemical engineering majors and combined majors only.
• Corequisite: CHME 2311.

CHME 2311 Lab for CHME 2310 (2 SH)
Accompanies CHME 2310. Uses experiment and simulation to explore the principles of momentum and heat transport. Offers students an opportunity to obtain practical laboratory experience and to develop technical writing and oral presentation skills. Students are asked to both design and perform experiments in the context of current fields of chemical engineering, to discover fundamental transport principles, and to develop engineering solutions through experiments using the fundamental transport principles.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: CHME 2310.
• NU Core: Writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major.
CHME 2320 Chemical Engineering Thermodynamics 1 (4 SH)
Covers the first and second laws of thermodynamics and their application to batch and flow systems, heat effects in chemicals, and physical properties/real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems.
• Prerequisite: CHME 2308 and MATH 2321.

CHME 2322 Chemical Engineering Thermodynamics 1 Abroad (4 SH)
Covers the first and second laws of thermodynamics and their application to batch and flow systems, heat effects in chemicals, and physical properties/real fluids. Applies basic principles and mathematical relations to the analysis and solution of engineering problems. Taught abroad.
• Repeatability: May be repeated without limit.

CHME 2949 Introductory Directed Research in Chemical Engineering (4 SH)
Provides project and other independent inquiry opportunities for students who have not completed CHME 2311 yet have an interest in research or topical areas in chemical engineering. Opportunities are arranged with individual faculty within the Department of Chemical Engineering.
• Prerequisite: Engineering students only.

CHME 3000 Professional Issues in Engineering (1 SH)
Offers students an opportunity to reflect on both academic and co-op experiences in the context of planning for their senior year and beyond. Focuses on developing advanced skills in preparation for graduation including job searches, professional resumés, cover letter writing, career portfolios, negotiations, and corporate culture. Reviews the prospect of graduate school training. Discusses issues around safety and ethical challenges; resolving ethical conflicts; awareness of engineers as professionals in a diverse world; strengthening decision-making skills; and lifelong learning needs, goals, and strategies. Explores leading-edge chemical engineering topics through presentation and case studies. Examines the role of different work and learning styles and diverse personal characteristics in the workplace and the classroom.
• Prerequisite: CHME 2000; engineering students only with junior or senior standing.
• NU Core: Comparative study of cultures.

CHME 3312 Transport Processes 2 and Separations (4 SH)
Continues CHME 2310. Presents the fundamentals and applications of energy transport, mass transport, and simultaneous energy/mass transport. Emphasizes separation processes using these principles. The methods taught are relevant to the analysis of engineering processes in a number of industries including chemical, pharmaceutical, food, energy, biotechnology, and materials.
• Prerequisite: CHME 2310 and MATH 2341; chemical engineering majors and combined majors only.
• Corequisite: CHME 3313.

CHME 3313 Lab for CHME 3312 (2 SH)
Accompanies CHME 3312. Uses experiment and simulation to explore the principles of mass transport and separation processes. Offers students an opportunity to obtain practical laboratory experience and to develop technical writing and oral presentation skills. Students are asked to both design and perform experiments in the context of current fields of chemical engineering, to discover fundamental transport principles, and to develop engineering solutions through experiments using the fundamental transport principles.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• Corequisite: CHME 3312.
• NU Core: Writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major.

CHME 3322 Chemical Engineering Thermodynamics 2 (4 SH)
Continues CHME 2320. Covers thermodynamic properties of mixtures; fugacity and the fugacity coefficients from equations of state for gaseous mixtures; liquid phase fugacities and activity coefficients for liquid mixtures; phase equilibriums; the equilibrium constant for homogeneous gas-phase reactions; and extension of theory to handle simultaneous, heterogeneous, and solution reactions.
• Prerequisite: CHME 2320 or CHME 2322.

CHME 3330 Chemical Engineering Process Analysis (4 SH)
Covers methods of mathematical analysis applied to chemical engineering problems. Includes use of computational software developed especially for the chemical engineering discipline. Develops linear and nonlinear problems for various chemical engineering applications. Demonstrates numerical and analytic solution methods. A number of examples are based on separation applications encountered in various chemical engineering specialties.
• Prerequisite: CHME 2308 and MATH 2341; chemical engineering majors only.
CHME 4510 Chemical Engineering Kinetics (4 SH)
Covers fundamental theories of the rate of chemical change in homogeneous reacting systems, integral and differential analysis of kinetic data; design of batch and continuous-flow chemical reactors; and an introduction to heterogeneous reactions and reactor design.
• Prerequisite: CHME 3312 and CHME 3322.

CHME 4512 Chemical Engineering Process Control (4 SH)
Covers Laplace transform and its use in solving ordinary differential equations; modeling liquid-level, temperature, and composition dynamics; linearization of nonlinear systems; first- and second-order system transfer functions; control valve sizing, and PID control; computer simulation of open- and closed-loop systems; control system stability; and feed-forward and cascade control.
• Prerequisite: CHME 3312, CHME 3322, and senior standing.

CHME 4524 Chemical Process Safety (4 SH)
Introduces students to important technical fundamentals as applied to chemical process safety. Demonstrates good chemical process safety practice through chemical plant trips, visiting experts, and video presentations.
• Prerequisite: CHME 2311 and junior or senior standing.

CHME 4625 Chemical Process Safety Abroad (4 SH)
Introduces important technical fundamentals as applied to chemical process safety internationally. Demonstrates good chemical process safety practice through chemical plant visits, visiting experts, and video presentations in the international setting in which the course is offered.
• Prerequisite: CHME 2311, CHME 2320, or CHME 2322 (the latter may be taken concurrently).
• Repeatability: May be repeated without limit.

CHME 4626 Special Topics in Process Safety Abroad (4 SH)
Covers special topics unique to the host country as related to chemical process safety. Includes chemical plant visits, review of specialized testing methods used in process safety, as well as national and international compliance requirements.
• Prerequisite: CHME 2311 or CHME 2320 (the latter may be taken concurrently).
• Repeatability: May be repeated without limit.

CHME 4634 Nanomaterials: Thin Films and Structures (4 SH)
Explores the applications and processing of electronic materials in nano-scale films and nanostructures. Stresses nanotechnology as an important field of chemical engineering that has applications in a variety of fields, such as material processing, drug delivery, semiconductor devices, and catalysis. Emphasizes the basic properties of electronic materials and the fundamental kinetic and transport principles in the manufacturing of thin films and nanostructures. Discusses the fundamentals in terms of the latest research in multifunctional devices and nanotechnology.
• Prerequisite: CHME 2311 and junior or senior standing.

CHME 4699 Special Topics in Chemical Engineering (4 SH)
Focuses on topics related to chemical engineering to be selected by instructor.
• Prerequisite: CHME 2311 and junior or senior standing.
• Repeatability: May be repeated without limit.

CHME 4701 Capstone Design 1: Process Analysis (4 SH)
Focuses on the design of a chemical process with a particular focus on separation technologies. Topics include computer simulation of steady-state processing conditions, selecting process operations, preparing flow sheets and stream tables, and evaluating the economics of a chemical process design.
• Prerequisite: CHME 3312, CHME 3322, and senior standing; engineering students only.
• NU Core: Capstone, writing intensive in the major.

CHME 4703 Capstone Design 2: Chemical Process Design (4 SH)
Continues CHME 4701. Requires each student to solve a comprehensive chemical process design problem. Topics include heat and power integration in chemical processing, design and scheduling of batch processes, sequencing separation operations, and safety considerations in process design.
• Prerequisite: CHME 4701; engineering students only with senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.

CHME 4721 Projects 1 (4 SH)
Offers individual research related to some phase of chemical engineering. Open only to students selected by the department head on the basis of scholarship and proven ability. Requires lab fee.
• Prerequisite: CHME 2311 and junior or senior standing.

CHME 4722 Projects 2 (4 SH)
Continues CHME 4721. Builds upon the previous course. Requires lab fee.
• Prerequisite: CHME 4721.
CHME 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Prerequisite: CHME 2311 and junior or senior standing.
• Repeatability: May be repeated without limit.

CHME 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: CHME 4970.
• Repeatability: May be repeated without limit.

CHME 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: CHME 2311; engineering students only.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 2 times.

CHME 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: CHME 2311.
• Repeatability: May be repeated without limit.

CHME 4993 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: CHME 2311; engineering students only.
• Repeatability: May be repeated without limit.

CHME 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• Prerequisite: CHME 2311 and junior or senior standing; engineering students only.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CHME 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• Prerequisite: CHME 2311 and junior or senior standing; engineering students only.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CHME 5137 Computational Modeling in Chemical Engineering (4 SH)
Builds on chemical engineering fundamentals to introduce computer programming to allow simulation of physical, chemical, and biological systems. Covers numerical experiments (e.g., Monte Carlo, global sensitivity analysis) to analyze the significance of parameters and model assumptions. Offers students an opportunity to work on a research or design project throughout the course.
• Prerequisite: (a) CHME 3312 and CHME 3322 or (b) graduate standing; engineering students only.

CHME 5160 Drug Delivery: Engineering Analysis (4 SH)
Focuses on engineering analysis of drug delivery systems, demonstrating the application of classic engineering principles to a nontraditional field for chemical engineers. Presents quantitative analysis of transport of a drug through the body and its control by physical and chemical drug and drug delivery device properties. Emphasizes the influence of biological tissue composition and structure on these processes.
• Prerequisite: Senior or graduate standing; chemical engineering majors only.

CHME 5204 Heterogeneous Catalysis (4 SH)
Explores design principles of gas-solid catalytic reactors. Covers heterogeneous catalysts, adsorption surface area and pore structure of catalysts, and mass and heat transport in porous catalysts. Studies catalyst preparation and industrial catalytic processes.
• Prerequisite: Chemical engineering students only.

CHME 5260 Special Topics in Chemical Engineering (4 SH)
Covers topics of interest to the staff member conducting this course for advanced study. A student may not take more than one special topics course with any one instructor.
• Prerequisite: Junior, senior, or graduate standing; chemical engineering students only.
• Repeatability: May be repeated without limit.

CHME 5510 Fundamentals in Process Safety Engineering (4 SH)
Introduces the basic concepts in process safety engineering as applied to the process industries as well as various terms and lexicon. Reviews the fundamentals involved in the prediction of scenarios and covers the assumptions involved as well as the range of these predictions. Emphasizes toxicology, industrial hygiene, sources models, toxic releases, and dispersion models, as well as fire and explosion prevention.
• Prerequisite: Senior or graduate standing; engineering students only.
CHME 5520 Process Safety Engineering—Chemical Reactivity, Reliefs, and Hazards Analysis (4 SH)
Reviews chemical reactivity hazards. Introduces relief methods and sizing estimation to prevent overpressurization vessel damage. Covers methods of hazards identification and risk assessment. Offers students an opportunity to obtain the ability to lead hazards analysis in any organization at any level.
• **Prerequisite:** Senior or graduate standing.

CHME 5630 Biochemical Engineering (4 SH)
Focuses on topics relevant to the design of cell culture processes for the production of pharmaceuticals. Topics include an overview of prokaryotic vs. eukaryotic cells; enzyme kinetics; overview of cellular processes (DNA replication, transcription, translation, primary metabolism, and regulation of protein synthesis at the transcriptional, posttranslational, and metabolic levels); overview of genetic engineering methods (for bacteria, mammalian, and plant cells); kinetics of cell growth (growth models, growth kinetic parameters); kinetics of product formation; bioreactor design and optimum operating conditions; scale-up; and overview of product recovery and purification methods.
• **Prerequisite:** (a) CHME 3312 or graduate standing and (b) junior, senior, or graduate standing; engineering students only.

CHME 5699 Special Topics in Chemical Engineering (4 SH)
Focuses on topics related to chemical engineering to be selected by the instructor.
• **Prerequisite:** Senior or graduate standing; chemical engineering students only.
• **Repeatability:** May be repeated up to 2 times.

CHME 5899 Biotechnology (4 SH)
Introduces biotechnology to students who are not majoring in biological sciences. The goal is to cover fundamental concepts, principles, and technologies central to the modern biotechnology industry. Topics range from, but are not limited to, recombinant DNA technologies; genomics, proteomics, and epigenetics; viruses, vaccines, and gene therapy; stem cell biology; genetically modified organisms (GMOs); synthetic biology; drug discovery and development; and regulatory issues in the biotechnology and biopharmaceutical industries.
• **Prerequisite:** Junior, senior, or graduate standing; chemical engineering students only.

CHME 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• **Prerequisite:** Junior, senior, or graduate standing.
• **Repeatability:** May be repeated without limit.

CHME 5978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• **Prerequisite:** Junior, senior, or graduate standing.
• **Repeatability:** May be repeated without limit.

CHME 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• **Prerequisite:** Junior, senior, or graduate standing.
• **Repeatability:** May be repeated without limit.

CHME 6610 Computational Programs in Process Safety for Relief and Scenario Modeling (4 SH)
Focuses on the use of process safety software that is available to perform hazard analysis, relief and flare system evaluation, and scenario analysis. The software may include use of Process Safety Office (ioMosaic), Aspen Process Simulator (Aspen Technologies), and FLACS (Flame Acceleration Simulator by GexCon). These programs are dedicated to predicting relief sizing for vessels and processes; flare system sizing; chemical reactivity analysis; and dispersion modeling, should a release occur, and its damage potential either as an explosive or toxic cloud.
• **Prerequisite:** Chemical engineering students only.

CHME 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

CHME 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• **Prerequisite:** ENCP 6000.
• **Repeatability:** May be repeated without limit.

CHME 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• **Prerequisite:** Engineering students only.
• **Repeatability:** May be repeated without limit.

CHME 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• **Repeatability:** May be repeated without limit.

CHME 7201 Fluid Mechanics (4 SH)
Examines statics, kinematics, and stress concepts associated with fluids. Also focuses on the formation of the general equations of motion with application to laminar and turbulent flow. Topics include boundary layer theory and compressible flow.
• **Prerequisite:** Chemical engineering students only.
CHME 7202 Chemical Process Heat Transfer (4 SH)
Covers empirical methods and calculations used to design heat transfer equipment for the chemical process industries. Reviews basic heat transfer principles. Focuses on shell-and-tube calculations for liquid and/or vapor phase heat transfer. Also covers direct contact and other special heat exchanger applications.
* Prerequisite: Chemical engineering students only.

CHME 7203 Separations Process (4 SH)
Comprises calculation and design methods used in processes involving mass transfer. Topics include vapor liquid equilibria for binary and multicomponent systems, and multicomponent distillation, absorption, and extraction. Emphasis is on methods and techniques common to many separation processes.
* Prerequisite: Chemical engineering students only.

CHME 7205 Numerical Techniques in Chemical Engineering (4 SH)
Examines digital computer applications to chemical engineering problems. Topics include location of roots of linear and nonlinear equations, numerical integration, and curve-fitting techniques, with emphasis on the numerical solution of ordinary and partial differential equations and on linear algebra.
* Prerequisite: Chemical engineering students only.

CHME 7210 Advanced Chemical Engineering Calculations (4 SH)
Focuses on fundamental process principles leading to an understanding of the stoichiometric principles of chemical process plants. Undertakes the study of complex material and energy balances with the view to apply these principles to actual large chemical plant conditions.
* Prerequisite: Familiarity with differential equations; chemical engineering students only.

CHME 7220 Electronic Materials, Thin Films, and Nanostructures (4 SH)
Presents the fundamental transport, kinetic, thermodynamic, and solid-state physics principles for semiconductor device processing. Emphasizes the various physical and chemical processes (including e-beam processes, sputtering, chemical vapor deposition, and molecular beam epitaxy) used in semiconductor technology and nanotechnology. Helps students appreciate the application of chemical engineering in the growing microelectronic industry, provides a working background in various microfabrication processes and ultrahigh vacuum technology, and introduces students to novel semiconductor material development and nanostructures.

CHME 7221 Thin Film Technology (4 SH)
Presents processing techniques as well as the surface chemistry and physics involved in the growth and characterization of single-crystal, polycrystalline, and amorphous thin films. Emphasis is on microelectronic device applications and various forms of chemical vapor deposition and molecular beam epitaxy. Covers homoepitaxy, heteroepitaxy, heterostructure device fabrication, and current developments in advanced electronic materials.

CHME 7222 Principals of Membrane Processes (4 SH)
Introduces membrane separation processes. Topics include the properties and characterization of membranes, preparation of synthetic membranes, and transport through membranes. Focuses on the determination of diffusion coefficients and free volume theory.

CHME 7231 Chemical Process Dynamics and Control (4 SH)
Reviews linear and nonlinear dynamic systems analysis. Topics include analysis/synthesis of single/multiple input-output control strategies including model predictive control, theoretical and practical implementation considerations in modern digital control systems, such as process identification and control application interactions, and introduction to multilayer plant-wide control. Also surveys recent control technology advances.

CHME 7232 Process Pollution Prevention and Control (4 SH)
Explores modeling of the transport/transformation of environmental contaminants, analysis of pollution prevention/reduction approaches for process facilities, techniques for environmental auditing, fundamentals of selected waste management technologies, and pollution prevention planning and project/risk evaluation methods. Includes an overview of various aspects and viewpoints on environmental quality, regulation, and the impact of industrial activity.

CHME 7240 Polymer Science (4 SH)
Covers basic concepts of polymers, thermodynamics of polymer solutions, and measurement of molecular weight. Topics include physical and chemical testing of polymers, crystallinity in polymers and rheology of polymers, physical and chemical properties of polymers, and mechanisms and conditions for polymerization of polymers including step reaction, addition, and copolymerization. Discusses carbon-chain polymers, fibers, and fiber technology.
* Prerequisite: BS in chemical engineering or chemistry; chemical engineering and chemistry students only.
CHME 7241 Principles of Polymerization and Polymer Processing (4 SH)
Introduces polymers and polymer properties. Examines mechanisms of polymerization including step polymerization, radical chain polymerization, emulsion polymerization, ionic-chain polymerization, chain copolymerization, and ring-opening polymerization. Focuses on stereo chemistry of polymerization and synthetic reactions of polymers. Also covers applications to reactor design of industrially important polymers.
• Prerequisite: Chemical engineering students only.

CHME 7250 Advanced Management Techniques in the Chemical Industry (4 SH)
Comprises management techniques applied to the chemical industry. Emphasis is on management of research organizations and management of engineering services, such as design, computer, and related activities.
• Prerequisite: Chemical engineering students only.

CHME 7260 Special Topics in Chemical Engineering (4 SH)
Covers topics of interest to the staff member conducting this class for advanced study. A student may not take more than one Special Topics course with any one instructor.
• Prerequisite: Chemical engineering students only.
• Repeatability: May be repeated without limit.

CHME 7261 Special Topics in Chemical Engineering (2 SH)
Covers topics of interest to the staff member conducting this class for advanced study. A student may not take more than one Special Topics course with any one instructor.
• Repeatability: May be repeated without limit.

CHME 7262 Special Topics in Process Safety (4 SH)
Covers topics of interest to the staff member conducting this class for advanced study. Current topics relevant in process safety are considered, such as a focus on layers of protection analysis, qualitative risk analysis, and specific process safety challenges. Process safety challenges from industrial settings may also serve as problems tackled in the course. A student may not take more than one special topics course with any one instructor.
• Prerequisite: Process safety engineering students only.

CHME 7260 Chemical Engineering Mathematics (4 SH)
Focuses on the formulation and solutions of problems involving advanced calculus as they arise in chemical engineering systems. Covers ordinary differential equations, series solutions, and complex variables. Also studies applications involving Laplace transforms, partial differential equations, matrix operations, vectors and tensors, and optimization methods. Emphasis is on methods for formulating the problems.
• Prerequisite: Engineering students only.

CHME 7230 Chemical Engineering Thermodynamics (4 SH)
Designed as an introductory course to graduate-level, classical thermodynamics. Covers the first and second laws, and their applications to problems of interest to the chemical engineer. Introduces Legendre transformation, multicomponent phase equilibrium, and stability as well as reaction equilibrium in an engineering context.
• Prerequisite: Engineering students only.

CHME 7340 Chemical Engineering Kinetics (4 SH)
Examines the theoretical foundations for the analysis of elementary chemical reaction rates. Comprises analysis and modeling of batch and ideal flow reactors, axial and radial dispersion in flow tubular reactors, and design principles of gas solid catalytic reactors.
• Prerequisite: Engineering students only.

CHME 7350 Transport Phenomena (4 SH)
Explores analytical and approximate solutions of equations of momentum, energy, and mass transport and their analogies. Covers heat and mass transfer at a fluid-solid interface. Introduces creeping, potential, and boundary layer flows. Examines macroscopic balances for isothermal systems and interphase transport of multicomponent systems.
• Prerequisite: Engineering students only.

CHME 7390 Seminar (0 SH)
Presents topics of an advanced nature by staff, outside speakers, and students in the graduate program. This course must be attended every semester by all full-time graduate students.
• Prerequisite: Chemical engineering students only.
• Repeatability: May be repeated without limit.

CHME 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

CHME 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

CHME 7990 Thesis (1 to 4 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. First-year students must attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Successful completion of the seminar program is required.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.
CHME 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

CHME 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: Engineering students only.

CHME 8960 Candidacy Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Chemical engineering PhD students only; intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
• Repeatability: May be repeated once.

CHME 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

CHME 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

CHME 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

CHME 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CHME 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

CHME 9986 Research (0 SH)
Offers theoretical and experimental work conducted under the supervision of a departmental faculty.
• Prerequisite: PhD candidacy in chemical engineering.
• Repeatability: May be repeated once.

CHME 9990 Dissertation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: CHME 9990 completed twice; chemical engineering students only.
• Repeatability: May be repeated without limit.

CHEMISTRY AND CHEMICAL BIOLOGY (CHEM)

CHEM 1000 Chemistry/Chemical Biology at Northeastern (1 SH)
Intended for freshmen in the College of Science. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Chemistry majors only.
• Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

CHEM 1101 General Chemistry for Health Sciences (4 SH)
Provides a one-semester introduction to general chemistry for the health sciences. Covers the fundamentals of elements and atoms; ionic and molecular structure; chemical reactions and their stoichiometry, energetics, rates, and equilibriums; and the properties of matter as gases, liquids, solids, and solutions. Other topics include acids and bases, and nuclear chemistry. Applications to the health sciences are included throughout.
• Corequisite: CHEM 1102 and CHEM 1103.
• NU Core: Science/technology level 1.

CHEM 1102 Lab for CHEM 1101 (1 SH)
Accompanies CHEM 1101. Covers a range of topics from the course, such as qualitative and quantitative analysis and the characteristics of chemical and physical processes. Includes measurements of heat transfer, rate and equilibrium constants, and the effects of temperature and catalysts. Emphasis is on aqueous acid-base reactions and the properties and uses of buffer systems.
• Corequisite: CHEM 1101 and CHEM 1103.
CHEM 1103 Recitation for CHEM 1101 (0 SH)
Accompanies CHEM 1101. Covers various topics from the course.
• Corequisite: CHEM 1101 and CHEM 1102.

CHEM 1104 Organic Chemistry for Health Sciences (4 SH)
Provides a one-semester introduction to organic chemistry for the health sciences. Covers the fundamentals of the structure, nomenclature, properties, and reactions of the compounds of carbon. Also introduces biological chemistry including amino acids, proteins, carbohydrates, lipids, nucleic acids, hormones, neurotransmitters, and drugs. Applications to the health sciences are included throughout.
• Prerequisite: CHEM 1101 with a grade of D.
• Corequisite: CHEM 1105 and CHEM 1106.

CHEM 1105 Lab for CHEM 1104 (1 SH)
Accompanies CHEM 1104. Covers a range of topics from the course, such as the properties and elementary reactions of hydrocarbons, alcohols, ethers, carbonyl compounds, carbohydrates, and amines.
• Corequisite: CHEM 1104 and CHEM 1106.

CHEM 1106 Recitation for CHEM 1104 (0 SH)
Accompanies CHEM 1104. Covers various topics from the course.
• Corequisite: CHEM 1104 and CHEM 1105.

CHEM 1107 Introduction to Forensic Chemistry (4 SH)
Introduces students to forensic science from a fundamental, chemical perspective. Explores the challenges and methodologies of forensic chemistry, and examines some misrepresentations of forensics by television dramas. Covers drug analysis, arson investigation, DNA analysis, as well as other relevant topics.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

CHEM 1117 Chemical Perspectives on Energy (4 SH)
Examines the chemical principles that underly the major sources of energy for society, including combustion of fossil fuels, biofuels, batteries, solar energy, and nuclear power. Examines the costs and benefits to society of each energy source. Does not substitute for CHEM 1101, CHEM 1151, or CHEM 1211.
• Prerequisite: High school chemistry strongly recommended.
• Corequisite: CHEM 1118.
• NU Core: Science/technology level 1.

CHEM 1118 Recitation for CHEM 1117 (0 SH)
Offers a small-group recitation setting for discussion of homework problems and completing group exercises in CHEM 1117.
• Corequisite: CHEM 1117.

CHEM 1151 General Chemistry for Engineers (4 SH)
Corresponds to one semester of study in important areas of modern chemistry, such as details of the gaseous, liquid, and solid states of matter; intra- and intermolecular forces; and phase diagrams. Presents the energetics and spontaneity of chemical reactions in the context of chemical thermodynamics, while their extent and speed is discussed through topics in chemical equilibria and kinetics. Aspects of electrochemical energy storage and work are considered in relation to batteries, fuel, and electrolytic cells.
• Corequisite: CHEM 1153.
• NU Core: Science/technology level 1.

CHEM 1152 Lab for CHEM 1151 (1 SH)
Accompanies CHEM 1151. Complements and reinforces the material in CHEM 1151 with emphasis on examples of interest in the context of modern materials, energy storage, and conversion.

CHEM 1153 Recitation for CHEM 1151 (0 SH)
Accompanies CHEM 1151. Offers a weekly sixty-five-minute drill/discussion session conducted by chemistry faculty or graduate teaching assistants. Discusses the homework assignments of CHEM 1151 in detail with emphasis on student participation.
• Corequisite: CHEM 1151.

CHEM 1201 General Chemistry 1 (4 SH)
Introduces the principles of chemistry, focusing on the states and structure of matter and chemical stoichiometry. Presents basic concepts and definitions, moles, gas laws, atomic structure, periodic properties and chemical bonding, all within a contextual framework.
• Corequisite: CHEM 1202 and CHEM 1203.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: CHEM 1207 and CHMY 1211.

CHEM 1202 Lab for CHEM 1201 (1 SH)
Accompanies CHEM 1201. Covers a range of topics from the course including qualitative and quantitative analysis and the characteristics of chemical and physical processes.
• Corequisite: CHEM 1201 and CHEM 1203.
• Equivalent: CHEM 1208.

CHEM 1203 Recitation for CHEM 1201 (0 SH)
Accompanies CHEM 1201. Covers various topics from the course.
• Corequisite: CHEM 1201 and CHEM 1202.
CHEM 1214 General Chemistry 2 (4 SH)
Continues CHEM 1211. Introduces the principles of chemical equilibrium, the rates and mechanisms of chemical reactions, and energy considerations in chemical transformations. Covers solutions, chemical kinetics, chemical equilibria, chemical thermodynamics, electrochemistry, and chemistry of the representative elements. Such contextual themes as energy resources, smog formation, and acid rain illustrate the principles discussed.
• Prerequisite: CHEM 1211 with a grade of D.
• Corequisite: CHEM 1215 and CHEM 1216.
• NUpath: Engaging with the natural and designed world.
• Equivalent: CHEM 1220.

CHEM 1215 Lab for CHEM 1214 (1 SH)
Accompanies CHEM 1214. Covers a range of topics from the course, such as measurements of heat transfer, rate and equilibrium constants, and the effects of temperature and catalysts. Particular attention is paid to aqueous acid-base reactions and to the properties and uses of buffer systems. Quantitative analysis of chemical and physical systems is emphasized throughout.
• Corequisite: CHEM 1214 and CHEM 1216.
• Equivalent: CHEM 1221.

CHEM 1216 Recitation for CHEM 1214 (0 SH)
Accompanies CHEM 1214. Covers various topics from the course.
• Corequisite: CHEM 1214 and CHEM 1215.

CHEM 1217 General Chemistry 1 for Chemical Science Majors (4 SH)
Offers the first of a two-semester sequence (with CHEM 1220) that introduces students majoring or intending to major in chemistry to the principles of chemistry with an emphasis on relating the macroscale physical and chemical properties of substances to the structure and behavior of the particles (atomic particles, ions, and molecules) of which they are composed. Explores the connections between chemistry and the other sciences, particularly the life and environmental sciences. Topics include atomic and molecular structure, bonding theories, intermolecular interactions, reactions in the gas phase and in aqueous solutions, the energetics of chemical change, and the properties of gases and solutions.
• Prerequisite: Chemistry majors only.
• Corequisite: CHEM 1218 and CHEM 1219.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: CHEM 1211 and CHMY 1211.

CHEM 1218 Lab for CHEM 1217 (2 SH)
Accompanies CHEM 1217. Explores nuclear chemistry, atomic structure, chemical reactions in the gas phase and in solutions, chemical bonding, intermolecular forces, and the properties of gases. The results of experiments form the basis for problem-solving sessions in CHEM 1217.
• Prerequisite: Chemistry majors only.
• Corequisite: CHEM 1217 and CHEM 1219.
• Equivalent: CHEM 1212.

CHEM 1219 Recitation for CHEM 1217 (0 SH)
Accompanies CHEM 1217. Provides students with opportunities to work interactively with instructors and other students to learn and apply the scientific method.
• Prerequisite: Chemistry majors only.
• Corequisite: CHEM 1217 and CHEM 1218.

CHEM 1220 General Chemistry 2 for Chemical Science Majors (4 SH)
Continues CHEM 1217. Offers the second of a two-semester sequence (following CHEM 1217) of guided inquiries into the principles of chemistry including the structure of solids, thermochemistry, thermodynamics, chemical kinetics, chemical equilibria, acids and bases, and electrochemistry and materials chemistry.
• Prerequisite: CHEM 1217 with a grade of C– or CHEM 1211 with a grade of C–.
• Corequisite: CHEM 1221 and CHEM 1222.
• Equivalent: CHEM 1214.

CHEM 1221 Lab for CHEM 1220 (2 SH)
Accompanies CHEM 1220. Explores the structure of solids, thermochemistry, thermodynamics, chemical kinetics, chemical equilibria, acids and bases, and electrochemistry and materials chemistry. The results of experiments form the basis for problem-solving sessions in CHEM 1220.
• Corequisite: CHEM 1220 and CHEM 1222.
• Equivalent: CHEM 1215.

CHEM 1222 Recitation for CHEM 1220 (0 SH)
Accompanies CHEM 1220. Provides students with opportunities to work interactively with instructors and other students to learn and apply the understandings acquired in lab and lecture.
• Corequisite: CHEM 1220 and CHEM 1221.
CHEM 2120 Tropical Disease and Medicine (4 SH)
Studies the chemistry and chemotherapy of tropical diseases, or “infectious diseases of poverty,” such as malaria, sleeping sickness, and Chagas disease, by conducting a survey of drugs developed to treat these diseases. Explores topics in drug discovery and development, mechanisms of drug action, factors affecting patient care in endemic countries, and recent developments in tropical diseases. Develops principles of organic chemistry, medicinal chemistry, and biochemistry as needed. Suitable for the student with an interest in global health who may not intend to pursue a career in the natural sciences.
• Prerequisite: (a) BIOL 1101, BIOL 1111, or BIOL 1121 and (b) CHEM 1101 or CHEM 1211; minimum grade of D required in all prerequisite courses; students without these prerequisites may seek permission of instructor.
• Equivalent: CHEM 1120.

CHEM 2311 Organic Chemistry 1 (4 SH)
Introduces nomenclature, preparation, properties, stereochemistry, and reactions of common organic compounds. Presents correlations between the structure of organic compounds and their physical and chemical properties, and mechanistic interpretation of organic reactions. Includes chemistry of hydrocarbons and their functional derivatives.
• Prerequisite: CHEM 1151, CHEM 1214, or CHEM 1220; minimum grade of D required in prerequisite course.
• Corequisite: CHEM 2312 and CHEM 2319.
• Equivalent: CHEM 0710 and CHEM 2315.

CHEM 2312 Lab for CHEM 2311 (1 SH)
Accompanies CHEM 2311. Introduces basic laboratory techniques, such as distillation, crystallization, extraction, chromatography, characterization by physical methods, and measurement of optical rotation. These techniques serve as the foundation for the synthesis, purification, and characterization of products from microscale syntheses integrated with CHEM 2311.
• Corequisite: CHEM 2311 and CHEM 2319.
• Equivalent: CHEM 2316.

CHEM 2313 Organic Chemistry 2 (4 SH)
Continues CHEM 2311. Focuses on additional functional group chemistry including alcohols, ethers, carbonyl compounds, and amines, and also examines chemistry relevant to molecules of nature. Introduces spectroscopic methods for structural identification.
• Prerequisite: CHEM 2311 with a grade of D or CHEM 2315 with a grade of D.
• Corequisite: CHEM 2314 and CHEM 2320.
• Equivalent: CHEM 0720 and CHEM 2317.

CHEM 2314 Lab for CHEM 2313 (1 SH)
Accompanies CHEM 2313. Basic laboratory techniques from CHEM 2312 are applied to chemical reactions of alcohols, ethers, carbonyl compounds, carbohydrates, and amines. Introduces basic laboratory techniques including infrared (IR) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy as analytical methods for characterization of organic molecules.
• Corequisite: CHEM 2313 and CHEM 2320.
• Equivalent: CHEM 2318.

CHEM 2315 Organic Chemistry 1 for Chemistry Majors (4 SH)
Reviews the basics of bonding and thermodynamics of organic compounds as well as conformational and stereochemical considerations. Presents the structure, nomenclature, and reactivity of hydrocarbons and their functional derivatives. Highlights key reaction mechanisms, providing an introduction to the methodology of organic synthesis.
• Prerequisite: CHEM 1214 with a grade of C– or CHEM 1220 with a grade of C–; chemistry majors only.
• Corequisite: CHEM 2316 and CHEM 2324.
• Equivalent: CHEM 0710 and CHEM 2311.

CHEM 2316 Lab for CHEM 2315 (2 SH)
Accompanies CHEM 2315. Introduces basic laboratory techniques, such as distillation, crystallization, extraction, chromatography, characterization by physical methods, and measurement of optical rotation. These techniques serve as the foundation for the synthesis, purification, and characterization of products from microscale syntheses integrated with CHEM 2315.
• Prerequisite: Chemistry majors only.
• Corequisite: CHEM 2315 and CHEM 2324.
• Equivalent: CHEM 2312.

CHEM 2317 Organic Chemistry 2 for Chemistry Majors (4 SH)
Continues CHEM 2315. Introduces structural identification of organic compounds using contemporary spectroscopic methods. Surveys key synthetic methods based on the mechanistic approach and functional group chemistry and application of these methods to design new chemical processes and novel chemical entities. Emphasizes the chemistry of biomolecules, natural products, and medicinal agents. Offers students an opportunity to outline novel multistep synthetic pathways, design new compositions of matter in silico (e.g., pharmaceuticals, agrochemicals, polymers); in the associated laboratory, students may produce these new materials. Students are assigned individual and group projects to refine and demonstrate their creative outputs.
• Prerequisite: CHEM 2311 with a grade of C– or CHEM 2315 with a grade of C–; chemistry majors only.
• Corequisite: CHEM 2318 and CHEM 2325.
• NUpath: Exploring creative expression and innovation.
• Equivalent: CHEM 0720 and CHEM 2313.
CHEM 2318 Lab for CHEM 2317 (2 SH)
Accompanies CHEM 2317. Introduces basic laboratory techniques including infrared (IR) spectroscopy and nuclear magnetic resonance (NMR) spectrometry as analytical methods for characterization of organic molecules. These methods serve as the basis for characterization of products from microscale syntheses.
- Prerequisite: Chemistry majors only.
- Corequisite: CHEM 2317 and CHEM 2325.
- Equivalent: CHEM 2314.

CHEM 2319 Recitation for CHEM 2311 (0 SH)
Offers students opportunities to work interactively with instructors and other students to learn and apply the understandings acquired in lab and lecture.
- Corequisite: CHEM 2311 and CHEM 2312.

CHEM 2320 Recitation for CHEM 2313 (0 SH)
Offers students opportunities to work interactively with instructors and other students to learn and apply the understandings acquired in lab and lecture.
- Corequisite: CHEM 2313 and CHEM 2314.

CHEM 2321 Analytical Chemistry (4 SH)
Introduces the principles and practices in the field of analytical chemistry. Focuses on development of a quantitative understanding of homogeneous and heterogeneous equilibria phenomena as applied to acid-base and complexometric titrations, rudimentary separations, optical spectroscopy, electrochemistry, and statistics.
- Prerequisite: CHEM 1151 with a grade of C–, CHEM 1214 with a grade of C–, or CHEM 1220 with a grade of C–.
- Corequisite: CHEM 2322.
- Equivalent: CHEM 0310.

CHEM 2322 Lab for CHEM 2321 (1 SH)
Accompanies CHEM 2321. Lab experiments provide hands-on experience in the analytical methods introduced in CHEM 2321, specifically, silver chloride gravimetry, complexometric titrations, acid-base titrations, UV-vis spectroscopy, cyclic voltammetry, Karl Fischer coulometry, and modern chromatographic methods.
- Corequisite: CHEM 2321.

CHEM 2324 Recitation for CHEM 2315 (0 SH)
Accompanies CHEM 2315 and CHEM 2316. Offers students an opportunity to work interactively with instructors and other students to learn and apply the knowledge acquired in lab and lecture.
- Corequisite: CHEM 2315 and CHEM 2316.

CHEM 2325 Recitation for CHEM 2317 (0 SH)
Accompanies CHEM 2317 and CHEM 2318. Offers students an opportunity to work interactively with instructors and other students to learn and apply the knowledge acquired in lab and lecture.
- Corequisite: CHEM 2317 and CHEM 2318.

CHEM 2331 Bioanalytical Chemistry (4 SH)
Develops good critical thinking and problem-solving skills through the exploration of open-ended group projects in a laboratory-based course centered on the analytical chemistry of biomolecules. Develops an understanding of the practice and business aspects of analytical chemistry as they relate to research and development labs in the biotechnology/pharmaceutical industry.
- Prerequisite: (a) CHEM 1214 with a grade of C– or CHEM 1220 with a grade of C– and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
- Corequisite: CHEM 2332.
- NU Core: Writing intensive in the major.
- NUpath: Analyzing and using data, writing intensive in the major.

CHEM 2332 Lab for CHEM 2331 (1 SH)
Accompanies CHEM 2331. Working in teams, students investigate real-world, open-ended research problems in the field of bioanalytical chemistry, broadly defined using modern analytical instrumentation.
- Corequisite: CHEM 2331.

CHEM 2341 Forensic Chemistry 1 (3 SH)
Provides students with insights into forensic science from a fundamental, chemical perspective. Explores the challenges and methodologies of forensic chemistry and addresses some misrepresentations of forensics by television dramas. Topics covered include drug analysis, arson investigation, questioned document analysis, serology, DNA evidence, fiber analyses, and weapon impressions.
- Prerequisite: (a) CHEM 1220 or (b) CHEM 1214 and CHEM 2321 or (c) CHEM 1151 and CHEM 2321; minimum grade of C– required in all prerequisite courses.
- Corequisite: CHEM 2342.
CHEM 2342 Lab for CHEM 2341 (1 SH)
Accompanies CHEM 2341. In the laboratory, a crime scene is staged. Students must determine what evidence is useful and what instrumentation to use. Instructional guidance is provided, but the methodologies are developed by the students, who need to rely on the lessons presented in lecture to “solve the case.” An important aspect of this process is for the students to learn details of evidence collection. Forensic samples are often contaminated and standard protocols are not always available. After a brief class discussion, students perform whatever experiments on the evidence they deem necessary to try to determine the events of the crime.
• Corequisite: CHEM 2341.

CHEM 3401 Chemical Thermodynamics and Kinetics (4 SH)
Traces the development of chemical thermodynamics through the three major laws of thermodynamics. These are applied to thermochemistry, chemical reaction and phase equilibria, and the physical behavior of multicomponent systems. Emphasizes quantitative interpretation of physical measurements.
• Prerequisite: (a) MATH 1252 or MATH 1342 and (b) CHEM 1214 or CHEM 1220 and (c) PHYS 1155 or PHYS 1165 (either of which may be taken concurrently); minimum grade of C– required in all prerequisite courses.
• Corequisite: CHEM 3402.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: CHEM 0810 and CHEM 3431.

CHEM 3402 Lab for CHEM 3401 (1 SH)
Accompanies CHEM 3401. Demonstrates the measurement of selected physical chemical phenomena presented in CHEM 3401, introducing experimental protocol and methods of data analysis. Experiments include investigations of gas nonideality and critical phenomena, electrochemical measurement of equilibrium, construction of phase diagrams, and bomb and differential scanning calorimetry.
• Corequisite: CHEM 3401.
• Equivalent: CHEM 3432.

CHEM 3403 Quantum Chemistry and Spectroscopy (4 SH)
Continues CHEM 3401. Presents theory of electrolytes and electrochemistry with analytical applications. Chemical reaction kinetics are introduced and applied to study complex reaction mechanisms. Molecular transport properties, including diffusion, sedimentation, and electrophoresis, are explored. The fundamentals of quantum mechanics and spectroscopy are introduced and applied to molecular structure determination and chemical analysis.
• Prerequisite: (a) MATH 1342 and (b) CHEM 3401, CHEM 3421, CHEM 3431, or CHME 3322 and (c) PHYS 1155 or PHYS 1165; minimum grade of C– required in all prerequisite courses.
• Corequisite: CHEM 3404.
• Equivalent: CHEM 0820.

CHEM 3404 Lab for CHEM 3403 (1 SH)
Accompanies CHEM 3403. Explores the principles covered in CHEM 3403 by laboratory experimentation. Experiments include measurement of reaction kinetics, such as excited state dynamics, measurement of gas transport properties, atomic and molecular absorption and emission spectroscopy, infrared spectroscopy of molecular vibrations, and selected applications of fluorimetry.
• Corequisite: CHEM 3403.

CHEM 3431 Physical Chemistry (4 SH)
Offers an in-depth survey of physical chemistry. Emphasizes applications in modern research, including examples from biochemistry. Topics include the laws of thermodynamics and their molecular interpretation; equilibrium in chemical and biochemical systems; molecular transport; kinetics, including complex enzyme mechanisms; and an introduction to spectroscopy and the underlying concepts of quantum chemistry.
• Prerequisite: (a) CHEM 1214 or CHEM 1220 and (b) MATH 1342 and (c) PHYS 1147, PHYS 1155 (preferred), PHYS 1165, or PHYS 1175 and (d) sophomore standing or above; minimum grade of C– required in all prerequisite courses.
• Corequisite: CHEM 3432.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: CHEM 0810 and CHEM 3401.

CHEM 3432 Lab for CHEM 3431 (1 SH)
Accompanies CHEM 3431. Covers practical skills in physical chemistry with an emphasis on current practice in chemistry, biochemistry, and pharmaceutical science. Introduces both ab initio and biological molecular modeling, differential scanning calorimetry, polymer characterization, protein unfolding and protein/ligand binding, electronic absorption spectroscopy, and synthesis of nanoparticles or quantum dots.
• Corequisite: CHEM 3431.
• Equivalent: CHEM 3402.

CHEM 3501 Inorganic Chemistry (4 SH)
Presents the following topics: basic concepts of molecular topologies, coordination compounds, coordination chemistry, isomerism, electron-transfer reactions, substitution reactions, molecular rearrangements and reactions at ligands, and biochemical applications.
• Prerequisite: CHME 3322, CHEM 3401, CHEM 3421, or CHEM 3431 (any of which may be taken concurrently); minimum grade of C– required in all prerequisite courses.
CHEM 3505 Introduction to Bioinorganic Chemistry (4 SH)
Explores basic concepts of molecular topologies, coordination compounds, coordination chemistry, isomerism, electron-transfer reactions, substitution reactions, molecular rearrangements, and reactions at ligands in the context of metal-based drugs, imaging agents, and metalloenzymes.
- Prerequisite: (a) CHEM 2313 or CHEM 2317 and (b) CHEM 3231 or CHEM 3431 and (c) CHEM 3401, CHEM 3421, or CHEM 3431 (any of which may be taken concurrently) and (d) junior or senior standing; minimum grade of C– required in all prerequisite courses; chemistry, biology, biochemistry, pharmacy, and chemical engineering students only.
- Corequisite: CHEM 3506 and CHEM 3507.

CHEM 3506 Lab for CHEM 3505 (1 SH)
Offers a laboratory course in inorganic chemistry with experiments and projects that track with the topics discussed in CHEM 3505. Designed for students who have mastered basic laboratory techniques in general and organic chemistry. Introduces new synthetic techniques and applies modern analytical characterization tools not previously used in other laboratory courses (such as CHEM 3522 and CHEM 3532).
- Corequisite: CHEM 3505 and CHEM 3507.

CHEM 3507 Recitation for CHEM 3505 (0 SH)
Offers students additional opportunities to work interactively with instructors and other students to learn and apply the concepts presented in CHEM 3505.
- Corequisite: CHEM 3505 and CHEM 3506.

CHEM 3521 Instrumental Methods of Analysis (1 SH)
Introduces the instrumental methods of analysis used in all fields of chemistry, with an emphasis on understanding not only the fundamental principles of each method but also the basics of the design and operation of the relevant instrumentation.
- Prerequisite: CHEM 2331 with a grade of C–.
- Corequisite: CHEM 3522.
- Equivalent: CHEM 0320.

CHEM 3522 Instrumental Methods of Analysis Lab (4 SH)
Accompanies CHEM 3521. Lab experiments provide hands-on experience in the instrumental methods of analysis discussed in CHEM 3521, such as high-performance liquid chromatography, gas chromatography, mass spectrometry, capillary electrophoresis, atomic absorption, cyclic voltammetry, and UV-vis spectroscopy.
- Prerequisite: CHEM 2331 with a grade of C–.
- Corequisite: CHEM 3521.

CHEM 3531 Chemical Synthesis Characterization (1 SH)
Introduces advanced techniques in chemical synthesis and characterization applicable to organic, inorganic, and organometallic compounds. Techniques used include working under inert atmosphere, working with liquefied gases, and handling moisture-sensitive reagents, NMR, IR, and UV-vis spectroscopy.
- Prerequisite: CHEM 2317 with a minimum grade of C–; chemistry majors only.
- Corequisite: CHEM 3532.

CHEM 3532 Chemical Synthesis Characterization Lab (4 SH)
Accompanies CHEM 3531. Covers topics from the course through various experiments.
- Prerequisite: (a) CHEM 2313 or CHEM 2317 and (b) CHEM 3231 or CHEM 3331; minimum grade of C– required in all prerequisite courses.
- Corequisite: CHEM 3531.

CHEM 4455 Organic Chemistry 3 Abroad (4 SH)
Offers students majoring in chemistry an opportunity to apply the principles gained in two semesters of organic chemistry and chemical biology to a relevant disciplinary context. The discovery, design, and development of biologically active compounds for medical purposes uses knowledge and techniques gained in both organic synthesis and chemical biology. The course emphasizes how to direct those skills to incorporate specific chemical features into organic compounds to meet biological criteria. As such, offers students an opportunity to develop problem-solving skills that are valuable across a range of chemical disciplines and not confined to synthetic organic chemistry alone. Taught abroad.
- Prerequisite: CHEM 2317 with a grade of C–; BS and BS/MS chemistry majors only.
- Corequisite: CHEM 4457.
- Equivalent: CHEM 4455.
CHEM 4457 Lab for CHEM 4456 (1 SH)
Accompanies CHEM 4456. Includes literature research activities, field trips, case studies, and presentations. Offers students an opportunity to prepare for a wider range of career options.
• Corequisite: CHEM 4456.

CHEM 4620 Introduction to Protein Chemistry (4 SH)
Introduces protein chemistry in the context of molecular medicine. Discusses analytical methods used to elucidate the origin, structure, function, and purification of proteins. Surveys the synthesis and chemical properties of structurally and functionally diverse proteins, including globular, membrane, and fibrous proteins. Discusses the role of intra- and intermolecular interactions in determining protein conformation, protein folding, and in their enzymatic activity. Intended for undergraduate students without prior experience in protein chemistry.
• Prerequisite: (a) CHEM 2313 or CHEM 2317 and (b) junior or senior standing in the College of Science; CHEM 2331 recommended.

CHEM 4621 Introduction to Chemical Biology (4 SH)
Probes the structure and function of biological macromolecules and the chemical reactions carried out in living systems, including biological energetics. Discusses techniques to measure macromolecular interactions and the principles and forces governing such interactions. Offers students an opportunity to gain experience in reading and evaluating primary literature. Intended for undergraduate students with no prior experience in the field.
• Prerequisite: (a) CHEM 2313 or CHEM 2317 and (b) CHEM 2321 or CHEM 2331 and (c) CHEM 3401, CHEM 3421, or CHEM 3431 (any of which may be taken concurrently); minimum grade of C– required in all prerequisite courses.
• Corequisite: CHEM 4622.

CHEM 4622 Lab for CHEM 4621 (1 SH)
Accompanies CHEM 4621. Complements and reinforces the concepts from CHEM 4621 with an emphasis on fundamental techniques. Offers students an opportunity to complete independent projects in modern chemical biology research.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: CHEM 4621.

CHEM 4628 Introduction to Spectroscopy of Organic Compounds (4 SH)
Examines the application of modern spectroscopic techniques to the structural elucidation of small organic molecules. Emphasizes the use of H and C NMR spectroscopy supplemented with information from infrared spectroscopy and mass spectrometry. Explores both the practical and nonmathematical theoretical aspects of 1D and 2D NMR experiments. Topics include the chemical shift, coupling constants, the nuclear Overhauser effect and relaxation, and 2D homonuclear and heteronuclear correlation. Designed for chemists who do not have an extensive math or physics background; no prior knowledge of NMR spectroscopy is assumed.
• Prerequisite: Either CHEM 2313 with a grade of C– or CHEM 2317 with a grade of C– and junior or senior standing.
• Corequisite: CHEM 4629.

CHEM 4629 Identification of Organic Compounds (2 SH)
Introduces the use of the nuclear magnetic resonance (NMR) spectrometer and basic NMR experiments. Determines the identity of unknown organic compounds by the use of mass spectrometry, infrared spectroscopy, and 1D and 2D nuclear magnetic resonance spectroscopy.
• Prerequisite: CHEM 2313 with a grade of C– or CHEM 2317 with a grade of C–.
• Corequisite: CHEM 4628.

CHEM 4750 Senior Research (4 SH)
Conducts original experimental work under the direction of members of the department on a project. Introduces experimental design based on literature and a variety of techniques depending upon the individual project.
• Prerequisite: (a) CHEM 2313 with a grade of C– or CHEM 2317 with a grade of C– and (b) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CHEM 4770 Chemistry Capstone (4 SH)
Integrates and assesses both curricular and experiential aspects of undergraduate chemical education. Requires written and oral presentations related to cooperative education or other experiential activities, and to the senior research project. Reporting on the research project requires extensive library and Internet research of background and scientific principles, and organization and interpretation of results. Includes class discussion and critiquing of materials presented.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
Course Descriptions

CHEM 4901 Undergraduate Research (4 SH)
Conducts original research under the direction of members of the department.
• Prerequisite: CHEM 2313, CHEM 2317, or CHEM 2321; minimum grade of C– required in prerequisite course.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CHEM 4902 Undergraduate Research Abroad (4 SH)
Offers students an opportunity to conduct original research under the direction of members of the department. Students are assigned an independent research topic and are expected to produce original work outputs, which can include written reports, laboratory experiments, and technical presentations. Taught abroad.
• Prerequisite: CHEM 2317; chemistry majors only.
• NUpath: Integrating knowledge and skills through experience.

CHEM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

CHEM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: CHEM 4970 with a grade of C.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

CHEM 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

CHEM 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

CHEM 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

CHEM 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CHEM 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CHEM 5500 Introduction to Regulatory Science (2 SH)
Introduces the science that supports regulatory affairs in the biopharmaceutical industry. Focuses on the methods and instruments used to characterize the processes and products of biotechnology including the production, separation, purification, characterization, and formulation of biologics; the pharmacokinetics of proteins; chemical and biological equivalencies of biogenerics; stability testing; high throughput assays; cell system expression; variants; method validation; and quality control.
• Prerequisite: Graduate standing.

CHEM 5550 Introduction to Glycobiology and Glycoprotein Analysis (3 SH)
Covers the background and methods used for glycoprotein characterization. Offers students an opportunity to obtain the background needed to assess the analytical steps necessary for development of glycoprotein drugs. Analyzes regulatory issues behind glycoprotein drug development. Covers recent developments in analytical and regulatory sciences.

CHEM 5570 Regulatory Science Applications Laboratory (4 SH)
Offers a laboratory course providing hands-on experience with cell culture techniques and analytical instrumentation currently used in the biotechnology industry. Methods of analysis include enzyme-linked immunosorbent assay (ELISA), gel electrophoresis, high-performance liquid chromatography, and mass spectrometry coupled with commonly used techniques in sample preparation for protein analysis.
• Prerequisite: CHEM 5500, CHEM 5550, and CHEM 5660; regulatory science students only.

CHEM 5599 Introduction to Research Skills and Ethics in Chemistry (0 SH)
Seeks to prepare students for success in CHEM 5600.
• Prerequisite: Chemistry graduate students only.
• Repeatability: May be repeated once.
CHEM 5600 Research Skills and Ethics in Chemistry (3 SH)
Discusses ethics in science. Topics include documentation of work in your laboratory notebook, safety in a chemistry research laboratory, principles of experimental design, online computer searching to access chemical literature, reading and writing technical journal articles, preparation and delivery of an effective oral presentation, and preparation of a competitive research proposal.
- Prerequisite: CHEM 5599; chemistry graduate students only.

CHEM 5610 Polymer Chemistry (3 SH)
Discusses the synthesis and analysis of polymer materials. Covers mechanisms and kinetics of condensation/chain-growth polymerization reactions and strategies leading to well-defined polymer architectures and compositions, including living polymerizations (free radical, cationic, anionic), catalytic approaches, and postpolymerization functionalization. Discusses correlation of chemical composition and structure to physical properties and applications.
- Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (c) junior, senior, or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5611 Analytical Separations (3 SH)
Describes the theory and practice of separating the components of complex mixtures in the gas and liquid phase. Also includes methods to enhance separation efficiency and detection sensitivity. Covers thin-layer, gas, and high-performance liquid chromatography (HPLC) and recently developed techniques based on HPLC including capillary and membrane-based separation, and capillary electrophoresis.
- Prerequisite: Junior, senior, or graduate standing.

CHEM 5612 Principles of Mass Spectrometry (3 SH)
Describes the theory and practice of ion separation in electrostatic and magnetic fields and their subsequent detection. Topics include basic principles of ion trajectories in electrostatic and magnetic fields, design and operation of inlet systems and electron impact ionization, and mass spectra of organic compounds.
- Prerequisite: Junior, senior, or graduate standing.

CHEM 5613 Optical Methods of Analysis (3 SH)
Describes the application of optical spectroscopy to qualitative and quantitative analysis. Includes the principles and application of emission, absorption, scattering and fluorescence spectroscopies, spectrometer design, elementary optics, and modern detection technologies.
- Prerequisite: Junior, senior, or graduate standing.

CHEM 5614 Electroanalytical Chemistry (3 SH)
Describes the theory of electrode processes and modern electroanalytical experiments. Topics include the nature of the electrode-solution interface (double layer models), mass transfer (diffusion, migration, and convection), types of electrodes, reference electrodes, junction potentials, kinetics of electrode reactions, controlled potential methods (cyclic voltammetry, chronocompartment), chronocoulometry and square wave voltammetry, and controlled current methods (chronopotentiometry).
- Prerequisite: Junior, senior, or graduate standing.

CHEM 5615 Protein Mass Spectrometry (3 SH)
Offers students an opportunity to obtain a fundamental understanding of modern mass spectrometers, the ability to operate these instruments, and the ability to prepare biological samples. Undoubtedly the most popular analytical method in science, mass spectrometry is utilized in fields ranging from subatomic physics to biology. Focuses on the analysis of proteins, with applications including biomarker discovery, tissue characterization, detection of blood doping, drug discovery, and the characterization of protein-based therapeutics. By the end of the course, the student is expected to be able to solve a particular chemistry- or biology-related problem by choosing the appropriate sample preparation methods and mass spectrometer.

CHEM 5616 Protein Mass Spectrometry Laboratory (3 SH)
Offers students an opportunity to develop an appreciation of the appropriate choice of mass spectrometer for a particular application.

CHEM 5620 Protein Chemistry (3 SH)
Describes proteins (what they are, where they come from, and how they work) in the context of analytical analysis and molecular medicine. Discusses the chemical properties of proteins, protein synthesis, and the genetic origins of globular proteins in solution, membrane proteins, and fibrous proteins. Covers the physical intra- and intermolecular interactions that proteins undergo along with descriptions of protein conformation and methods of structural determination. Explores protein folding as well as protein degradation and enzymatic activity. Highlights protein purification and biophysical characterization in relation to protein analysis, drug design, and optimization.
- Prerequisite: (a) CHEM 2313 with a grade of C– and junior or senior standing or (b) CHEM 2317 with a grade of C– and junior or senior standing or (c) graduate standing.
CHEM 5621 Principles of Chemical Biology for Chemists (3 SH)
Explores the use of natural and unnatural small-molecule chemical tools to probe macromolecules, including affinity labeling and click chemistry. Covers nucleic acid sequencing technologies and solid-phase synthesis of nucleic acids and peptides. Discusses in-vitro selection techniques, aptamers, and quantitative issues in library construction. Uses molecular visualization software tools to investigate structures of macromolecules. Intended for graduate and advanced undergraduate students.
• Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 2321, CHEM 2331, or graduate standing and (c) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (d) senior or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5622 Lab for CHEM 5621 (1 SH)
Accompanies CHEM 5621. Complements and reinforces the concepts from CHEM 5621 with emphasis on fundamental techniques. Offers an opportunity to complete independent projects in modern chemical biology research.
• Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 2321, CHEM 2331, or graduate standing and (c) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (d) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing and (e) senior or graduate standing; minimum grade of C– required in all chemistry prerequisite courses.

• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

CHEM 5625 Chemistry and Design of Protein Pharmaceuticals (3 SH)
Covers the chemical transformations and protein engineering approaches to protein pharmaceuticals. Describes protein posttranslational modifications, such as oxidation, glycosylation, formation of isoaspartic acid, and disulfide. Then discusses bioconjugate chemistry, including those involved in antibody-drug conjugate and PEGylation. Finally, explores various protein engineering approaches, such as quality by design (QbD), to optimize the stability, immunogenicity, activity, and production of protein pharmaceuticals. Discusses the underlying chemical principles and enzymatic mechanisms as well.
• Prerequisite: (a) Either CHEM 2313 or CHEM 2317, CHEM 3521 (which latter may be taken concurrently), and junior or senior standing or (b) CHEM 5621 (may be taken concurrently) and graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5626 Organic Synthesis 1 (3 SH)
Surveys types of organic reactions including stereochemistry, influence of structure and medium, mechanistic aspects, and synthetic applications.
• Prerequisite: Junior, senior, or graduate standing.

CHEM 5627 Mechanistic and Physical Organic Chemistry (3 SH)
Surveys tools used for elucidating mechanisms including thermodynamics, kinetics, solvent and isotope effects, and structure/reactivity relationships. Topics include molecular orbital theory, aromaticity, and orbital symmetry. Studies reactive intermediates including carbenes, carbonium ions, radicals, biradicals and carbanions, acidity, and photochemistry.
• Prerequisite: Junior, senior, or graduate standing.

CHEM 5628 Principles of Spectroscopy of Organic Compounds (3 SH)
Studies how to determine organic structure based on proton and carbon nuclear magnetic resonance spectra, with additional information from mass and infrared spectra and elemental analysis. Presents descriptive theory of nuclear magnetic resonance experiments and applications of advanced techniques to structure determination. Includes relaxation, nuclear Overhauser effect, polarization transfer, and correlation in various one- and two-dimensional experiments.
• Prerequisite: (a) Either CHEM 2313 with a grade of C– or CHEM 2317 with a grade of C– and junior or senior standing or (b) graduate standing with one year of organic chemistry or equivalent.

CHEM 5636 Statistical Thermodynamics (3 SH)
Briefly reviews classical thermodynamics before undertaking detailed coverage of statistical thermodynamics, including probability theory, the Boltzmann distribution, partition functions, ensembles, and statistically derived thermodynamic functions. Reconsiders the basic concepts of statistical thermodynamics from the modern viewpoint of information theory. Presents practical applications of the theory to problems of contemporary interest, including polymers and biopolymers, nanoscale systems, molecular modeling, and bioinformatics.
• Prerequisite: (a) CHEM 3401, CHEM 3421, CHEM 3431, or graduate standing and (b) junior, senior, or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5637 Foundations of Spectroscopy (3 SH)
Covers the fundamentals of quantum mechanics, with applications to spectroscopy of atoms, molecules, and proteins. Topics include introduction to quantum mechanics, mathematical tools, rigid rotor, microwave spectroscopy, harmonic oscillator, infrared and raman spectroscopy, hydrogen atom, emission spectra, electron spin, and applications to molecular and biological systems.
• Prerequisite: Junior, senior, or graduate standing.
CHEM 5638 Molecular Modeling (3 SH)
Introduces molecular modeling methods that are basic tools in the study of macromolecules. Is structured partly as a practical laboratory using a popular molecular modeling suite, and also aims to elucidate the underlying physical principles upon which molecular mechanics is based. These principles are presented in supplemental lectures or in laboratory workshops.
* Prerequisite: Junior, senior, or graduate standing.

CHEM 5639 Chemical Kinetics (3 SH)
Explores the use of experimental data to deduce the rate law of a reaction. Covers mechanisms deduced from rate laws, and the influence of experimental error on precision of rate constants and activation energies. Examines collision- and transition-state theories of reaction rates.
* Prerequisite: Junior, senior, or graduate standing.

CHEM 5644 Principles and Analysis of Carbohydrates (3 SH)
Focuses on carbohydrates and their derivatives, which are important molecular and cellular building blocks and are of increasing significance as subunits of biopharmaceuticals including proteins and monoclonal antibodies. Surveys structural features and the chemical reactivity of simple through more complex carbohydrates and assesses contemporary methods of analysis. Highlights glycosylated biopharmaceuticals, including antibody and glycoprotein therapeutics, together with a study of glycosylation pathways in the posttranslational modification of gene products.
* Prerequisite: (a) CHEM 2321 with a grade of C– and junior or senior standing or (b) CHEM 2331 with a grade of C– and junior or senior standing or (c) graduate standing.

CHEM 5645 Drug Discovery and Development (3 SH)
Designed to provide a broad overview of the drug discovery and development processes involved in the identification and commercialization of new chemical entities (NCEs). Topics include target validation, high throughput screening, route selection, process chemistry, manufacturing under GMP/GLP conditions, preclinical and clinical analysis, and formulation chemistry.
* Prerequisite: (a) CHEM 2313 with a grade of C– and junior or senior standing or (b) CHEM 2317 with a grade of C– and junior or senior standing or (c) graduate standing.

CHEM 5646 Synthesis and Reactivity of Inorganic Compounds (3 SH)
Offers an advanced undergraduate/introductory graduate course in inorganic chemistry. Topics include an introduction to solid-state structures and the origin of color in inorganic compounds. Describes the synthesis, reactivity, and bonding of transition metal coordination compounds along with applications in health-related fields.
* Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (c) junior, senior, or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5647 Bioinorganic Chemistry (3 SH)
Explores coordination chemistry, electron-transfer reactions, substitution reactions, molecular rearrangements, and reactions at ligands in coordination compounds, imaging agents, and metalloenzymes.
* Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (c) junior, senior, or graduate standing; CHEM 2331 recommended; minimum grade of C– required in all prerequisite courses.

CHEM 5651 Materials Chemistry of Renewable Energy (3 SH)
Studies renewable energy in terms of photovoltaics, photoelectrochemistry, fuel cells, batteries, and capacitors. Focuses on the aspects of each component and their relationships to one another.
* Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 3403 or graduate standing and (c) senior standing or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5652 Fundamental Science of Photovoltaics (3 SH)
Covers the basics of photovoltaic energy conversion. Emphasizes the underlying challenge in the chemistry of materials required to effect direct conversion of solar energy into electricity. Also emphasizes artificial photosynthesis and how to leverage photosynthesis in the quest for new materials. Includes graduate-level discussion of different generations of the solar cell, from silicon-based, organic, polymer, and dye-sensitized to the quantum-dot-hybrid biosolar cell. Lectures cover solid-state chemistry and physics of photovoltaics, p-n junctions, Fermi level, flat bands, charge, field, photo current, quantum dots, solar spectrum, atmospheric attenuation, geometric effects, Shockley-Queisser limit on efficiency of solar cells, Schottky barriers, and future directions toward a green biosolar cell.
* Prerequisite: (a) CHEM 3403 with a grade of C– and junior or senior standing or (b) graduate standing.
CHEM 5660 Analytical Biochemistry (3 SH)
Focuses on the analysis of biological molecules, which include nucleic acids, proteins, carbohydrates, lipids, and metabolites. Methods used for isolation, purification, and characterization of these molecules are discussed.

Prerequisite: Graduate standing.

CHEM 5668 Principles of Radiochemistry (3 SH)
Introduces the properties, production, and labeling methods associated with radionuclides used in radiotracer development. Covers general radiochemical principles, emphasizing radiohalogens and radiometals. Reviews specific issues associated with particular classes of nuclides, such as decay properties, half-life, production and isolation, methods for incorporation, and detection methods.

Prerequisite: (a) CHEM 2317 with a grade of C– and senior standing or (b) graduate standing; open to students in Bouvé College of Health Sciences, College of Engineering, and College of Science only.

CHEM 5669 Environmental Analytical Chemistry (3 SH)
Describes the application of instrumental methods for analyzing environmental samples for major, minor, and trace components of toxicological concern. Topics include sampling strategies for natural systems; determination of trace metals in natural waters and biologicals; determination of xenobiotics by GC, LC, GC-MS, and LC-MS; remote sensing of atmospheric pollutants; and molecular biomarkers and detection of protein and DNA adducts.

Prerequisite: CHEM 5611, CHEM 5612, CHEM 5613, and junior, senior, or graduate standing; minimum grade of D required in prerequisite courses for undergraduate students, C– for graduate students.

CHEM 5672 Organic Synthesis 2 (3 SH)
Continues CHEM 5626. Surveys types of organic reactions including stereochemistry, influence of structure and medium, mechanistic aspects, and synthetic applications.

Prerequisite: CHEM 5626 and junior, senior, or graduate standing; minimum grade of D required in prerequisite course for undergraduate students, C– for graduate students.

CHEM 5676 Bioorganic Chemistry (3 SH)
Covers host guest complexation by crown ethers, cryptands, podands, spherands, and so forth; molecular recognition including self-replication; peptide and protein structure; coenzymes and metals in biogromatic chemistry; nucleic acid structure; interaction of DNA with proteins and small molecules including DNA-targeted drug design; catalytic RNA; and catalytic antibodies.

Prerequisite: (a) CHEM 5626, CHEM 5627, and junior or senior standing or (b) graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5678 Design and Synthesis of Radiotracers for Biological Targets (3 SH)
Studies and evaluates the process for developing noninvasive, biological probes, including design and synthesis. Uses case studies to explore how radiotracers are employed to study specific biological problems. Discusses the context of the biological system for each problem. Evaluates criteria related to radionuclide properties, biochemical readout, and chemical synthesis. Examples cover major radionuclide families and biological targets.

Prerequisite: (a) CHEM 2317 with a grade of C– and senior standing or (b) graduate standing; CHEM 5668 recommended; open to students in Bouvé College of Health Sciences, College of Engineering, and College of Science only.

CHEM 5686 Fundamentals of Molecular Structure and Electronics (3 SH)
Studies many-electron atoms, simple diatomic molecules, conjugated pi-electron systems, the electronic structure of molecules, molecular modeling, and modeling of proteins and biological systems.

Prerequisite: CHEM 5637 with a grade of C– and junior, senior, or graduate standing.

CHEM 5687 Principles of Solid State Chemistry (3 SH)
Overviews solid-state materials from a chemistry perspective. Specific perspectives are those of classification, characterization, and structure-property relationships, and synthesis and design of tailor-made materials to meet future technological needs. Includes relevant theory and practice of spectroscopic methods as well as concepts of physics involved with structure-property relationships.

Prerequisite: CHEM 5646 with a grade of C– and junior, senior, or graduate standing.

CHEM 5688 Principles of Magnetic Resonance (3 SH)
Presents the physical principles underlying magnetic resonance spectroscopy including Fourier transform theory, classical and quantum-mechanical treatments of spin angular momentum, the Bloch equations, spin relaxation, and density matrix formalism applied to chemical and molecular dynamics. Introduces different magnetic resonance methods, with emphasis on time-domain NMR methods such as phase cycling, 2D spectroscopy, and selective pulse sequences. A special topic may include magnetic resonance imaging (MRI), solid-state NMR (CP-MAS), or macromolecular structure.

Prerequisite: Junior, senior, or graduate standing.
CHEM 5696 Organometallic Chemistry (3 SH)
Offers an advanced graduate-level course in organometallic chemistry of the transition metals. Requires an advanced undergraduate or introductory graduate course in inorganic chemistry. It is assumed that students have a good working background in NMR spectroscopy and its application to the identification of organic compounds. Addresses the structure, bonding, and reactivity patterns of transition metal organometallic complexes, with applications to organic synthesis. Topics include metal carbonyls, metal pi-complexes, insertion and elimination reactions, and catalysis using transition metal organometallic compounds.

* Prerequisite: (a) CHEM 2313, CHEM 2317, or graduate standing and (b) CHEM 3401, CHEM 3421, CHEM 3431 (any of which may be taken concurrently) or graduate standing and (c) junior, senior, or graduate standing; minimum grade of C– required in all prerequisite courses.

CHEM 5698 Physical Methods in Chemistry (3 SH)
Introduces resonance spectroscopy, electronic absorption spectroscopy, electronic states and structure, and NMR spectroscopy. Concentrates on interpretation and origin of resonance of inorganic nuclei, that is, 31P, 11B not proton; fluxionality, and EPR. Discusses interpretation of ESR spectra with respect to the structure of inorganic compounds and magnetic measurements.

* Prerequisite: CHEM 5646 and junior, senior, or graduate standing; minimum grade of D required in prerequisite course for undergraduate students, C– for graduate students.

CHEM 5904 Seminar (1 SH)
Focuses on oral reports by master of science and PlusOne participants on current research topics in chemistry and chemical biology.

* Prerequisite: MS and BS/MS students in chemistry and chemical biology only.
* Repeatability: May be repeated up to 2 times.

CHEM 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated without limit.

CHEM 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated without limit.

CHEM 5984 Research (1 to 6 SH)
Offers an opportunity to conduct research under faculty supervision.

* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated up to 3 times for up to 6 total semester hours.

CHEM 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

CHEM 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.

* Repeatability: May be repeated without limit.

CHEM 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

CHEM 7247 Advances in Nanomaterials (3 SH)
Designed to provide an entry-level perspective of solid-state chemistry both from a fundamental and applied perspective. Discusses the basic aspects of materials science encompassing broad areas of structure, physical properties, and classification in the context of both bulk and surface (thin films, interfaces) properties.

CHEM 7250 Chemical Bioenergetics: Applications in Biomaterials Design (3 SH)
Covers principles of energy transduction in biological systems and biomolecules with an emphasis on the application of such processes in the design of a novel class of biologically functionalized energetic materials. Topics include electron transport, chemical energy, electrochemistry, resonant energy transfer, photoinduced charge transfer, and thermal stability in biological systems, and the assembly of biofunctionalized materials. Discusses the application of these principles to the development of nanomotors, biofuel cells, biosolar cells, and self-assembling systems on the nanoscale.

* Prerequisite: One year of undergraduate physical chemistry with lab.

CHEM 7301 Special Topics in Analytical Chemistry (3 SH)
Presents selected topics of current importance in analytical chemistry.

* Repeatability: May be repeated without limit.

CHEM 7305 Special Topics in Inorganic and Materials Chemistry (3 SH)
Presents selected topics of current importance in inorganic and materials chemistry.

* Repeatability: May be repeated without limit.
CHEM 7310 Special Topics in Organic Chemistry (3 SH)
Presents selected topics of current importance in organic chemistry.
• Repeatability: May be repeated without limit.

CHEM 7317 Analytical Biotechnology (3 SH)
Focuses on analysis, detection, characterization, and quantitation of proteins, peptides, antibodies, carbohydrates, nucleic acids, oligonucleotides, and related biopolymers. Emphasizes techniques of HPLC, HPCE, immunoassays, flat bed electrophoresis, MS, PDS, LALLS, biacore, and other contemporary techniques.
• Prerequisite: CHEM 5611 and CHEM 5612 or equivalent undergraduate courses; minimum grade of C– required in all prerequisite courses.

CHEM 7320 Special Topics in Physical Chemistry (3 SH)
Studies advanced topics of importance in physical chemistry including quantum chemistry.
• Repeatability: May be repeated without limit.

CHEM 7730 Advanced Laboratory Methods (4 SH)
Seeks to provide intensive practical laboratory training in a chosen thematic area. Students select from organic and medicinal chemistry, physical and materials chemistry, or analytical and biological chemistry. The course involves a common practical training module followed by specialized modules in the chosen concentration area. The practical training features a combination of formal laboratory instruction coupled with rotation through selected research laboratories.
• Prerequisite: Full-time PhD students only.

CHEM 7750 Advanced Problem Solving (3 SH)
Designed to provide skills necessary to lead advanced problem-solving case studies. Faculty mentors in one of three thematic areas chosen from organic and medicinal chemistry, physical and materials chemistry, or analytical and biological chemistry assign casework to students for presentation and analysis in group sessions. Students are required to provide rational solutions to complex problems derived from the contemporary literature and engage in dialogue with faculty mentors to justify their analysis. The faculty mentors assign grades to reflect intellectual maturity and ability of the students to display creative, independent thinking.
• Prerequisite: Full-time PhD students who have successfully completed qualifying examinations.

CHEM 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

CHEM 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

CHEM 7990 Thesis (1 to 4 SH)
Offers thesis supervision by members of the department.
• Repeatability: May be repeated without limit.

CHEM 7996 Thesis Continuation (0 SH)
Offers continuing thesis supervision by members of the department.

CHEM 8500 Analytical Seminar (1 SH)
Focuses on oral reports by the participants on current investigations in analytical chemistry.
• Prerequisite: Enrollment in full-time program.
• Repeatability: May be repeated without limit.

CHEM 8501 Inorganic Seminar (1 SH)
Focuses on oral reports by the participants on current investigations in inorganic chemistry.
• Prerequisite: Enrollment in full-time program.
• Repeatability: May be repeated without limit.

CHEM 8502 Organic Seminar (1 SH)
Focuses on oral reports by the participants on current investigations in organic chemistry.
• Prerequisite: Enrollment in full-time program.
• Repeatability: May be repeated without limit.

CHEM 8503 Physical Chemistry Seminar (1 SH)
Focuses on oral reports by the participants on current investigations in physical chemistry.
• Prerequisite: Enrollment in full-time program.
• Repeatability: May be repeated without limit.

CHEM 8504 Graduate Seminar (1 SH)
Focuses on oral reports by the participants on current research topics in chemistry and chemical biology.
• Repeatability: May be repeated without limit.

CHEM 8505 Directed Laboratory Research (4 SH)
Involves faculty-guided studies that are not directly related to research pursued for thesis or dissertation.
• Prerequisite: Nonthesis students only.

CHEM 8506 Directed Literature Research (4 SH)
Focuses on extensive research of the primary literature under direction of a graduate faculty member, leading to a comprehensive written review of a significant chemical problem and an oral examination.
• Prerequisite: Nonthesis students only.
CHEM 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for and take the PhD qualifying exams (cumulative exams).

CHEM 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

CHEM 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

CHEM 8984 Research (1 to 6 SH)
Offers the chance to conduct original research, written thesis thereon, or to the establishment of doctoral candidacy.
• Repeatability: May be repeated without limit.

CHEM 8986 Research (0 SH)
Offers the student the opportunity to conduct full-time research for the master’s degree.
• Repeatability: May be repeated without limit.

CHEM 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

CHEM 9860 Doctoral Research (0 SH)
Offers the opportunity to complete in-depth original research, representing a significant contribution of new chemical knowledge and a written dissertation thereon, under the supervision of a faculty member.
• Prerequisite: Chemistry and chemical biology students only.
• Repeatability: May be repeated without limit.

CHEM 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CHEM 9986 Research (0 SH)
Offers the student the opportunity to conduct full-time research for the PhD.
• Repeatability: May be repeated without limit.

CHEM 9990 Dissertation (0 SH)
Offers the student the opportunity to conduct theoretical and experimental research for the PhD degree.
• Prerequisite: Chemistry and chemical biology students only.
• Repeatability: May be repeated once.

CHEM 9996 Dissertation Continuation (0 SH)
Offers dissertation supervision by members of the department.
• Prerequisite: Chemistry and chemical biology students only.
• Repeatability: May be repeated without limit.

CHINESE (CHNS)

CHNS 1101 Elementary Chinese 1 (4 SH)
Designed for students who have very little or no prior knowledge of Chinese. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audio-lingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in China and the varied cultures within the world of Chinese speakers. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources. Focuses on Mandarin Chinese; students who wish to speak another dialect of Chinese should consult instructor for proper placement.

CHNS 1102 Elementary Chinese 2 (4 SH)
Continues CHNS 1101. Reviews and continues the study of grammar and basic language skills. Offers progressively more intensive practice in oral and written communication. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.
• Prerequisite: CHNS 1101 or CHNS 1301.

CHNS 1201 Elementary Chinese 1—BSIB (4 SH)
Description to come.
• Prerequisite: International business majors only.

CHNS 1202 Elementary Chinese 2—BSIB (4 SH)
Description to come.
• Prerequisite: CHNS 1201 or CHNS 1301; international business majors only.

CHNS 1301 Elementary Chinese Immersion 1 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Focuses on standard Chinese. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
CHNS 1302 Elementary Chinese Immersion 2 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Focuses on standard Chinese. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

CHNS 1501 Elementary Chinese 1 for Heritage Speakers (4 SH)
Designed for those who are skilled in spoken Chinese as a heritage language but have yet to learn basic Chinese reading and writing. Focuses on reading, writing, and grammar, along with improvement of oral communication skills. Covers some 370 basic Chinese characters. Also introduces Chinese phonetics, pinyin, as well as the structure of Chinese characters.

CHNS 1502 Elementary Chinese 2 for Heritage Speakers (4 SH)
Designed for those students who have finished CHNS 1501 or equivalent and who have learned basic Chinese reading and writing techniques. Seeks to help them to move on a fast track beyond the beginner level to the intermediate university level. Strongly focuses on Chinese reading and writing skills, with more sophisticated sentences and paragraphs. Offers students an opportunity to develop writing skills to a functional literacy level, allowing them to carry out a number of practical writing tasks. Also aims to prepare students for CHNS 2102.
• Prerequisite: CHNS 1501 or permission of instructor.

CHNS 2101 Intermediate Chinese 1 (4 SH)
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current Chinese periodicals. Allows students to engage actively in communication within various contexts and reviews the more subtle problems of grammar and writing style. This communicative class is for intermediate or advanced learners. It is especially suitable for Asian-American students who have some knowledge of certain Chinese dialects (that is, Cantonese and a level of language competence equal to two semesters of college Chinese) and want to learn Mandarin Chinese through reading, writing, and discussion.
• Prerequisite: CHNS 1102 or CHNS 1302.

CHNS 2102 Intermediate Chinese 2 (4 SH)
Continues CHNS 2101. Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current Chinese periodicals.
• Prerequisite: CHNS 1502, CHNS 2101, or CHNS 2301.

CHNS 2151 Intermediate Chinese for Business Purposes (4 SH)
Emphasizes communicating in a business environment, tailoring grammar and sentence pattern coverage, vocabulary, and cultural topics to a business setting. Combines contemporary business topics and intermediate business Chinese. Offers students an opportunity to be prepared to communicate in speaking and writing in a business setting in China and with a better understanding of the current business culture in China.
• Prerequisite: CHNS 2101, CHNS 2201, CHNS 2301, or permission of instructor.

CHNS 2201 Intermediate Chinese 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 1202. Offers students an opportunity to continue building vocabulary and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
• Prerequisite: CHNS 1202 or CHNS 1302; international business majors only.

CHNS 2202 Intermediate Chinese 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 2201. Offers students an opportunity to continue building vocabulary and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
• Prerequisite: CHNS 2201 or CHNS 2301; international business majors only.

CHNS 2301 Intermediate Chinese Immersion 1 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

CHNS 2302 Intermediate Chinese Immersion 2 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

CHNS 2900 Specialized Instruction in Chinese (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.
Course Descriptions

CHNS 3101 Advanced Chinese 1 (4 SH)
Stresses the fundamentals of Chinese to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary Chinese novel or a Chinese cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern Chinese writing with confidence and to be able to talk and write about it in good Chinese; and second, to provide preparation for advanced courses.

• Prerequisite: CHNS 2102 or CHNS 2302.

CHNS 3102 Advanced Chinese 2 (4 SH)
Continues CHNS 3101. Enhances and reinforces those practical language and communication skills students encounter when they are abroad.

• Prerequisite: CHNS 3101 or CHNS 3301.

CHNS 3201 Advanced Chinese 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 2202. Offers students an opportunity to continue building vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.

• Prerequisite: CHNS 2202 or CHNS 2302; international business majors only.

CHNS 3202 Advanced Chinese 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 3201. Offers students an opportunity to continue building vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.

• Prerequisite: CHNS 3201 or CHNS 3301; international business majors only.

CHNS 3301 Advanced Chinese Immersion 1 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

CHNS 3302 Advanced Chinese Immersion 2 (4 SH)
Designed for students who are in a Chinese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

CHNS 3800 Special Topics in Chinese (1 to 4 SH)
Focuses on a unique aspect of the Chinese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).

• Prerequisite: At least an intermediate level of skill in the language.

• Repeatability: May be repeated up to 3 times.

CHNS 3900 Specialized Instruction in Chinese (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.

• Prerequisite: At least an advanced level of competence in the language.

• Repeatability: May be repeated without limit.

CHNS 4101 Advanced Proficiency Chinese 1 (4 SH)
Designed mainly for students of Chinese as a foreign language at a high intermediate or beginning advanced level of proficiency as designated by the American Council on Teaching of Foreign Languages (ACTFL) standards (or third-year Chinese language at universities). Seeks to help students perform most informal and formal language tasks with ease, confidence, and competence. Also seeks to strengthen understanding of contemporary Chinese culture and social environment, such as changing social values and contemporary popular culture. Offers students an opportunity to develop advanced language skills through integrated activities in listening, speaking, reading, and writing and to express complicated and abstract ideas.

• Prerequisite: CHNS 3102, CHNS 3302, or permission of instructor.

CHNS 4102 Advanced Proficiency Chinese 2 (4 SH)
Builds upon the skills developed in previous Chinese courses. Seeks to enable students to accurately communicate detailed narratives and opinions in both spoken and written form. Offers students an opportunity to learn to provide structured arguments to support their opinions, to correctly use quantifiers and hypotheticals, and to develop good control of a full range of grammatical structures and a fairly wide general vocabulary.

• Prerequisite: CHNS 4101 or permission of instructor.

CHNS 4201 Advanced Proficiency Chinese 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 3202. Offers students an opportunity to continue building vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.

• Prerequisite: CHNS 3202 or CHNS 3302; international business majors only.
CHNS 4202 Advanced Proficiency Chinese 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on CHNS 4201. Offers students an opportunity to continue to build vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
- Prerequisite: CHNS 4201; international business majors only.

CHNS 4800 Special Topics in Chinese (1 to 4 SH)
Focuses on a unique aspect of the Chinese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Topics focus on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

CHNS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

CHNS 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

CHNS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated up to 3 times.

CHNS 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

CHNS 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

CIVIL AND ENVIRONMENTAL ENGINEERING (CIVE)

CIVE 2000 Introduction to Engineering Co-op Education (1 SH)
Provides students preparation for the first co-op experience. Focuses on skills that provide a basis for successful co-op engagement including expectations and requirements, an introduction to professional credentials, résumé construction, self-assessment and goal setting, interviewing, professional and co-op ethics, issues of diversity in the workplace community, academic planning and decision making, and an introduction to career portfolios.
- Prerequisite: GE 1000.

CIVE 2221 Statics and Strength of Materials (4 SH)
Introduces solid mechanics including properties of areas and volumes (centroidal axes, moments of inertia, and so on), equilibrium of particles and rigid bodies in two and three dimensions, analysis of internal forces in trusses and simple frames, shear and moment diagrams in beams, computation of stresses induced by moment, shear and torque, and mechanical properties of materials.
- Prerequisite: (a) PHYS 1151 or PHYS 1161 (either may be taken concurrently) and (b) MATH 1342.
- Corequisite: CIVE 2222.

CIVE 2222 Recitation for CIVE 2221 (0 SH)
Accompanies CIVE 2221. Covers problem solving and topics related to the course.
- Corequisite: CIVE 2221.

CIVE 2260 Civil Engineering Materials (4 SH)
Introduces the physical, mechanical, and chemical properties of materials of importance to civil engineers. Offers an overview of the ways in which these properties affect the material selection process, material behavior, and the design process.
- Prerequisite: (a) CHEM 1151 or CHEM 1211 and (b) MATH 1342 and (c) PHYS 1151 or PHYS 1161.
- Corequisite: CIVE 2261.

CIVE 2261 Materials and Measurements Lab (1 SH)
Involves the use of standard lab test methods and equipment to determine properties of materials common to civil engineering practice. Also introduces students to land surveying, site layout, and the measurement of distance, elevation, and direction.
- Corequisite: CIVE 2260.
- NUpath: Analyzing and using data.
CIVE 2320 Structural Analysis 1 (4 SH)
Covers shear stresses in beams, combined stress analysis (bars with axial load plus shear and bending), introduction to buckling, influence lines (application to statically determinate systems), computation of deflections (statically determinate systems), and analysis of indeterminate structures using the flexibility method and moment distribution.
• Prerequisite: CIVE 2221.
• Corequisite: CIVE 2321.

CIVE 2321 Recitation for CIVE 2320 (0 SH)
Accompanies CIVE 2320. Covers problem solving and topics related to the course.
• Corequisite: CIVE 2320.

CIVE 2324 Reinforced Concrete Design (4 SH)
Covers design of common reinforced concrete structural elements. Explores mechanical properties of steel and concrete. Examines behavior and design of reinforced concrete beams, one-way slab systems, footings, and short columns based on latest ACI-318 code.
• Prerequisite: CIVE 2221.

CIVE 2331 Fluid Mechanics (4 SH)
Introduces the principles of fluid mechanics and the applications in basic hydraulic engineering systems. Topics include properties of fluids; pressure and force on surfaces and submerged bodies; continuity, momentum, and energy conservation principles; dimensional analysis and hydraulic similitude; flow in closed conduits; steady flow in pipe networks; unsteady flow in pipes; flow in open channels; hydraulic machines; and hydraulic structures. The laboratory component includes demonstrations and experiments to show the applicability of fluid mechanics and hydraulics principles.
• Prerequisite: CIVE 2221.

CIVE 2334 Environmental Engineering 1 (4 SH)
Focuses on protection and management of the environment. Topics include assessment of environmental quality; introduction to water and wastewater treatment technologies; air pollution control; and solid waste management.
• Prerequisite: CHEM 1151 or CHEM 1211.

CIVE 2340 Soil Mechanics (4 SH)
Studies soil classification, soil-water phase relations, water in soil, seepage, consolidation theory, and strength properties of soils.
• Prerequisite: CIVE 2221 or CIVE 2260.
• Corequisite: CIVE 2341.

CIVE 2341 Lab for CIVE 2340 (1 SH)
Accompanies CIVE 2340. Introduces standard laboratory procedures for characterizing the physical, hydraulic, and mechanical properties of soils as well as data reduction and analysis methods for various test methods. Laboratory methods and determinations include moisture content, Atterberg limits, permeability, compaction, consolidation, and direct shear. Includes the use of computer-based data acquisition systems and measurement transducers.
• Corequisite: CIVE 2340.

CIVE 3000 Professional Issues in Engineering (1 SH)
Provides students with an opportunity to reflect on both academic and co-op experiences in the context of planning for the senior year and beyond. Issues include professional and ethical issues, resolving ethical conflicts, awareness of engineers as professionals in a diverse world, strengthening decision-making skills, career portfolios, and lifelong learning needs, goals, and strategies. Students reflect upon issues of diversity from their experience in the University and in their cooperative education placements. Explores the role of different work and learning styles and diverse personal characteristics on the workplace and the classroom. Professional issues include impact of the cultural context, both in the United States and around the world, on the client, government relations, and workplace.
• Prerequisite: Junior or senior standing.
• NU Core: Comparative study of cultures.

CIVE 3425 Steel Design (4 SH)
Concentrates on design of steel members subject to tension, compression, bending, and combinations of loading, and design of connections, braced frames, and rigid frames. Design is based on the latest load resistance factor specifications of the American Institute for Steel Construction code. The theoretical basis of code formulas is also emphasized.
• Prerequisite: CIVE 2320.

CIVE 3464 Probability and Engineering Economy for Civil Engineering (4 SH)
Introduces engineering probability and statistics, as well as engineering economic analysis for project or design evaluation. Case studies are used to illustrate the integration of these areas in the design/system analysis process. Topics in engineering probability and statistics include descriptive statistics, expected value of random variables, and hypotheses testing. Statistical process control and sampling methods are introduced. Reliability methods for the analysis and improvement of system/design performance are discussed. Also covers fundamental concepts of time value of money and economic evaluation of alternatives, including the effects of depreciation and taxes.
• Prerequisite: MATH 2321.
• NU Core: Mathematical/analytical thinking level 2.
CIVE 4534 Environmental Engineering 2 (3 SH)
Continues CIVE 2334. Concentrates on unit operations, unit processes, and related fundamental design of physical, chemical, and biological water and wastewater treatment systems, using both lectures and laboratory instruction. Topics include aeration systems, activated sludge, fixed-film biological treatment, gas transfer, reaction kinetics, reactor modeling, coagulation, flocculation, sedimentation, filtration, and subsurface disposal system design.
• Prerequisite: CIVE 2331 and CIVE 2334.
• Corequisite: CIVE 4535.

CIVE 4535 Lab for CIVE 4534 (1 SH)
Accompanies CIVE 4534. Covers topics from the course through various experiments.
• Corequisite: CIVE 4534.

CIVE 4540 Resource Recovery and Waste Treatment Technologies Abroad (4 SH)
Examines different aspects relative to municipal and industrial solid waste, with a special focus on material recovery. Covers chemical-physical characterization of waste, source reduction and toxicity, recycling and selection of different fractions, resource and energy recovery (e.g., composting, anaerobic digestion, combustion to energy), and analysis and preliminary design of treatment disposal options. Through design projects, offers students an opportunity to apply lessons learned to the U.S. context. Taught in a study-abroad format in a European nation.

CIVE 4541 Waste Management and Policy Abroad (4 SH)
Explores how the country visited manages the recovery and treatment of both industrial and municipal solid waste. Emphasizes waste generated in mining and other industrial activities (e.g., refinery, military). Examines multifaceted aspects, including governance; science/engineering; and health, social, and policy. Offers students an opportunity to interact with local experts and to visit key sights. Encourages students to think about possible policy lessons for the United States. Taught abroad.

CIVE 4542 Foundation Engineering (4 SH)
Explores soil-bearing capacity determination, design of shallow foundations and pile foundations, and design of retaining walls and excavation support systems.
• Prerequisite: (a) CIVE 2340 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

CIVE 4544 Highway Engineering (4 SH)
Concentrates on highway design including route selection, geometric design, foundation and pavement design, drainage design, and construction issues. Analyzes highway traffic including traffic flow fundamentals and capacity and level of service analysis for freeways and rural highways. Covers the environmental impact and public review process for highway construction. Includes project component.
• Prerequisite: (a) CIVE 2261 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

CIVE 4554 Design for Sustainable Transportation: Netherlands (4 SH)
Examines how the design of Dutch transportation infrastructure promotes travel by foot, bicycle, and public transportation as opposed to private automobile and how it promotes urban livability and traffic safety. Topics include bicycling infrastructure planning and design; Vision Zero traffic safety principles and design treatments for safe roads, intersections, and crossings; and high-quality transit service planning and design. Through design projects, offers students an opportunity to apply lessons learned to the U.S. context. Taught in a study-abroad format in the Netherlands.

CIVE 4566 Planning and Policy for Sustainable Urban Transportation: Netherlands (4 SH)
Examines urban transportation planning practices and policies in the Netherlands that promote travel by bicycling, public transportation, and foot and help prevent urban mobility from degrading urban livability. Topics include land use planning at the site, neighborhood, and regional scale; transit- and bicycle-oriented development, including both land use and transportation infrastructure planning and policies for large-scale urban expansions; and traffic circulation planning and policies to promote safety, prevent roads from becoming barriers to walking, cycling, or transit, and to create car-free and car-lite zones. Taught in study-abroad format in the Netherlands.

CIVE 4575 Construction Management (3 SH)
Surveys the construction industry and tasks that must be addressed by construction management including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, conceptual and detailed cost estimating, labor relations, network planning and scheduling, construction accounting, and project control.
• Prerequisite: Junior or senior standing.

CIVE 4577 Construction Management (4 SH)
Surveys the construction industry and tasks that must be addressed by construction management including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, conceptual and detailed cost estimating, labor relations, network planning and scheduling, construction accounting, and project control.
• Prerequisite: Junior or senior standing.

CIVE 4587 Construction Management (3 SH)
Surveys the construction industry and tasks that must be addressed by construction management including resource allocation, construction environment, organization, contracts, funding, cash flow, productivity, conceptual and detailed cost estimating, labor relations, network planning and scheduling, construction accounting, and project control.
• Prerequisite: Junior or senior standing.

CIVE 4699 Special Topics in Civil Engineering (4 SH)
Covers special topics in civil engineering initiated by the appropriate discipline committee and approved by the department.
• Repeatability: May be repeated without limit.
CIVE 4700 Civil Engineering Research (4 SH)
Offers independent work for students in the University Honors Program under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

CIVE 4765 Senior Design Project—Environmental (5 SH)
Using teams, students design a civil engineering project that primarily involves the environmental subdiscipline. Design teams are advised by a faculty member and engineering practitioners. Lectures cover supplemental technical background specific to the project, as well as cross-disciplinary aspects of project development, value engineering, aesthetics, and constructability. Integrates project design with further development of student communications skills; students present the design to practicing engineers and interested parties such as community groups.
• Prerequisite: (a) CIVE 4534 or CIVE 5536 and (b) ENGW 3301, ENGW 3302, ENGL 3301, ENGL 3302, or ENGL 3315 and (c) junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: CIVE 4765, CIVE 4766, CIVE 4768, and CIVE 4769.

CIVE 4766 Senior Design Project—Geotechnical (5 SH)
Using teams, students design a civil engineering project that primarily involves the geotechnical subdiscipline. Design teams are advised by a faculty member and engineering practitioners. Lectures cover supplemental technical background specific to the project, as well as cross-disciplinary aspects of project development, value engineering, aesthetics, and constructability. Integrates project design with further development of student communications skills; students present the design to practicing engineers and interested parties such as community groups.
• Prerequisite: (a) CIVE 4542 and (b) ENGW 3301, ENGL 3301, or ENGL 3302 and (c) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• Equivalent: CIVE 4765, CIVE 4767, CIVE 4768, and CIVE 4769.

CIVE 4767 Senior Design Project—Structural (5 SH)
Using teams, students design a civil engineering project that primarily involves the structural subdiscipline. Design teams are advised by a faculty member and engineering practitioners. Lectures cover supplemental technical background specific to the project, as well as cross-disciplinary aspects of project development, value engineering, aesthetics, and constructability. Integrates project design with further development of student communications skills; students present the design to practicing engineers and interested parties such as community groups.
• Prerequisite: (a) CIVE 3425 or CIVE 5522 and (b) ENGW 3301, ENGW 3302, ENGL 3301, or ENGL 3302 and (c) junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: CIVE 4765, CIVE 4766, CIVE 4768, and CIVE 4769.

CIVE 4768 Senior Design Project—Transportation (5 SH)
Using teams, students design a civil engineering project that primarily involves the transportation subdiscipline. Design teams are advised by a faculty member and engineering practitioners. Lectures cover supplemental technical background specific to the project, as well as cross-disciplinary aspects of project development, value engineering, aesthetics, and constructability. Integrates project design with further development of student communications skills; students present the design to practicing engineers and interested parties such as community groups.
• Prerequisite: (a) CIVE 4554 and (b) CIVE 5373 or CIVE 5376 and (c) ENGW 3301, ENGW 3302, ENGL 3301, or ENGL 3302 and (d) junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: CIVE 4765, CIVE 4766, CIVE 4767, and CIVE 4769.
CIVE 4777 Climate Hazards and Resilient Cities Abroad (4 SH)
Focuses on the science of “global weirding”—unprecedented changes in weather caused by global warming and natural climate variability. Introduces the physical-science basis of climate, computer models of the earth system, statistical tools for the analysis of climate model, and remote sensor data. Also introduces the concept of urban resilience, focusing on preventing natural hazards from turning into catastrophic disasters in densely populated and vulnerable regions. Examines multifaceted aspects of resilience, including governance, emergency response, infrastructural, informational, social, and policy aspects. Encourages students to consider the science, engineering, and policy challenges in transforming urban and coastal regions to climate-resilient cities and to examine how societies can learn from each other by comparing Boston with the country visited. Taught abroad.
• NU Core: Science/technology level 1.

CIVE 4778 Climate Adaptation and Policy Abroad (4 SH)
Explores how the country visited plans to adapt to climate change and natural hazards and how that country participates in international climate and emissions negotiations, within the context of its history and culture. Focuses on how an emerging economy adjusts to the reality of climate change/extremes and how citizens may drive decisions and policy. Incorporates topics from climate change, environmental sciences, civil and chemical engineering, remote sensing, social sciences, electrical engineering, computer science, and the management sciences. Encourages students to think about possible policy lessons for the United States. Offers students an opportunity to visit key sights. Culminates with a mock “climate change war game,” simulating an event in which international negotiators meet to formulate treaties on climate change adaptation and mitigation. Taught abroad.
• NU Core: Science/technology level 1.

CIVE 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

CIVE 4993 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

CIVE 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CIVE 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CIVE 5221 Construction Project Control and Organization (2 SH)
Overviews the organization of construction firms at the general corporate level and the project level. Covers cost, schedule, budget, and financial control of projects. Also examines the flow of information between parties to the project.
• Prerequisite: (a) CIVE 4575 or CIVE 7220 and (b) junior, senior, or graduate standing.
• Equivalent: CIVE 7221.
CIVE 5270 Environmental Protection and Management (4 SH)
Examines public and private environmental quality management and resource protection systems. Considers regulatory issues, risk management approaches, local vs. regional impacts, long-term sustainability, and economic/financial issues. Covers selected current topics and a broad range of specific environmental issues.
• Prerequisite: Junior, senior, or graduate standing.

CIVE 5271 Solid and Hazardous Waste Management (4 SH)
Introduces various aspects of integrated solid waste management system and hazardous waste management practices. Includes both engineering principles as well as socioeconomic and regulatory issues surrounding solid and hazardous waste management. Provides sufficient background to enable the student to understand, evaluate, and critique the design of and the decisions in various waste management alternatives.
• Prerequisite: Junior, senior, or graduate standing.

CIVE 5275 Life Cycle Assessment of Materials, Products, and Infrastructure (4 SH)
Reviews engineering models that form the foundation of life cycle assessment (LCA), its computational structure, and relevant international standards. LCA is a widely used systems-modeling method for quantifying the environmental and health implications of a product over its entire life cycle, from manufacturing to use to disposal. This information guides design, technology decisions, and policy on topics ranging from consumer products to green buildings to the large-scale energy technologies. Students receive several hands-on training modules for popular commercial and open-source LCA software packages and have an opportunity to work examples for various products and systems. Students then carry out independent group projects for real clients in industry and government.
• Prerequisite: Juniors, seniors, and graduate students only.

CIVE 5321 Geoenvironmental Engineering (4 SH)
Covers definitions and regulations, soil formation and mineralogy, hydraulic conductivity measurements, reactive contaminant transport through fine-grained soils, landfill and liners design, and seepage barriers and cutoff walls. Introduces site characterization and remediation.
• Prerequisite: Junior, senior, or graduate standing.

CIVE 5373 Transportation Planning and Engineering (4 SH)
Discusses urban transportation planning and engineering for modes other than highway. Covers travel demand forecasting for both the short and long term including impact analysis methods, simple elasticity models, and the four-step model system of trip generation, trip distribution, modal split, and network assignment. Introduces transit service analysis and design. Other topics include capacity, service, and engineering design basics for different travel modes, such as bus, airport, rail, and bicycle. Considers the environmental impact, economic evaluation, and financial impact of different modes of transportation.
• Prerequisite: Junior, senior, or graduate standing.

CIVE 5376 Traffic Engineering (4 SH)
Explores traffic flow theory and measurement, capacity and level of service analysis for intersections and urban arterials, intersection layout design, intersection signal plan design for both isolated intersections and arterials, parking analysis and design, and congestion mitigation and traffic management. Offers students an opportunity to practice with standard software.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: CIVE 4556 and CIVE 7376.

CIVE 5522 Structural Analysis 2 (4 SH)
• Prerequisite: (a) CIVE 2320 and MATH 2341 or (b) graduate standing.
• Equivalent: CIVE 3522.

CIVE 5536 Hydrologic Engineering (4 SH)
Introduces principles of engineering hydrology. Covers the hydrologic cycle; rainfall-runoff relationships; hydrologic flood routing; and ground water hydraulics. Applies these concepts to issues such as water supply and storm water management. Includes project component.
• Prerequisite: (a) CIVE 2331 or graduate standing and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students with junior, senior, or graduate standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: CIVE 4536.
CIVE 5698 Special Topics in Civil Engineering (Nontechnical Elective) (2 to 4 SH)
Offered when the need for a special topic is evident to faculty and students. Initiated by the appropriate faculty members and discipline committee and approved by the department. May not be used as a technical elective in a degree program.
- **Prerequisite:** Senior or graduate standing.
- **Repeatability:** May be repeated up to 5 times for up to 12 total semester hours.

CIVE 5699 Special Topics in Civil Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. Topics are initiated by appropriate faculty members and discipline committee and approved by the department.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated up to 5 times for up to 12 total semester hours.

CIVE 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

CIVE 5978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

CIVE 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

CIVE 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

CIVE 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- **Prerequisite:** ENCP 6000.
- **Repeatability:** May be repeated without limit.

CIVE 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
- **Prerequisite:** Engineering students only.
- **Repeatability:** May be repeated without limit.

CIVE 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
- **Repeatability:** May be repeated without limit.

CIVE 7100 Applied Time Series and Spatial Statistics (4 SH)
Offers an interdisciplinary course covering the fundamentals of time series and spatial statistics with applications in engineering, science, and business. Introduces analysis and forecasting methods for time series, spatial, and spatiotemporal data. Discusses classical time or frequency domain methods, as well as recent techniques motivated from computer science, physics, statistics, or engineering. Case studies relate to ongoing research and to real-world examples. A demo project is selected by the instructor based on discussion with individual students. A computer-based final project can be tailored to student interests in environmental engineering, sustainability sciences, security threat assessments, social sciences, business, or management science and finance.
- **Prerequisite:** Undergraduate probability and statistics (CIVE 3464 or equivalent); background in programming languages such as MATLAB or R helpful but not required.

CIVE 7110 Critical Infrastructure Resilience (4 SH)
Introduces the concept of resilience by exploring engineering concepts and perspectives to offer students an opportunity to develop the ability to be prepared for and adapt to challenging situations and scenarios—e.g., globalization, climate change, security threats, and natural disasters—on critical infrastructures and key resources. Topics include application of tools for infrastructure modeling and risk assessment; identification of natural and man-made hazards; management of disaster risks and communications; resilience design; and future challenges, policy, and novel approaches to advance resilience. Explores application to real-life examples through group projects.
- **Prerequisite:** One semester of undergraduate statistics.

CIVE 7220 Construction Management (4 SH)
Presents all aspects of construction management, with emphasis on cost and schedule. Provides conceptual and detailed cost estimates and network-based scheduling techniques (CPM and PERT). Covers project cash flow and finances.
- **Prerequisite:** One semester of undergraduate probability and statistics.

CIVE 7230 Legal Aspects of Civil Engineering (4 SH)
Overviews the U.S. legal system and the theories necessary for the comprehension of business and contractual liabilities. Discusses various types of contracts, forms of business ownership, claims and disputes, and environmental law.
- **Prerequisite:** Engineering students only.
CIVE 7240 Construction Equipment and Modeling (4 SH)
Focuses on the selection and application of earthmoving equipment. Topics include equipment production systems and cost analysis, simulation modeling of equipment operations, statistical aspects of computer simulation, and risk analysis fundamentals.
• Prerequisite: One semester of construction management or one semester of undergraduate soil mechanics.

CIVE 7250 Environmental Chemistry (4 SH)
Examines applications of chemistry to environmental engineering. Covers properties of water and pollutants, acid-base reactions, pH, alkalinity, equilibrium chemistry, chemical kinetics, chemical thermodynamics, coordination chemistry, precipitation-dissolution reactions, surface chemistry, adsorption-desorption, redox reactions, and organic chemistry as it relates to the environment. Includes relevant laboratory exercises such as colorimetry, gravimetric, and electrochemical methods; atomic absorption spectrophotometry; and ion and gas chromatography.
• Prerequisite: One semester of undergraduate chemistry.

CIVE 7251 Environmental Biological Processes (4 SH)
Examines microbiology with emphasis on biological processes in environmental engineering applications. Topics include cell structure, morphology, cell nutrition and growth, energy transfer and utilization, aerobic and anaerobic microbial metabolism, biological wastewater process theory and modeling, biological nutrients removal, and disinfection of relevant microorganisms. Includes relevant laboratory exercises of treatment parameters used to monitor the biological processes, such as BOD, TOC, COD, gravimetric methods, and dissolved oxygen. Also covers enzyme kinetics and evaluation of kinetic coefficients for biotreatment.
• Prerequisite: One semester of undergraduate chemistry or one semester of undergraduate biology.

CIVE 7252 Water Engineering, Resources, and Energy Recovery (4 SH)
Covers theory and design principles of major water and wastewater treatment processes. Focuses on the emerging issues in water sustainability and advances in fundamental science and technology in integrating scientific principles, engineered processes, and systems analyses to address diverse challenges related to society’s growing water needs and their nexus with energy and the environment. Designed to stimulate multidisciplinary thinking and research among traditional areas of civil and environmental engineering, biology, chemistry, modeling, data science, and others. Special projects are designed to have students working in multidisciplinary teams to develop sustainable solutions to meet the present and future water and resources needs of the society. Given current conditions, innovative approaches and creative energy solutions for self-sustaining wastewater treatment facilities are needed.
• Prerequisite: One semester of undergraduate chemistry or one semester of undergraduate biology.

CIVE 7255 Environmental Physical/Chemical Processes (4 SH)
Examines the processes of physical and chemical phenomena related to water quality and water treatment within environmental engineering. Presents the use of fundamental theory, mathematical description, and applied knowledge of these processes and how they are used to characterize water quality in natural systems (lakes, rivers) and to predict performance in engineered systems (water treatment systems). Uses a mass balance and reaction kinetics approach to derive analysis and design equations for water treatment unit operations. Covers physical and chemical processes, including reaction kinetics, flow regimes, dissolved solute removal, particulate removal, phase transfer processes, and redox processes. Includes laboratory demonstrations.
• Prerequisite: Basic knowledge of water quality, environmental chemistry, and differential equations preferred.

CIVE 7260 Hydrologic Modeling (4 SH)
Covers evaluation of surface and ground water as an integrated resource using hydrologic principles. Topics include the hydrologic cycle (precipitation, interception and surface storage, infiltration, evapotranspiration, lakes and stream flow, and ground water discharge to oceans), hydrologic measurements and monitoring, surface water hydrology (rainfall/runoff modeling, hydrographs, hydrograph routing, and snow hydrology), and ground water hydrology (basic ground water hydraulics and porous media properties, aquifers, regional flow, and basin development and yield). Additional topics include hydrologic design, stochastic hydrology, and simulation modeling.
• Prerequisite: Knowledge of differential equations and undergraduate probability and statistics; engineering students only.

CIVE 7261 Surface Water Quality Modeling (4 SH)
Examines mechanisms through which environmental water quality becomes degraded, control strategies for mitigating degradation, and resource management strategies for preventing degradation. Topics include contaminant sources, eutrophication processes, environmental transport and transformation processes, water quality measurements and monitoring, contaminant fate and transport modeling in lakes, rivers, estuaries, and ground water, water quality control methods and strategies, and water resource protection regulations and strategies.
• Prerequisite: CIVE 7250 and CIVE 7260.
CIVE 7263 Groundwater Quality Modeling (4 SH)
Examines methods and models used to evaluate flow and contaminant transport in ground water, focusing on practical applications. Topics in ground water flow include one-dimensional flow, well hydraulics, aquifer parameter tests, unsaturated zone flow, seepage from canals and ditches, seepage through earth structures, and an introduction to aquifer modeling. Topics in ground water quality include chemical transport and transformation processes, chemical fate and transport modeling in ground water, and ground water quality measurement and monitoring. Studies solution methods that focus on analytical methods. Also discusses ground water quality control and resource protection methods, strategies, and regulations.
* Prerequisite: CIVE 7260; engineering students only.

CIVE 7272 Air Quality Management (4 SH)
Explores engineering theory and practice related to air resources management. Focuses on modeling dispersion and reactions for atmospheric pollutants and on analysis of systems for controlling gaseous and particulate emissions including dry collection, wet collection, absorption, and catalytic processes. Also addresses biological and chemical aspects of air pollution including toxicological issues, physiological effects of aerosols, analysis of organic and inorganic constituents of the atmosphere, and rationale for establishing air quality criteria and standards.
* Prerequisite: One semester of undergraduate soil mechanics.

CIVE 7301 Advanced Soil Mechanics (4 SH)
Studies characterization of soils, soil mineralogy and chemistry, stresses within a soil mass, basic porous media flow principles, effective stress principle, compaction, drained and undrained stress-strain-strength concepts, and consolidation theory and its application.
* Prerequisite: One semester of undergraduate soil mechanics.

CIVE 7302 Advanced Foundation Engineering (4 SH)
Focuses on bearing-capacity and settlement analysis of conventional shallow foundations and combined footings; mat design; lateral earth pressure theory and application to retaining wall design, braced excavations, sheet pile wall design, and slurry trench walls; bearing-capacity design and analysis for deep foundations; and laterally loaded piles, friction piles, and pile-driven analysis.
* Prerequisite: One semester of undergraduate soil mechanics.

CIVE 7311 Soil and Foundation Dynamics (4 SH)
Considers dynamic loads, blast vibrations and monitoring, dynamic response of single-mass, multi degree-of-freedom systems, design of machine foundations, dynamic soil properties, ground response analysis, liquefaction, and seismic analysis of slopes and dams.
* Prerequisite: One semester of undergraduate statics.

CIVE 7330 Advanced Structural Analysis (4 SH)
Explores modern methods of structural analysis, matrix formulation of flexibility and stiffness methods, and analysis of structures with material and geometric nonlinearities. Also introduces energy methods.
* Prerequisite: CIVE 5522 or one semester undergraduate matrix structural analysis.

CIVE 7331 Structural Dynamics (4 SH)
Studies plate tectonics, seismology, faults and characteristics, ground motions, seismic hazard analysis, dynamic response of single degree-of-freedom system, response spectrum, site effects, and seismic design considerations for buildings, bridges, and earth-retaining structures.
* Prerequisite: One semester of undergraduate statics.

CIVE 7340 Seismic Analysis and Design (4 SH)
Considers the response of linear systems to coherent and incoherent support motion, nonlinear response, the concept of ductility, inelastic response spectra, soil-structure interaction, random vibration theory, development of seismic codes, and characterizations of earthquakes for design.
* Prerequisite: CIVE 7331.

CIVE 7341 Structural Reliability (4 SH)
Examines applications of probability theory and random variables for determining the reliability of structures. Includes the following topics: formulation of reliability for structural components and systems; first-order second-moment method, first- and second-order reliability methods, and simulation methods; analysis of model uncertainty and Bayesian parameter estimation technique; load and resistance models and bases for probabilistic structural codes; and time-dependent reliability methods. Assumes no prior knowledge of probability theory.

CIVE 7342 System Identification (4 SH)
Studies methods for identifying the fundamental characteristics of structures. Includes topics in linear algebra (singular value and QR decomposition, pseudoinversion, and so on); input-output relationships for linear time-invariant systems; frequency response functions; signal processing fundamentals; realization theory; the eigensystem realization algorithm; use of observers in identification; and introduction to out-only system identification.
* Prerequisite: One semester of undergraduate structural analysis.
CIVE 7343 Experimental Modal Analysis (4 SH)
Covers the fundamentals of signals, filters, and system identification in the time and frequency domain as applied to structural engineering. Offers students an opportunity to carry out projects in the laboratory to obtain practical experience in modal identification, model updating, and damage diagnosis.
• Prerequisite: One semester of undergraduate structural analysis.

CIVE 7350 Behavior of Concrete Structures (4 SH)
Considers flexural mechanics of reinforced concrete cross sections and members; combined bending, axial, and shear loads; advanced topics in shear, torsion, and connection design; and application of plastic analysis to reinforced concrete frames, their behavior under cyclic loading, and response of structures under seismic actions.
• Prerequisite: One semester of undergraduate concrete design.

CIVE 7351 Behavior of Steel Structures (4 SH)
Studies the behavior of steel structures and its relation to design. Includes flexural mechanics of steel cross sections and members; instability; combined bending, axial, and shear loads; torsion of open and closed thin-walled sections; advanced topics in shear and connection design; and plate girders.
• Prerequisite: One semester of undergraduate steel design.

CIVE 7354 Wind Engineering (4 SH)
Covers atmospheric circulation, atmospheric boundary layer winds, bluff-body aerodynamics, introduction to random vibration theory, response of structures to fluctuating wind loads, aeroelastic phenomena, wind-tunnel and full-scale testing, nonsynoptic winds (hurricanes, tornadoes, etc.), wind-load standards, and design applications.

CIVE 7355 Advanced Bridge Design (4 SH)
Studies the behavior and design of prestressed concrete bridges. Includes conceptual design, flexural design, shear design, and torsional design of prestressed elements. Analyzes indeterminate prestressed structures and design for prestressed concrete bridges, including material properties, loads, reinforcement, structural analysis, temperature effects, and construction methods. Covers solid slab, T-beam, and box girders. Final projects include complete designs for a simple supported girder bridge and a continuous girder bridge using load factor and resistance design (LFRD) specifications.
• Prerequisite: One semester of undergraduate structural analysis.

CIVE 7357 Advanced Structural Mechanics (4 SH)
Covers stress and strain analysis of structural components, including beams and plates subject to bending, shear, tension, and compression, as well as nonsymmetric geometry and loading cases. Considers the derivation and analysis of elastic instabilities of structural components, including the lateral, torsional, and lateral-torsional buckling of beams and the inelastic yielding and concentrated plasticity of beam components. Includes 3D stress and strain analysis for elastic and inelastic continua as related to advanced structural problems. Introduces variational methods.
• Prerequisite: One semester of graduate structural analysis.

CIVE 7380 Transportation Performance and Simulation Models (4 SH)
Reviews concepts and methods for analyzing the performance of complex transportation systems as well as methodologies for planning, designing, monitoring, and managing and controlling traffic flows over complex transportation networks. Topics include deterministic and probabilistic models, elements of queuing theory, network optimization algorithms, and simulation. Applications include traffic flow modeling, capacity analysis of diverse transportation facilities, level of service and estimation of delays, optimal design of transportation network services, and traffic assignment.

CIVE 7381 Transportation Demand Models (4 SH)
Examines methods and models used to predict urban travel demand. Introduces supporting statistical methods including linear regression, maximum likelihood estimation, and statistical tests. Also studies the effect of variable demand on project evaluation.
• Prerequisite: One semester of undergraduate probability and statistics.

CIVE 7382 Advanced Traffic Control and Simulation (4 SH)
Covers principles and logic of traffic signal control, including actuated control, coordinated control, transit signal priority, and signal control schemes for better accommodating pedestrians and bicycles. Topics include traffic microsimulation principles for urban street networks, intersection and network performance modeling and measurement, and design and programming of traffic signal control using traffic microsimulation.
CIVE 7385 Public Transportation (4 SH)
Studies the analysis, planning, and operational design of urban public transportation systems. Topics include service design and scheduling, such as route and system-level design and optimization, passenger flow modeling, rail operations, and bus operational control including automatic vehicle location and priority at signalized intersections. Also covers passenger sampling, ridership estimation, demand forecasting, data collection design, and service quality monitoring, with an emphasis on intelligent systems. Discusses policy issues including pricing, subsidy, and priority. Introduces supporting mathematical methods in optimization and statistical sampling.

• Prerequisite: Knowledge of probability theory.

CIVE 7387 Design Aspects of Roadway Safety (4 SH)
Concentrates on roadway design features that affect safety, including system users and design elements. Topics include crash causation and countermeasures, statistical procedures for crash analysis, and geometric design improvements for roads and intersections. Analyzes crash data, including both intersecting and nonintersecting locations. Presents concepts, including design, to create a safer transportation system while addressing specific high-crash locations.

CIVE 7388 Special Topics in Civil Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7390 Special Topics in Construction Management Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7392 Special Topics in Environmental Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7394 Special Topics in Geotechnical Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7396 Special Topics in Structural Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7398 Special Topics in Transportation Engineering (2 or 4 SH)
Offered when the need for a special topic is evident to faculty and students. The course is initiated by the appropriate faculty members and discipline committee and approved by the department.

• Repeatability: May be repeated without limit.

CIVE 7400 Seminar (0 SH)
Presents topics of an advanced nature by staff, outside speakers, and students in the graduate program. This course must be attended every semester by all full-time graduate students in the Department of Civil and Environmental Engineering.

• Repeatability: May be repeated without limit.

CIVE 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

• Repeatability: May be repeated without limit.

CIVE 7978 Independent Study (1 to 4 SH)
Offers an individual effort in an area selected by student and adviser and approved by the Department Discipline Committee resulting in a definitive report.

• Prerequisite: Engineering students only.

• Repeatability: May be repeated without limit.

CIVE 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental research conducted by arrangement with and under the supervision of the department.

• Prerequisite: Engineering students only.

• Repeatability: May be repeated without limit.

CIVE 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.

• Prerequisite: CIVE 7990.

• Repeatability: May be repeated without limit.

CIVE 7996 Thesis Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.

• Prerequisite: Engineering students only.
CIVE 8674 Master's Report (2 or 4 SH)
Offers an individual effort consisting of laboratory and/or literature investigation and analysis of advanced design of a project in an area of civil engineering selected by student and adviser resulting in a definitive report. Requires a completed report seven years from the start of the master’s program.
• Prerequisite: Engineering students only.

CIVE 8960 Exam Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
• Repeatability: May be repeated once.

CIVE 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

CIVE 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

CIVE 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

CIVE 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CIVE 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

CIVE 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of program requirements for PhD candidacy.

CIVE 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CIVE 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

CIVE 9990 Dissertation (0 SH)
Offers analytical and/or experimental research conducted by arrangement with and under the supervision of the department. Open to full-time students only.
• Prerequisite: PhD candidacy in civil engineering.
• Repeatability: May be repeated once.

CIVE 9996 Dissertation Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: CIVE 9990 completed twice; civil engineering students only.
• Repeatability: May be repeated without limit.

COMM 1000 Communication Studies at Northeastern (1 SH)
Intended for freshmen in the College of Arts and Sciences. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Communication studies majors and combined majors only.

COMM 1101 Introduction to Communication Studies (4 SH)
Surveys the field of communication studies. Covers major theories and methodological approaches in communication studies and situates communication within larger social, political, and economic institutions. Exposes students to ways of ethical reasoning across communication contexts, including organizational communication, social media, intercultural communication, mass media, and interpersonal communication.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

COMM 1112 Public Speaking (4 SH)
Develops skills in public communication. Topics include choosing and researching a topic, organizing and delivering a speech, handling speech anxiety, listening critically, and adapting language to an audience. Offers the opportunity for students to present a series of speeches and receive advice and criticism from an audience.
• NUpath: Exploring creative expression and innovation.
COMM 1113 Business and Professional Speaking (4 SH)
Designed to assist students in developing advanced public speaking and presentational skills for professional and leadership positions. Covers fundamentals such as audience, speech objectives and structure, and effective delivery. Emphasizes the production and successful interaction with electronic and traditional supportive media. Offers students an opportunity to develop their presentational skills in a variety of settings and realistic business tasks.
* NUpath: Exploring creative expression and innovation.

COMM 1120 Principles of Argumentation (4 SH)
Considers how the theories and techniques of argumentation can be used to understand and promote differing points of view, explore ideas and alternatives, and convince others of the need to change or act. Starts with the principles of formal logic and introduces students to truth tables and diagramming techniques. Continues to discuss informal logic and modern argumentation theory, including argumentative reconstruction, argument structures, argument schemes and critical questions, as well as informal fallacies. Concludes with a discussion of the effective use of reasoning in society from a logical, dialectical, and rhetorical point of view.
* NUpath: Conducting formal and quantitative reasoning.

COMM 1125 Science, Communication, and Society (4 SH)
Introduces the major areas of research analyzing the role of communication and the media in shaping debates over science, technology, and the environment. Focuses on what U.S. National Academies calls the “science of science communication” to offer students an opportunity to acquire the knowledge necessary to assess the interplay between science, engineering, and society, including the implications for strategic communication, public engagement, personal decisions, and career choices. Examines the scientific, social, and communication dimensions of debates over climate change, evolution, human genetic engineering, childhood vaccination, food biotechnology, and other case studies. Covers how to find, discuss, evaluate, and use expert sources of information; to formulate research questions and expectations; to think effectively about professional situations and choices; and to write evidence-based, persuasive papers and essays.
* NUpath: Understanding societies and institutions.

COMM 1131 Sex, Relationships, and Communication (4 SH)
Focuses on communication as it occurs in sexual and romantic relationships, specifically on the positive and negative role of verbal and nonverbal communication in these relationships. Topics may include the role of communication in interpersonal attraction, attachment, affection, love, sex, and relational duration and outcomes. May also introduce communication in other types of relationships, such as family and/or friendship, as points of comparison. Encourages students to explore the central place of communication in all aspects of sexual and romantic relationships and how communication may help them derive maximum social rewards.
* NUpath: Understanding societies and institutions.

COMM 1210 Persuasion and Rhetoric (4 SH)
Seeks to teach students to be more astute receivers and producers of persuasive messages by learning how to dissect them. Examines both classical and contemporary theories of persuasion, after which students consider “persuasion in action”—how persuasion is used in everyday language, nonverbal communication, sales techniques, politics, and propaganda. Ethical issues in persuasion are addressed throughout the course.
* NU Core: Humanities level 1.
* NUpath: Interpreting culture.
* Equivalent: COMM 4510.

COMM 1225 Communication Theory (4 SH)
Explores communicative and cultural practice from a wide variety of theoretical perspectives. Considers a wide range of cultural practices, texts, and artifacts, including popular culture (television shows, movies, and video games); social media and online content; as well as organizational communication (press releases) and interpersonal interactions (conversations between romantic partners). Communication theory is based on two premises: Our cultural assumptions inform and shape our ability to communicate; and communication is the process through which culture is created, modified, and challenged.
* NUpath: Interpreting culture.

COMM 1231 Principles of Organizational Communication (4 SH)
Surveys the communication process in complex organizations. Topics include the evolution of organizational communication, communication networks, information management, and communication climate. Analyzes case studies and teaches how to improve the quality of communication in an organization.
* NUpath: Interpreting culture.
COMM 1255 Communication in a Digital Age (4 SH)
Covers digital communication’s history, technical basis (“protocol” and the “Web”), communicative effects, commercial applications, culture, and societal interactions. Digital communication is central to contemporary life and is (consequently) often taken for granted, which this course seeks to remedy. Applies practical skills relative to theories about collaboration and cultural production and engagement with and analyses of online cultures. Offers students an opportunity to become effective online communicators—using practical exercises such as email filtering, online collaboration, and writing in a Web markup format—and to make use of critical thinking to understand and engage with issues such as online privacy, gender and racial bias, and marketplace credibility and fraud.
• NUpath: Interpreting culture, understanding societies and institutions.

COMM 1310 Classical Foundations of Communication (4 SH)
Reviews the foundations of the field of speech and communication in ancient Greece and Rome. Topics include Aristotle’s ideas about persuasion, the sophistic tradition, the rhetorical theories of Cicero and Quintilian, and famous speeches of the golden age of Greece and Rome. Employs classical rhetorical theory as a mode of critical thinking and public involvement to study the processes of argumentation and persuasion in various interpersonal, political, academic, and pop culture settings.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions.
• Equivalent: COMM 2310.

COMM 1331 Legal Argumentation, Advocacy, and Citizenship (4 SH)
Seeks to train students to become community leaders, provide students with the tools for effective participation in national and local politics, and prepare students for careers in which persuasive skills are critical to success. Offers an opportunity to study historical documents to understand the processes of argumentation and to develop arguments by performing detailed research about contemporary issues.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, employing ethical reasoning.
• Equivalent: COMM 2331.

COMM 1412 Social Movement Communication (4 SH)
Examines the communication strategies (including rhetorical messaging, public advocacy, grassroots organizing, fund-raising, and media outreach) of historical and contemporary advocacy groups, movements, and organizations. Social movements considered may include immigration protests, AIDS activism, environmental advocacy, disability movements, and animal-rights “terrorism.”
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: COMM 2412.

COMM 1414 Great Speakers and Speeches 1, 1630–1930 (4 SH)
Reviews notable U.S. orations of the period between 1630 and 1930, with an emphasis on speeches that were given after the American Revolution. Topics covered include the nature of public address and its importance in U.S. history; the role of the critic in studying public address; and genres of oratory, including inaugural speeches, apologies, and political movement oratory.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture.
• Equivalent: COMM 2414 and COMM 3410.

COMM 1511 Communication and Storytelling (4 SH)
Engages students in the discovery of varied and culturally diverse texts in the literary genres of poetry, prose, and drama. Students focus on analyzing an author’s meaning and communicating that meaning to an audience through interpretive performance.
• NU Core: Humanities level 1.
• NUpath: Exploring creative expression and innovation.
• Equivalent: COMM 3511.

COMM 1600 Communication Ethics (4 SH)
Focuses on ethical principles, issues, and dilemmas in communication. Covers professional codes as well as personal, interpersonal, small group, organizational, and societal factors affecting ethical mediated communication. Designed to stimulate the moral imagination, reveal ethical issues inherent in communication, and provide resources for making and defending choices on ethical grounds.
• NUpath: Exploring ethical reasoning.

COMM 2100 Elements of Debate (4 SH)
Introduces the principles and skills of effective argument. Topics include the process of advocacy, how to develop an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates.
• NUpath: Exploring creative expression and innovation.

COMM 2105 Social Networks (4 SH)
Explores the use of social network analysis theories and methods to understand the growing connectivity and complexity in the world around us on different scales, ranging from small groups to the World Wide Web. Offers students an opportunity to see the world in a new way: using a network perspective. Covers a wide range of topics and applications relating to social network analysis. Discusses how social networks concepts, theories, and visual-analytic methods are being used to map, measure, understand, and design a wide range of phenomena such as groups and organizations, friendships and romantic relationships, social networking sites (Facebook), recommender systems (Amazon), online games and virtual worlds (Second Life), and the World Wide Web.
• NUpath: Engaging with the natural and designed world, analyzing and using data.
COMM 2301 Communication Research Methods (4 SH)
Offers an overview of the concepts, methods, tools, and ethics of communication research. Introduces students to the basic statistical concepts used by communication researchers. Designed to help students become knowledgeable consumers and limited producers of communication research. Offers students an opportunity to learn to read, interpret, and critically evaluate research reports. Exposes students to basic social science concepts and research designs and the fundamentals of conducting and analyzing research using surveys, experiments, and content analyses. Students conduct their own empirical research study as a final project, which entails research design, data collection, data analysis, and a written presentation.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.

COMM 2303 Global and Intercultural Communication (4 SH)
Focuses on theories of and approaches to the study of intercultural communication. Emphasizes the importance of being able to negotiate cultural differences and of understanding intercultural contact in societies and institutions. Stresses the benefits and complexities of cultural diversity in global, local, and organizational contexts.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

COMM 2304 Communication and Gender (4 SH)
Presents a theoretical and practical examination of the ways in which communication is gendered in a variety of contexts. Integrates into this analysis how different institutions and interpersonal situations affect our understanding of gender roles.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: WMNS 2304.

COMM 2312 Voice and Articulation (4 SH)
Provides training in developing clear and articulate speech. Topics include the physiology of the vocal mechanism, voice projection and variety, articulation and pronunciation, and appropriate speech. Trains students through lectures, drills, and exercises.

COMM 2350 Producing for the Entertainment Industry (4 SH)
Investigates the role of the producer in the production of content for traditional and new media venues. Explores a variety of distribution systems, including online channels, mobile video, terrestrial/satellite radio, documentary film, and independent films, among other platforms. Examines the producer’s role in story conceptualization, budget planning, preproduction, and marketing. Through a series of discussions, screenings, homework writing assignments, and in-class writing workshops, offers students an opportunity to gain the skills to produce commercially viable content.
• NUpath: Exploring creative expression and innovation.

COMM 2402 Presentation, Style, and Professional Communication (4 SH)
Develops students’ understanding and skills in presentation beyond public speaking. The integration of display technologies to accompany talks and presentations is expanded in this course. Comprises further conceptual and applied work on matching institutional objectives to presentation and presentation goals.
• Prerequisite: COMM 1112.

COMM 2450 Sound Production for Digital Media (4 SH)
Designed to prepare students to work with audio in modern media settings. Introduces the process of planning, preparing, producing, and evaluating audio production styles and techniques. Through a series of discussions, screenings, homework, and in-class exercises, offers students an opportunity to gain the skills needed to produce successful audio recordings. Exposes students to the elements and terminology of audio production as they record, mix, and produce their own original projects.
• NUpath: Exploring creative expression and innovation.

COMM 2451 Sports Broadcasting (4 SH)
Develops and refines skills in the art of sportscasting. Students are given an historical perspective and a state-of-the-art analysis. Emphasis is on practical development of skills and evaluation of talent and potential. Areas of study include play-by-play announcing, interviewing, reporting, writing, and anchoring.
• Prerequisite: Sophomore standing or above.
COMM 2454 Broadcast Management and Programming (4 SH)
Examines television industry strategies for creating content, increasing revenue, and designing innovative distribution systems to reach increasingly elusive audiences. Studies what tactics and strategies networks are using to leverage the power of prime-time programs; the opportunities and challenges for networks in producing quality online content; and how TV programmers can engage audiences through “second screens” and social TV apps. Analyzes the external influences on programming, including the sway of advertisers, government regulations, self-regulation, and FCC rulings. Investigates economics, marketing, promotion, advertising, media research groups, and audience ratings across digital platforms. Through a series of discussions, screenings, homework writing assignments, and in-class writing workshops, offers students an opportunity to gain the skills to produce commercially viable television shows.
• NUpath: Exploring creative expression and innovation.

COMM 2501 Communication Law (4 SH)
Introduces the fundamental principles of communication law and ethics. Explores the complex interplay between law (the First Amendment) and ethics (personal and professional responsibilities). Topics covered include blasphemy, commercial speech, copyright, defamation, fighting words, free press/fair trial, hate speech, heresy, incitement, obscenity, political speech, pornography, prior restraint, public forums, special settings (such as schools, prisons, and the military), symbolic speech, threats, and time-place-manner restrictions. Emphasizes ethical issues involving privacy, accuracy, property, and accessibility. The transcendent question in communication law and ethics is whether it is right to exercise the rights granted communication professionals under the First Amendment.
• NUpath: Employing ethical reasoning.

COMM 2531 Application of Organizational Communication (4 SH)
Examines the problems of sending and receiving information in complex organizations. Reviews technologies used to disseminate information, communication auditing processes, and methods to devise and assess communication programs for organizations.
• Prerequisite: COMM 1231.

COMM 2551 Free Speech in Cyberspace (4 SH)
Examines the extension of communication law to the Internet, assesses a range of pending proposals designed to regulate free speech in cyberspace, and discusses a variety of national and international schemes intended to govern the developing global information infrastructure. Considers free speech (political speech, sexually explicit expression, and defamation); intellectual property (trademark and copyright); and emerging issues (privacy, unsolicited commercial email or spam, schools, and international law). Does not cover issues related to electronic commerce or contracts, gambling, personal jurisdiction, or Internet taxation.

COMM 2555 Games for Change (4 SH)
Offers students sound introduction to the psychological and behavioral theories of entertainment media with the goal of implementing these theories to the future design and evaluation of games for change. Focuses more on the psychological, behavioral, and social aspects of video games than on pure technical aspects. Organized around a collection of selected readings and real-world games and discussions. The final project is based on reflective thinking, critical evaluation, and creative application.
• Cross-list: GAME 2555.
• NUpath: Exploring creative expression and innovation.
• Equivalent: GAME 2555.

COMM 2650 The Business of Entertainment (4 SH)
Examines business issues associated with the entertainment industry. Through lectures, guest lectures, and case studies, introduces students to financing, contracts, intellectual property issues, licensing, product placement, marketing and publicity, ratings, the impact of piracy, understanding and leveraging new technologies, and distribution. Offers students an opportunity to master these concepts by organizing into teams and developing an original entertainment industry business product or services. Requires each team to develop a formal business plan that includes a market analysis, a budget, and a marketing plan.
• NUpath: Exploring creative expression and innovation.

COMM 3201 Health Communication (4 SH)
Explores various topics as they relate to health communication including interpersonal aspects, cultural issues, and political complexities of health. Subject matter includes patient-provider communication, organizational systems, advertising in the health industry, and the role of media in the formation of expectations about health and the use of media to promote social change.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

COMM 3230 Interpersonal Communication (4 SH)
Offers an overview of the theory and practice of interpersonal communication with the goal of developing the knowledge and skills to create dialogue in conversation, work through conflict, adapt to change, and establish/maintain relationships. Topics include definitions of the communication process, identity, self-disclosure, verbal and nonverbal language, listening, management of interpersonal conflict, and relational and dialogic communication.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
COMM 3304 Communication and Inclusion (4 SH)
Explores theoretical and practical issues in the relationships between communication, social identity, and social inclusion. Focuses on how communication shapes perceptions and positions of salient social identity groups and how individuals and groups resist and transform identity and promote inclusion through communication. Specifically focuses on communication and inclusion in the contexts of gender, race, sexual identity, social class, ability, and age. Course topics cover a range of theoretical and practical issues, including diversity in organizational settings and the social construction of identity.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• Cross-list: WMNS 3304.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Engaging difference and diversity, writing intensive in the major.
• Equivalent: COMM 1304, WMNS 1304, and WMNS 3304.

COMM 3306 International Communication Abroad (4 SH)
Applies communication theory and practice to a wide range of documents, artifacts, museums, and landmarks. Available to students participating in a Dialogue of Civilizations sponsored by the Department of Communication Studies. Content is adapted by the faculty depending on the location of the class. For example, students may study the classical foundations of communication and contemporary political discourse in Athens or British history and documentary film production in London. Often includes meetings with foreign professors, government officials, community organizers, and local artists that have shaped their own country in unique and innovative ways.
• Repeatability: May be repeated without limit.

COMM 3307 Production Practicum Abroad (4 SH)
Combines the process of filmmaking with exploring Britain’s multicultural society, offering students an opportunity to obtain firsthand experience to develop a deeper, more complex understanding of the culture, particularly as it is evident in London. Covers all aspects of field production from the preproduction process of intensive research and development of story ideas to the technical aspects of filming, lighting, sound recording, digital editing, and graphics. Students work with remote video equipment that includes HD cameras, audio, and remote editing equipment. Taught in London.
• NUpath: Exploring creative expression and innovation.

COMM 3308 Political Communication (4 SH)
Reviews the construction and influence of rhetoric in political campaigns, particularly contemporary presidential campaigns. Also studies the impact of mass communication on the outcome of elections. Offers students an opportunity to analyze artifacts from recent political campaigns such as stump speeches, campaign debates, campaign advertising, and formal campaign speeches such as nomination acceptance addresses, concession and victory speeches, and inaugural addresses.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Understanding societies and institutions, writing intensive in the major.
• Equivalent: COMM 4610.

COMM 3330 Argumentation Theory (4 SH)
Studies the conditions of successful and valid human reasoning as manifested in its products (arguments) and procedures (debates and critical discussions). The first half of the course explores the ethical and structural fundamentals of argumentation, including its main theorems regarding argument schemes and critical questions, argument structures and reconstruction, and fallacies and felicity conditions of valid reasoning. The second half engages contemporary trends in argumentation studies, including the formalization of arguments and its diagramming for artificial intelligence, the contextualization in different societal domains (politics, health, private and public discourse), and the translation of argument theory into pedagogical practice.
• Prerequisite: Junior or senior standing.
• NUpath: Conducting formal and quantitative reasoning, employing ethical reasoning, writing intensive in the major.

COMM 3331 Argumentation and Debate (4 SH)
Introduces the principles and skills of effective argument. Topics include the process of advocacy, how to develop an argument through reasoning, the psychology of argument, and motivational techniques of argumentation. Combines theory and practice in argument through individual presentations and team debates.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

COMM 3400 Rhetoric of Science (4 SH)
Explores the “rhetoric of science,” which since the 1980s has organized intellectual energies and managed disciplinary anxieties. The animating insight of rhetoric of science work is that the discourses, methods, boundaries, and genres of science do not just feature hallmarks of persuasive activity but are thoroughly rhetorically constituted.
• NUpath: Writing intensive in the major.
COMM 3409 Advocacy Writing (4 SH)
Offers an Advanced Writing in the Disciplines (AWD) course. Dedicated to teaching students to write scholarly arguments in the discipline of public advocacy and rhetoric and to translate that work for a general audience. Features an academic approach to writing in the field of rhetoric and a practical approach to writing persuasively for general audiences.
- Prerequisite: (a) COMM 1210, COMM 1310, COMM 1331, COMM 1412, COMM 1414, or COMM 2310 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; communication studies majors only.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.

COMM 3414 Great Speakers and Speeches 2, 1930–Present (4 SH)
Reviews significant moments of oratory from 1930 to the present, assessing them in the historical context in which they occurred. Offers students an opportunity not only to understand the way that history prompts public discourse and how that discourse shapes history but to learn critical approaches to better understand the rhetoric of this period. Emphasizes the analysis of rhetorical texts but adds to it the contemporary dimensions of sound and images.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Interpreting culture, writing intensive in the major.
- Equivalent: COMM 3411.

COMM 3415 Communication Criticism (4 SH)
Offers students an opportunity to deepen their abilities to think critically about texts in a variety of forms such as orations, advertisements, music, and art. Studies methods that may range from close textual analysis to deconstruction to theories of performance. Students are required to write a lengthy research paper that carefully analyzes a rhetorical object.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

COMM 3445 Public Relations Principles (4 SH)
Presents the principles, history, and methods of public relations; processes of influencing public opinion; responsibilities of the public relations practitioner; and analyses of public relations programs. Through case studies and class discussions, offers students an opportunity to confront real-life ethical dilemmas and learn to apply ethical frameworks to evaluate and resolve them
- Prerequisite: Junior or senior standing.
- Cross-list: JRNL 3425.
- NUpath: Employing ethical reasoning, writing intensive in the major.
- Equivalent: JRNL 3425.

COMM 3450 Voice-Over Artist (4 SH)
Introduces voice-over acting techniques for TV commercials, radio, multimedia, and various styles of presentation for both audio and video projects. Offers students an opportunity to uncover and develop their vocal range as narrator, announcer, character, and spokesperson with effectiveness and emotional authenticity. Covers both the “business” and the technical aspects of being a voice talent. Includes the use of microphones, headsets, and recording equipment while in our audio lab. Studies the essentials of vocal techniques, studio etiquette, and working with direction during a studio session.
- Prerequisite: Junior or senior standing.
- NUpath: Exploring creative expression and innovation.

COMM 3451 Advertising Practices (4 SH)
Examines the development, procedures, economic functions, and responsibilities of advertising. Explores planning, research, production, and other elements that go into successful advertising. Covers the preparation of advertising for print and broadcast media, including campaign planning, space and time buying, and scheduling.
- Prerequisite: Sophomore standing or above.
- NUpath: Exploring creative expression and innovation.

COMM 3500 Environmental Issues, Communication, and the Media (4 SH)
Analyzes major debates over the environment, climate change, and related technologies such as nuclear energy, wind power, natural gas “fracking,” and food biotechnology. Studies the relevant scientific, political, and ethical dimensions of each case; the generalizable theories, frameworks, and methods that scholars use to analyze them; and the implications for effective public communication, policymaker engagement, and personal decision making. Offers students an opportunity to gain an integrated understanding of their different roles as professionals, advocates, and consumers and to improve their ability to find and use expert sources of information; assess competing media claims and narratives; write persuasive essays, analyses, and commentaries; and author evidence-based research papers.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Writing intensive in the major.
- NUpath: Understanding societies and institutions, writing intensive in the major.
**COMM 3501 Free Speech: Law and Practice (4 SH)**
Provides students with an opportunity to better understand freedom and limits to freedom, particularly in the realm of speech and expression. Materials covered range from the philosophy of freedom to historical legal cases about free speech and the press to political correctness and the repression of dissent.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Exploring creative expression and innovation.

**COMM 3530 Communication and Sexualities (4 SH)**
Analyzes the ways in which sexualities intersect with issues relating to interpersonal communication, mediated communication, popular culture, identity, and social movements. Discusses outing, media representations, queer identity development, and the HIV/AIDS epidemic. Covers theoretical perspectives from communication and other social science disciplines, gender and sexuality studies, and cultural studies. Students work with a variety of materials, contemporary and historical, theoretical and empirical, fiction and nonfiction. Offers students an opportunity to design, conduct, and write their own original empirical research paper relating to sexualities and communication using class content as a theoretical framework.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.

**COMM 3532 Theories of Conflict and Negotiation (4 SH)**
Explores both theories of conflict and potential strategies for more effectively managing conflict in a variety of contexts, that is, interpersonal relationships, organizational settings, and broader societal contexts. Offers students the opportunity to participate in the process of conflict assessment and to explore various negotiation strategies as well as discuss the role of forgiveness in conflict situations.
- **Prerequisite:** ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Employing ethical reasoning, writing intensive in the major.

**COMM 3533 Group Communication (4 SH)**
Instructs in small group decision-making processes, problem solving, and the interpersonal dynamics of groups. Develops skills in working with and in a variety of small groups. Topics include communication dynamics, systems thinking, dialogue, conflict management, leadership, power, teams, and learning organizations.
- **Prerequisite:** Sophomore standing or above.

**COMM 3534 Group Communication Strategies (4 SH)**
Designed to bring together upper-level students from multiple disciplines who are interested in taking a microscopic view of how issues are purposefully driven by professionals interested in promoting causes, political candidates, public policy, and corporate image. Examines how corporations and others make decisions and which theories of institutional behavior best explain those choices. Are companies motivated solely by economics as Marx would argue, or do they approach their image in a more functional way? Are the messages of politicians determined by race and class, or do they respond to a different framework? Requires students to follow current issues and dissect significant past campaigns. Knowledge of public relations tactics is helpful but not necessary.
- **Prerequisite:** Junior or senior standing.
- **Cross-list:** JRNL 3627.
- **NUpath:** Understanding societies and institutions, writing intensive in the major.
- **Equivalent:** JRNL 3627.

**COMM 3535 Communication and Sexualities (4 SH)**
Explores both theories of conflict and potential strategies for more effectively managing conflict in a variety of contexts, that is, interpersonal relationships, organizational settings, and broader societal contexts. Offers students the opportunity to participate in the process of conflict assessment and to explore various negotiation strategies as well as discuss the role of forgiveness in conflict situations.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.

**COMM 3536 Critical Thinking about Public Relations (4 SH)**
Demonstrates practices and techniques employed in the field including organization of events and functions. Studies campaign planning, research, and media relationships.
- **Prerequisite:** JRNL 3425.
- **Cross-list:** JRNL 3625.
- **Equivalent:** JRNL 3625.

**COMM 3550 Television Field Production (4 SH)**
Offers advanced training in video production techniques, emphasizing remote location shooting. Includes location scouting, production budgets, writing techniques, equipment location, postproduction editing, and content analysis. Covers the fundamentals of single-camera field production and the nonlinear editing process. Offers students an opportunity to work in teams to produce and direct television using remote video equipment.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Exploring creative expression and innovation.
COMM 3650 Television Studio Production (4 SH)
Introduces the process of planning, preparing, producing, and evaluating studio productions. Exposes students to the elements and terminology of studio production using multiple cameras, live switching, audio mixing, and studio lighting. Through a series of discussions, screenings, homework, and in-class exercises, offers students an opportunity to obtain skills in the basics of directing creative and technical talent and the skills needed to produce successful television studio productions.
• NUpath: Exploring creative expression and innovation.

COMM 3750 Special Effects and Postproduction for Television (4 SH)
Explores a variety of approaches to making special effects for film, video, and the World Wide Web. Offers students an opportunity to utilize cutting-edge technology and to apply state-of-the-art techniques to design and produce innovative special effects. Explores historical, technical, and theoretical aspects of special effects. Topics covered include compositing, matte painting, multiplane animation, explosions, smoke, three-dimensional lighting, particle emitters, chroma keying, motion graphics, video tracking, and more.
• Prerequisite: Junior or senior standing.
• NUpath: Exploring creative expression and innovation.

COMM 4102 Health Communication Campaigns (4 SH)
Offers an in-depth look at how persuasive health campaigns are designed and executed. Discusses how campaigns are designed to intentionally influence awareness, knowledge gain, and attitude/behavior change. Offers students an opportunity to obtain skills to design and evaluate campaigns through the completion of their own campaign projects and to learn about visual and verbal arguments and the unique ethical and other considerations of health campaigns.
• Prerequisite: COMM 2301 and junior or senior standing.
• NU Core: Capstone.
• NUpath: Analyzing and using data, demonstrating thought and action in a capstone.

COMM 4131 Sex and Interpersonal Communication (4 SH)
Builds on health and interpersonal communication courses. Offers students an opportunity to explore interpersonal communication and its relation to sex and romance. Explores how overarching structures regarding sex influence the interpretation of modern social issues. Investigates major research on emerging contemporary topics as they relate to the study of sex and interpersonal communication. Focuses largely on topic areas including deception, divorce, political life of children, eugenics, and HIV/AIDS advancements.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

COMM 4170 Communication and Quality of Life (4 SH)
Seeks to further develop an understanding of the function of communication in life and how that relates to quality of life. Examines the communicative experiences of organizations and relationships using both theoretical approaches and practical experience. Students participate in activities designed to develop knowledge and skills necessary to successfully analyze and address ethical and interpersonal communication issues. Offers students an opportunity to be able to reflect on and assess one’s own competence in communication and how one’s communication affects one’s quality of life and to respectfully consider the ethical complexities of quality-of-life issues in both organizational and interpersonal settings.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone.
• NUpath: Employing ethical reasoning, demonstrating thought and action in a capstone.

COMM 4533 Consultation Skills (4 SH)
Introduces the theoretical frameworks necessary to engage in a broad range of consulting activities (management consulting or organizational training and development). By studying nonprofit organizations in the Boston area, offers students an opportunity to learn how to gather and analyze data, to use mathematical methods to perform critical analysis, and to evaluate and critique choices made in the presentation of data. Requires students to make a formal report to the organization and to write a paper reflecting on the organization and its mission in the context of broader social, political, and economic issues. Emphasizes ethical considerations involving security, privacy, and fairness.
• Prerequisite: (a) COMM 2531 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major, demonstrating thought and action in a capstone.

COMM 4534 Organizational Communication Training and Development (4 SH)
Introduces both theoretical frameworks and practical strategies for developing organizational training and development (i.e., instructional communication skills). Specifically examines contemporary approaches to teaching and training activities. Uses a service-learning project to help in the application of both theoretical understandings as well as the development of practical skills.
• Prerequisite: (a) COMM 1231 or COMM 3230 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience, demonstrating thought and action in a capstone.
COMM 4535 Nonverbal Social Interaction (4 SH)
Offers analytic insight on methods people use to communicate different types of social action through body language. Much of our communication is nonverbal, as it is through our body language that we initiate new relationships (both personal and professional) and communicate anger, frustration, happiness, and grief. Offers students an opportunity to develop an understanding of the tools needed to examine the role nonverbal behaviors (body orientation, gaze direction, gesture, laughter, etc.) have in conveying meaning and constructing and negotiating interpersonal relationships. This course incorporates materials from communication, psychology, anthropology, and sociology.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Demonstrating thought and action in a capstone.

COMM 4602 Contemporary Rhetorical Theory (4 SH)
Studies theories for analyzing language, image, and sound and their relationship to culture. Methods covered range from traditional rhetorical theorists to modern philosophers of media and culture. Expects students to select an artifact and analyze it from a variety of theoretical perspectives.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major, demonstrating thought and action in a capstone.

COMM 4603 Advocacy Workshop (4 SH)
Designed to engage students in a project that directly benefits local nonprofit organizations. Using the service-learning model, offers students an opportunity to gain the skills needed to effectively advocate for a cause and then actively participate in public service. Students are expected to write public advocacy policies that are tailored to the organization’s needs, to meet with state legislators to advocate for the disadvantaged, and to create media plans and pitch news articles to publicize their efforts.
• Prerequisite: (a) COMM 1210, COMM 1331, COMM 1412, JRNL 1150, POLS 1150, or SOCL 1228 and (b) junior or senior standing; College of Arts, Media and Design; College of Science; and College of Social Sciences and Humanities students only.
• NU Core: Capstone, experiential learning.
• NUpath: Integrating knowledge and skills through experience, demonstrating thought and action in a capstone.

COMM 4605 Youth and Communication Technology (4 SH)
Examines how meanings of “youth” and “communication technology” shift in relation to one another and to broader changes in society, culture, politics, and the economy over time. Analyzes how communication technologies (and the content they deliver) positively and negatively affect the social, emotional, and cognitive development of young people and how these changes are influenced by the particular family, school, community, and institutional contexts in which children grow up. Examines how young people differ individually across the life span as well as collectively by class, race, ethnicity, nationality, gender, sexuality, and disability. Requires a final paper at the end of the term in which students articulate and defend positions about youth and communication technology.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Understanding societies and institutions, engaging difference and diversity, writing intensive in the major.

COMM 4608 Strategic Communication Capstone (4 SH)
Offers students an opportunity to complete a semester-long, intensive research and writing capstone project related to the field of strategic communication. Research topics can span business, politics, advocacy, entertainment, public health, the environment, and other societal sectors. Building on previous course work, students have an opportunity to gain a deeper scholarly and professional understanding of strategic communication; cultivate professional and academic contacts; and demonstrate mastery of relevant theoretical concepts, professional principles, research methods, and writing approaches. Encourages students to share and translate their findings for relevant academic and professional communities.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone.
• NUpath: Demonstrating thought and action in a capstone.

COMM 4625 Online Communities (4 SH)
Considers the question of whether or not online communities are “real.” Scholars conclude they are real, describing how people share enduring activities, identity, and relations online. Covers related issues of online communities, including formation, governance, conflict, and exit. Offers students an opportunity to obtain an understanding of community and how this relates to topics such as behavior, identity, and language online. Reviews contemporary issues and concerns. Engages the question and practice of what it means to develop and maintain a successful online community.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, experiential learning.
• NUpath: Demonstrating thought and action in a capstone.
COMM 4630 Assessment Technique and Planning (4 SH)
Centers on creating and administering diagnostic tools used to assess the quality of communication in organizations. Students review measurement techniques, test organizational communication quality in simulated situations, and design programs intended to improve the quality of communication in organizations.
• Prerequisite: COMM 2531.

COMM 4631 Crisis Communication and Image Management (4 SH)
Examines theories, models, and strategies related to crisis communication and establishes ethical principles regarding what, how, and when essential elements must be employed for effective and ethical crisis communication. Offers students an opportunity to learn how to distinguish between an incident and crisis; to analyze communication practices and methods applied during a crisis; to apply social scientific theory to explain how and why a crisis occurred; and to draw upon upon theory to develop effective crisis communication plans. Assesses responses to crises using ethical principles such as transparency, two-way symmetrical communication, and timing. Designed to prepare communication professionals who appreciate the need for responsible advocacy when responding to crises.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: COMM 2631.

COMM 4650 Digital Editing for TV (4 SH)
Addresses the changes in editing practices through digitization and offers students advanced training in nonlinear editing utilizing Avid Media Composer. Introduces the terms and concepts of nonlinear editing as well as the technical/creative aspects of postproduction. Students are expected to have a working knowledge of digital video equipment and Macintosh computer skills.
• NUpath: Exploring creative expression and innovation.

COMM 4750 Advanced Digital Editing for TV and Film (4 SH)
Introduces Media Composer effects and seeks to prepare students for real-world editing sessions. Covers intermediate audio and video-editing techniques, nesting effects, video layering, and features from the 3D-effect palette. Students should be comfortable working in a nonlinear editing environment and have a clear understanding of the basic features on Media Composer, as well as practical experience in audio mixing, nonlinear editing, and working with third-party graphics.
• NUpath: Exploring creative expression and innovation.

COMM 4901 Seminar in Communications (4 SH)
Integrates students’ experiences in cooperative education with classroom concepts and theories. Topics include integrative learning, the field of communication, pathways and careers in communication, and the professional communicator. Offers students the opportunity to demonstrate competency in communication skills such as oral reporting, conducting research in communication, and writing.
• Prerequisite: Junior or senior standing; communication studies majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

COMM 4912 Special Topics in Communication Studies (4 SH)
Offers a special topics course in communication studies. Course content may vary from term to term.
• Repeatability: May be repeated up to 4 times.

COMM 4916 Organizational Communication Practicum (4 SH)
Focuses on internal newsletters, department brochures, and electronic and conventional bulletin boards, some of the methods that organizations use to communicate with their internal audiences. This practicum requires that students serve as designers and creators of communication instruments to be used in the Department of Communication Studies. Interested students must complete an application in the department office.
• Prerequisite: COMM 2531.
• Repeatability: May be repeated without limit.

COMM 4918 Special Topics in Communication Studies (4 SH)
Examines communication issues that are not addressed in course length in any existing courses. Content varies from term to term. Topical issues, specific student interest, and faculty/visiting faculty expertise can determine the substance of any individual offering of this course.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Repeatability: May be repeated up to 4 times.

COMM 4940 Special Topics in Media Production (4 SH)
Addresses the emerging developments in the production of television, film, and video. Course content may vary from term to term.
• Prerequisite: Sophomore standing or above.
• Repeatability: May be repeated up to 4 times.
COMM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

COMM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: COMM 4970.
• Repeatability: May be repeated without limit.

COMM 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

COMM 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: COMM 1101.
• Repeatability: May be repeated without limit.

COMM 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

COMM 4994 Internship in Communication (4 SH)
Offers students the opportunity to gain hands-on experience in the communications industry. Further internship details are available in the department office.
• Prerequisite: COMM 1101 and sophomore standing or above; communication studies majors only.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

COMM 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

COMM 5200 Theories and Practices in Communication, Media, and Cultural Studies (3 SH)
Examines the foundational concepts underlying cultural studies with an emphasis on critical theories of the media and communication practices. It is intended to provide an understanding of how cultural studies approaches developed and evolved, assessing the major theoretical interventions within historically specific conjunctions. Analyzes the means through which power and hegemony are established and maintained in contemporary society, the alignment of culture and ideology, representation and the role of the media in the construction of social identities, and issues of global media and transnational communication in the contexts of postcolonial politics and postmodern thought.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5225 Cultural Studies of Everyday Life (3 SH)
Examines key theories and approaches to popular culture and the intersection of media and culture formations. Encourages students to explore the textual construction of meaning and the negotiated processes of understanding “the everyday” as a contested site for political and social struggle. Aspects of the course offer innovative approaches to research methods and methodologies that include ethnographic and related analytical tools and strategies. Students have the opportunity to engage in an open-ended way with established and emerging academic approaches to the study of everyday life that are at the cutting edge of cultural and media studies.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5230 Representations of Race and Difference (3 SH)
Approaches race as central to our understanding of contemporary national, transnational, and global culture. Examines the construction and deployment of race and difference through a range of theoretical and methodological lenses that highlight the challenges of multicultural communications. In doing so, the course connects historical narratives and imagery of race to current representations, encouraging students to think critically about race and difference through a variety of media productions, including television, film, and music.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5235 Rhetorical Studies (3 SH)
Offers students the opportunity to examine contemporary trends in the study of rhetoric, with a focus on the emergence of critical approaches to the field.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.
COMM 5240 Global and Intercultural Media (3 SH)
Provides students with the opportunity to examine and review the variety of literature, theory, and practice associated with media in the global context. Offers students the chance to develop an understanding of the challenges involved in cultural production that crosses borders to redefine meaning and identity.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5255 Visual Communication Culture (3 SH)
Examines theories of visuality and visual culture focusing on the analysis of images as texts. Explores some of the following issues to help students more fully understand images and the visual as a contested arena in which cultural meanings are constituted: the nature of representation, the construction of meaning, and the management of perception in and through image making; the organization of visual languages by institutions of meaning; the role of the viewer in the construction of image meanings and the rearticulation of these meanings into everyday lived culture.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5260 Media Production and Critical Theory (3 SH)
Blends theory and practice of media production. Examines the theoretical frameworks, production techniques, and aesthetic strategies of selected documentary films that explore social and/or political issues. Offers students an opportunity to complete a short documentary project of their own.
• Prerequisite: COMM 5200, COMM 5252 (which latter may be taken concurrently), and graduate standing; communication, media, and cultural studies majors only.

COMM 5262 Neo-Liberalism and Democracy (3 SH)
Examines the historical articulations of modern Euro-American democracy, its association with mercantilism and capitalism, and the rise of liberal governmental structures. Topics covered include Marxist and nationalist and fascist critiques of liberal capitalism, alternatives to democracy, economic liberalism, the Cold War, structured free market capitalism, and contrasting political and economic models.
• Prerequisite: Senior or graduate standing.

COMM 5275 Cultural Industries (3 SH)
Examines the intersection of media studies and associated cultural formations within an interdisciplinary framework derived from political economy and institutional economics. Offers students the opportunity to develop a critical approach to analyzing how the prevailing structural arrangements associated with media production and culture in contemporary society play out and the alternative approaches that have been devised. It also seeks to provide students with a perspective on the development of cultural policy studies and its various typologies in national and global contexts.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5280 Audience Studies (3 SH)
Offers students the opportunity to examine contemporary trends in the study of audiences, with a focus on the emergence of critical approaches to the field drawn specifically from cultural studies theory.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 5676 Media Production (6 SH)
Designed for students who want to link theories and concepts to a media production. Offers students an opportunity to prepare a media production comparable to a master’s thesis under supervision of a faculty advisor.
• Prerequisite: COMM 5200, COMM 5252, and graduate standing; communication, media, and cultural studies majors only.

COMM 7945 Media Project (6 SH)
Offers a final-year production option. Focuses on preparing a media production comparable to a master’s thesis under supervision of a faculty committee.
• Prerequisite: Communication, media, and cultural studies majors only with junior, senior, or graduate standing.

COMM 7976 Directed Study (1 to 4 SH)
Offers an opportunity to work with a nominated faculty advisor with a specialization in an acknowledged area of communication studies. Under instruction from the advisor, students have an opportunity to identify an area of study that combines theory and practice and, in association with the advisor, generate a course of study that includes detailed reading and writing projects in the area of specialization. Students are encouraged to develop projects based on areas of specialization that reflect expertise and interest.
• Repeatability: May be repeated without limit.
COMM 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

COMM 7990 Thesis (6 SH)
Offers final-year thesis option, undertaken at a standard that reflects master’s-quality research and writing at a sustained and original level, as agreed by the student’s faculty supervisory committee.
• Repeatability: May be repeated without limit.

COMM 7996 Thesis Continuation (0 SH)
Provides students who require additional time beyond the one semester allocated with the opportunity to complete their thesis.

CS 1100 Computer Science and Its Applications (4 SH)
Introduces students to the field of computer science and the patterns of thinking that enable them to become intelligent users of software tools in a problem-solving setting. Examines several important software applications so that students may develop the skills necessary to use computers effectively in their own disciplines.
• Prerequisite: Not open to students in the College of Computer and Information Science or in the College of Engineering.
• NU Core: Science/technology level 1.
• NUpath: Analyzing and using data.

CS 1200 Computer Science/Information Science Co-op Preparation (1 SH)
Prepares students for co-op through topics such as ethics, privacy, security, responsibility, and intellectual property. Exposes students to popular industry technologies.
• Prerequisite: Intended for transfer students into computer/information science who are above the freshman level.
• Equivalent: CS 1210.

CS 1500 Algorithms and Data Structures for Engineering (4 SH)
Introduces algorithms and data structures for engineering students. Discusses data structures such as arrays, stacks, queues, and lists, and the algorithms that manipulate these structures. Introduces simple algorithm analysis. Discusses classes and objects and presents the basic material about encapsulation, inheritance, and polymorphism. Introduces software development practices such as modular design, use of libraries, testing methods, and debugging techniques.
• Prerequisite: GE 1111; not open to students in the College of Computer and Information Science.
• Corequisite: CS 1501.
• NU Core: Science/technology level 1.

CS 1501 Lab for CS 1500 (1 SH)
Accompanies CS 1500. Covers topics from the course through various experiments.
• Prerequisite: Not open to students in the College of Computer and Information Science.
• Corequisite: CS 1500.
CS 1800 Discrete Structures (4 SH)
Introduces the mathematical structures and methods that form the foundation of computer science. Studies structures such as sets, tuples, sequences, lists, trees, and graphs. Discusses functions, relations, ordering, and equivalence relations. Examines inductive and recursive definitions of structures and functions. Discusses principles of proof such as truth tables, inductive proof, and basic logic. Also covers the counting techniques and arguments needed to estimate the size of sets, the growth of functions, and the space-time complexity of algorithms.
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Conducting formal and quantitative reasoning.

CS 1801 Recitation for CS 1800 (0 SH)
Accompanies CS 1800. Provides students with additional opportunities to ask questions and to see sample problems solved in detail.

CS 2500 Fundamentals of Computer Science 1 (4 SH)
Introduces the fundamental ideas of computing and the principles of programming. Discusses a systematic approach to word problems, including analytic reading, synthesis, goal setting, planning, plan execution, and testing. Presents several models of computing, starting from nothing more than expression evaluation in the spirit of high school algebra. No prior programming experience is assumed; therefore, suitable for freshman students, majors and nonmajors alike who wish to explore the intellectual ideas in the discipline.
• Corequisite: CS 2501.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world, conducting formal and quantitative reasoning.

CS 2501 Lab for CS 2500 (1 SH)
Accompanies CS 2500. Covers topics from the course through various experiments.
• Corequisite: CS 2500.

CS 2510 Fundamentals of Computer Science 2 (4 SH)
Continues CS 2500. Examines object-oriented programming and associated algorithms using more complex data structures as the focus. Discusses nested structures and nonlinear structures including hash tables, trees, and graphs. Emphasizes abstraction, encapsulation, inheritance, polymorphism, recursion, and object-oriented design patterns. Applies these ideas to sample applications that illustrate the breadth of computer science.
• Prerequisite: CS 2500.
• Corequisite: CS 2511.
• NUpath: Engaging with the natural and designed world, analyzing and using data.

CS 2511 Lab for CS 2510 (1 SH)
Accompanies CS 2510. Covers topics from the course through various experiments.
• Corequisite: CS 2510.

CS 2600 Computer Organization (4 SH)
Introduces the basic design of computing systems. Covers central processing unit (CPU), memory, input, and output. Provides a complete introduction to assembly language such as the basics of an instruction set plus experience in assembly language programming using a RISC architecture. Uses system calls and interrupt-driven programming to show the interaction with the operating system. Covers machine representation of integers, characters, and floating-point numbers. Describes caches and virtual memory.
• Prerequisite: CS 2510.

CS 2800 Logic and Computation (4 SH)
Introduces formal logic and its connections to computer and information science. Offers an opportunity to learn to translate statements about the behavior of computer programs into logical claims and to gain the ability to prove such assertions both by hand and using automated tools. Considers approaches to proving termination, correctness, and safety for programs. Discusses notations used in logic, propositional and first order logic, logical inference, mathematical induction, and structural induction. Introduces the use of logic for modeling the range of artifacts and phenomena that arise in computer and information science.
• Prerequisite: (a) CS 1800, MATH 1365, or MATH 2310 and (b) CS 2500.
• Corequisite: CS 2801.
• NU Core: Mathematical/analytical thinking level 2.

CS 2801 Lab for CS 2800 (1 SH)
Accompanies CS 2800. Covers topics from the course through various experiments.
• Corequisite: CS 2800.

CS 2900 Honors Freshman Seminar 1 (1 SH)
Introduces a variety of topics that extend the material in the standard freshman computer courses or go beyond the scope of these courses.
• Prerequisite: Honors Program participation.

CS 2901 Honors Freshman Seminar 2 (1 SH)
Introduces a variety of topics that extend the material in the standard freshman computer courses or go beyond the scope of these courses.
• Prerequisite: Honors Program participation.
CS 3200 Database Design (4 SH)
Studies the design of a database for use in a relational database management system. The entity-relationship model and normalization are used in problems. Relational algebra and then the SQL (structured query language) are presented. Advanced topics include triggers, stored procedures, indexing, elementary query optimization, and fundamentals of concurrency and recovery. Students implement a database schema and short application programs on one or more commercial relational database management systems.

• Prerequisite: CS 1500 or CS 2510.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

CS 3500 Object-Oriented Design (4 SH)
Presents a comparative approach to object-oriented programming and design. Discusses the concepts of object, class, meta-class, message, method, inheritance, and genericity. Reviews forms of polymorphism in object-oriented languages. Contrasts the use of inheritance and composition as dual techniques for software reuse: forwarding vs. delegation and subclassing vs. subtyping. Fosters a deeper understanding of the principles of object-oriented programming and design including software components, object-oriented design patterns, and the use of graphical design notations such as UML (unified modeling language). Basic concepts in object-oriented design are illustrated with case studies in application frameworks and by writing programs in one or more object-oriented languages.

• Prerequisite: CS 1500 or CS 2510.
• NUpath: Engaging with the natural and designed world, analyzing and using data.

CS 3520 Programming in C++ (4 SH)
Examines how to program in C++ in a robust and safe manner. Reviews basics, including scoping, typing, and primitive data structures. Discusses data types (primitive, array, structure, class, string); addressing/parameter mechanisms (value, pointer, reference); stacks; queues; linked lists; binary trees; hash tables; and the design of classes and class inheritance, emphasizing single inheritance. Considers the instantiation of objects, the trade-offs of stack vs. heap allocation, and the design of constructors and destructors. Emphasizes the need for a strategy for dynamic memory management. Addresses function and operator overloading; templates, the Standard Template Library (STL), and the STL components (containers, generic algorithms, iterators, adaptors, allocators, function objects); streams; exception handling; and system calls for processes and threads.

• Prerequisite: CS 1500 or CS 2510.

CS 3540 Game Programming (4 SH)
Introduces the different subsystems used to create a 3D game, including rendering, animation, collision, physics, audio, trigger systems, game logic, behavior trees, and simple artificial intelligence. Offers students an opportunity to learn the inner workings of game engines and how to use multiple libraries such as physics and graphics libraries to develop a game. Discusses graphics pipeline, scene graph, level design, behavior scripting, object-oriented game design, world editors, and game scripting languages.

• Prerequisite: CS 3500 and CS 3520.

CS 3600 Systems and Networks (4 SH)
Introduces the basic concepts underlying computer operating systems and computer networks and provides hands-on experience with their implementation. Covers the basic structure of an operating system: application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Also introduces network architectures, network topologies, network protocols, layering concepts (for example, ISO/OSI, TCP/IP reference models), communication paradigms (point-to-point vs. multicast/broadcast, connectionless vs. connection oriented), and networking API’s (sockets). Uses examples from many real operating systems and networks (UNIX, MS-DOS, Windows, TCP/IP, Ethernet, ATM, and token rings) to reinforce concepts.

• Prerequisite: CS 2600 or CS 3520.

CS 3650 Computer Systems (4 SH)
Introduces the basic design of computing systems, computer operating systems, and assembly language using a RISC architecture. Describes caches and virtual memory. Covers the interface between assembly language and high-level languages, including call frames and pointers. Covers the use of system calls and systems programming to show the interaction with the operating system. Covers the basic structures of an operating system, including application interfaces, processes, threads, synchronization, interprocess communication, deadlock, memory management, file systems, and input/output control.

• Prerequisite: CS 1500 or CS 2510.
CS 3700 Networks and Distributed Systems (4 SH)
Introduces the fundamentals of computer networks, including network architectures, network topologies, network protocols, layering concepts (for example, ISO/OSI, TCP/IP reference models), communication paradigms (point-to-point vs. multicast/broadcast, connectionless vs. connection oriented), and networking APIs (sockets). Also covers the construction of distributed programs, with an emphasis on high-level protocols and distributed state sharing. Topics include design patterns, transactions, performance trade-offs, security implications, and reliability. Uses examples from real networks (TCP/IP, Ethernet, 802.11) and distributed systems (Web, BitTorrent, DNS) to reinforce concepts.
• Prerequisite: CS 3600 or CS 3650.

CS 3740 Introduction to Security (4 SH)
Introduces the fundamental principles of designing and implementing secure programs and systems. Presents and analyzes prevalent classes of attacks against systems. Discusses techniques for identifying the presence of vulnerabilities in system design and implementation, preventing the introduction of or successful completion of attacks, limiting the damage incurred by attacks, and strategies for recovering from system compromises. Offers opportunities for hands-on practice of real-world attack and defense in several domains, including systems administration, the Web, and mobile devices. Presents the ethical considerations of security research and practice.
• Prerequisite: CS 3600 or CS 3650.

CS 3800 Theory of Computation (4 SH)
Introduces the theory behind computers and computing aimed at answering the question, “What are the capabilities and limitations of computers?” Covers automata theory, computability, and complexity. The automata theory portion includes finite automata, regular expressions, nondeterminism, nonregular languages, context-free languages, pushdown automata, and noncontext-free languages. The computability portion includes Turing machines, the Church-Turing thesis, decidable languages, and the Halting theorem. The complexity portion includes big-O and small-o notation, the classes P and NP, the P vs. NP question, and NP-completeness.
• Prerequisite: CS 1500 or CS 2510.
• NU Core: Mathematical/analytical thinking level 2.

CS 4000 Senior Seminar (1 SH)
Requires students to give a twenty- to thirty-minute formal presentation on a topic of their choice in computer science. Prepares students for this talk by discussing methods of oral presentation, how to present technical material, how to choose what topics to present, overall organization of a talk, and use of presentation software and other visual aids.
• Prerequisite: Senior standing; computer/information science students only.

CS 4100 Artificial Intelligence (4 SH)
Introduces the fundamental problems, theories, and algorithms of the artificial intelligence field. Includes heuristic search; knowledge representation using predicate calculus; automated deduction and its applications; planning; and machine learning. Additional topics include game playing; uncertain reasoning and expert systems; natural language processing; logic for common-sense reasoning; ontologies; and multiagent systems.
• Prerequisite: CS 2800 and CS 3500.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4120 Natural Language Processing (4 SH)
Introduces the computational modeling of human language; the ongoing effort to create computer programs that can communicate with people in natural language; and current applications of the natural language field, such as automated document classification, intelligent query processing, and information extraction. Topics include computational models of grammar and automatic parsing, statistical language models and the analysis of large text corpora, natural language semantics and programs that understand language, models of discourse structure, and language use by intelligent agents. Course work includes formal and mathematical analysis of language models and implementation of working programs that analyze and interpret natural language text.
• Prerequisite: CS 3500 and CS 3800; knowledge of statistics is helpful.

CS 4150 Game Artificial Intelligence (4 SH)
Offers an overview of classical and modern approaches to artificial intelligence in digital games. Focuses on the creation of believable agents and environments with the goal of providing a fun and engaging experience to a player. Covers player modeling, procedural content generation, behavior trees, interactive narrative, decision-making systems, cognitive modeling, and path planning. Explores different approaches for behavior generation, including learning and rule-based systems. Requires students to complete several individual assignments in these areas to apply the concepts covered in class. Students choose a group final project to explore one aspect of artificial intelligence for games in further depth. Offers students an opportunity to learn team management and communication.
• Prerequisite: (a) CS 2800 and CS 3500 or (b) permission of instructor.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
CS 4200 Database Internals (4 SH)
Explores the internal workings of database management systems. Explains how database systems store data on disks. Studies how to improve query efficiency using index techniques such as B+-tree, hash indices, and multidimensional indices. Describes how queries are executed internally and how database systems perform query optimizations. Introduces concurrency control schemes implemented by locking, such as hierarchical locking and key range locking. Discusses how database systems can perform logging and recovery to avoid loss of data in case of system crashes.
• Prerequisite: CS 3200 or CS 5200.

CS 4240 Parallel Data Processing in MapReduce (4 SH)
Introduces the MapReduce programming model and the core technologies it relies on in practice, such as a distributed file system and the distributed consensus protocol. Also discusses related approaches and technologies from distributed databases and cloud computing. Emphasizes practical examples and hands-on programming experiences. Examines both plain MapReduce and database-inspired advanced programming models running on top of a MapReduce infrastructure.
• Prerequisite: (a) CS 3600, CS 3650, CS 5600, or permission of instructor and (b) CS 4800, CS 5800, or permission of instructor.

CS 4300 Computer Graphics (4 SH)
Charts a path through every major aspect of computer graphics with varying degrees of emphasis. Discusses hardware issues: size and speed; lines, polygons, and regions; modeling, or objects and their relations; viewing, or what can be seen (visibility and perspective); rendering, or how it looks (properties of surfaces, light, and color); transformations, or moving, placing, distorting, and animating and interaction, or drawing, selecting, and transforming.
• Prerequisite: (a) CS 1500, CS 2510, or CS 3500 and (b) MATH 1260, MATH 2331, or MATH 2341.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4400 Programming Languages (4 SH)
Introduces a systematic approach to understanding the behavior of programming languages. Covers interpreters; static and dynamic scope; environments; binding and assignment; functions and recursion; parameter-passing and method dispatch; objects, classes, inheritance, and polymorphism; type rules and type checking; and concurrency.
• Prerequisite: CS 3500 and CS 3800 (CS 3800 may be taken concurrently).

CS 4410 Compilers (4 SH)
Studies the construction of compilers and integrates material from earlier courses on programming languages, automata theory, computer architecture, and software design. Examines syntax trees; static semantics; type checking; typical machine architectures and their software structures; code generation; lexical analysis; and parsing techniques. Uses a hands-on approach with a substantial term project.
• Prerequisite: CS 4400, CS 5400, or CS 7400.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4500 Software Development (4 SH)
Considers software development as a systematic process involving specification, design, documentation, implementation, testing, and maintenance. Examines software process models; methods for software specification; modularity, abstraction, and software reuse; and issues of software quality. Students, possibly working in groups, design, document, implement, test, and modify software projects.
• Prerequisite: (a) CS 3500 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

CS 4510 Software Testing (4 SH)
Examines the software development process from the point of view of testing. Focuses on unit testing, white- and black-box testing, randomized testing, the design of equality comparison, and the design of a test tool that evaluates the tests and reports the results. Next considers integration testing, stress tests and other performance tests, testing automation, and other techniques for assuring correctness and integrity of programs with several interacting components. Explores tools for measuring code quality and how these tools may be used to improve code design. Requires a comprehensive project in which all techniques studied are applied.
• Prerequisite: CS 3500.

CS 4520 Mobile Application Development (4 SH)
Focuses on mobile application development on a mobile phone or related platform. Discusses memory management; user interface building, including both MVC principles and specific tools; touch events; data handling, including core data, SQL, XML, and JSON; network techniques and URL loading; and, finally, specifics such as GPS and motion sensing that may be dependent on the particular mobile platform. Students are expected to work on a project that produces a professional-quality mobile application. The instructor chooses a modern mobile platform to be used in the course.
• Prerequisite: CS 3500.
CS 4550 Web Development (4 SH)
Discusses Web development for sites that are dynamic, data driven, and interactive. Focuses on the software development issues of integrating multiple languages, assorted data technologies, and Web interaction. Considers ASP.NET, C#, HTTP, HTML, CSS, XML, XSLT, JavaScript, AJAX, RSS/Atom, SQL, and Web services. Requires each student to deploy individually designed Web experiments that illustrate the Web technologies and at least one major integrative Web site project. Students may work as a team with the permission of the instructor. Each student or team must also create extensive documentation of their goals, plans, design decisions, accomplishments, and user guidelines. All source files must be open and be automatically served by a sources server.
- **Prerequisite:** CS 3500.
- **NU Core:** Capstone, writing intensive in the major.
- **NUpath:** Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4600 Topics in Operating Systems (4 SH)
Studies advanced concepts underlying computer operating systems and computer networks. Examines in depth all major operating-system and network components including device drivers, network protocol stacks, memory managers, centralized and distributed file systems, interprocess communication mechanisms, real-time schedulers, and security mechanisms. Additional components are covered as time permits. Provides hands-on experience with the source code of commercial-grade operating systems and networks.
- **Prerequisite:** (a) CS 3500 and (b) CS 3600, CS 3650, or CS 5600.

CS 4610 Robotic Science and Systems (4 SH)
Introduces autonomous mobile robots, with a focus on algorithms and software development, including closed-loop control, robot software architecture, wheeled locomotion and navigation, tactile and basic visual sensing, obstacle detection and avoidance, and grasping and manipulation of objects. Offers students an opportunity to progressively construct mobile robots from a predesigned electromechanical kit. The robots are controlled wirelessly by software of the students’ own design, built within a provided robotics software framework. The course culminates in a grand challenge competition using all features of the robots.
- **Prerequisite:** CS 3500.

CS 4611 Lab for CS 4610 (1 SH)
Offers a laboratory course to accompany CS 4610.

CS 4620 Building Extensible Systems (4 SH)
Deals with the design of extensible software systems, which enable clients to add functionality both statically as well as dynamically. Examples of such systems are operating systems, game servers, and Web browsers. Describes the classic systems built on C-like languages with unsafe, manual memory control and the more recent systems built on Java-like languages with safe, automated memory management. Introduces the Rust programming language, which combines the efficiency of C with safe manual memory control via type specifications and compiler constraints. Offers students an opportunity to build systems using all three settings but focuses on the Rust approach. Students also have an opportunity to evaluate their work via essays and memos.
- **Prerequisite:** (a) CS 3500 and (b) CS 3600, CS 3650, or CS 5600.
- **NU Core:** Capstone, writing intensive in the major.
- **NUpath:** Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4650 High Performance Computing (4 SH)
Introduces students to research in the domain of high-performance computing. Each instance of this course covers a single topic with broad open questions. The required systems background needed to investigate these questions is covered in the first part of the course. Then, working in teams, students have an opportunity to address different aspects of the open questions so that in combination the entire class may learn more than any single team could accomplish. Example topics include use of new hardware such as GPUs on video boards, use of new software tools for multicore computing, development of check-pointing packages for more robust long computations, software for GUI window systems, and cloud computing.
- **Prerequisite:** CS 3600, CS 3650, or CS 5600.
- **NU Core:** Capstone, writing intensive in the major.
- **NUpath:** Writing intensive in the major, demonstrating thought and action in a capstone.
- **Repeatability:** May be repeated once.

CS 4700 Network Fundamentals (4 SH)
Introduces the fundamental concepts of network protocols and network architectures. Presents the different harmonizing functions needed for the communication and effective operation of computer networks. Provides in-depth coverage of data link control, medium access control, routing, end-to-end transport protocols, congestion and flow control, multicasting, naming, auto configuration, quality of service, and network management. Studies the abstract mechanisms and algorithms as implemented in real-world Internet protocols. Also covers the most common application protocols (e-mail, Web, and ftp).
- **Prerequisite:** CS 3600, CS 3650, or CS 5600.
CS 4740 Network Security (4 SH)
Studies topics related to Internet architecture and cryptographic schemes in the context of security. Provides advanced coverage of the major Internet protocols including IP and DNS. Examines denial of service, viruses, and worms, and discusses techniques for protection. Covers cryptographic paradigms and algorithms such as RSA and Diffie-Hellman in sufficient mathematical detail. The advanced topics address the design and implementation of authentication protocols and existing standardized security protocols. Explores the security of commonly used applications like the Web and e-mail.
• Prerequisite: CS 3600, CS 3650, or CS 5600.

CS 4750 Secure Wireless Ad Hoc Robots on Mission (SWARM) 1 (4 SH)
Introduces the concepts underlying the design of robust and secure heterogeneous wireless networking of mobile robots: Internetworking, security, wireless communication, embedded development, and mobile phone platforms. Students form mixed teams with the goal of designing and building rescue-mission-oriented heterogeneous wireless systems operating in adversarial environments. These systems consist of off-the-shelf robots enhanced by the students with a low-power control and sensing embedded system; a low-power digital radio frequency communication network; a coordination unit connected to the Internet; and a messaging and command system based on cell phones. The course culminates in a competition between teams. Students are graded based on their designs, presentations, innovation, robustness, and competition performance. Graduate students are expected to make a research contribution.
• Prerequisite: CS 3600, CS 3650, or CS 5600.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4760 Secure Wireless Ad Hoc Robots on Mission (SWARM) 2 (4 SH)
Continues CS 4750. Based on the experiences in CS 4750, student teams have an opportunity to build more autonomous systems that can navigate areas where wireless communication or direct visibility are not possible. The systems must be resilient to more sophisticated denial-of-service attacks and need to more carefully account for energy consumption expended on mobility, communication, and meeting the mission task. Graduate students are expected to make a research contribution.
• Prerequisite: CS 4750.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4770 Cryptography (4 SH)
Studies the design of cryptographic schemes that enable secure communication and computation. Emphasizes cryptography as a mathematically rigorous discipline with precise definitions, theorems, and proofs and highlights deep connections to information theory, computational complexity, and number theory. Topics include pseudorandomness; symmetric-key cryptosystems and block ciphers such as AES; hash functions; public-key cryptosystems, including ones based on factoring and discrete logarithms; signature schemes; secure multiparty computation and applications such as auctions and voting; and zero-knowledge proofs.
• NUpath: Conducting formal and quantitative reasoning.

CS 4800 Algorithms and Data (4 SH)
Introduces the basic principles and techniques for the design, analysis, and implementation of efficient algorithms and data representations. Discusses asymptotic analysis and formal methods for establishing the correctness of algorithms. Considers divide-and-conquer algorithms, graph traversal algorithms, and optimization techniques. Introduces information theory and covers the fundamental structures for representing data. Examines flat and hierarchical representations, dynamic data representations, and data compression. Concludes with a discussion of the relationship of the topics in this course to complexity theory and the notion of the hardness of problems.
• Prerequisite: CS 1500 or CS 2510.
• NU Core: Mathematical/analytical thinking level 2.

CS 4850 Building Game Engines (4 SH)
Discusses the components of game engines and strategies for their software implementation. Includes graphics management algorithms (animation, scene graph, level of detail); basic artificial intelligence algorithms (search, decision making, sensing); and related algorithmic issues (networking, threading, input processing). Explores the use of data-driven software design. Offers students an opportunity to use a rendering engine and to build and integrate several software components to create a complete game engine. Requires students to work on several individual assignments to apply the algorithms and then develop a project in a team. Offers students an opportunity to learn team/project management; work division; team communication; and the software development cycle of implementation, testing, critique, and further iteration.
• Prerequisite: CS 3540 or permission of instructor.
CS 4900 Honors Senior Seminar (4 SH)
Offers a capstone course for computer science honors students. Exposes students to one or more topics of current interest in computer science. Requires students to prepare a one-hour presentation on a topic in computer science and to write a paper on that topic.
• Prerequisite: Senior standing and Honors Program participation; computer/information science students only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4910 Computer Science Topics (4 SH)
Offers a lecture course in computer science on a topic not regularly taught in a formal course. Topics may vary from offering to offering.
• Prerequisite: CS 3500 and CS 3800.
• Repeatability: May be repeated up to 3 times.

CS 4920 Computer Science Project (4 SH)
Focuses on students developing a substantial software or hardware artifact under faculty supervision.
• Prerequisite: CS 3500 and CS 3800.
• Repeatability: May be repeated up to 3 times.

CS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

CS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: CS 4970.
• Repeatability: May be repeated without limit.

CS 4991 Research (4 or 8 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: CS 3500 and CS 3800.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience, demonstrating thought and action in a capstone.
• Repeatability: May be repeated up to 3 times.

CS 4992 Directed Study (1 to 6 SH)
Focuses on student examining standard computer science material in fresh ways or new computer science material that is not covered in formal courses.
• Prerequisite: CS 3500 and CS 3800.
• Repeatability: May be repeated up to 3 times.

CS 4993 Independent Study (1 to 6 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: CS 3500 and CS 3800.
• Repeatability: May be repeated up to 3 times.

CS 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.

CS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.

CS 4997 Computer Science Thesis (4 SH)
Focuses on student preparing an undergraduate thesis under faculty supervision.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CS 4998 Computer Science Thesis Continuation (4 SH)
Focuses on student continuing to prepare an undergraduate thesis under faculty supervision.
• Prerequisite: CS 4997.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
CS 5001 Intensive Foundations of Computer Science (4 SH)
Introduces the fundamental ideas of computing and programming principles. Discusses a systematic approach to word problems, including analytic reading, synthesis, goal setting, planning, plan execution, and testing. Presents several models of computing, beginning with functional program design. The latter part of the course consists of two parts: a task organization (ranging from the description of data to the creation of a test suite) and a data-oriented approach to the organization of programs (ranging from atomic data to self-referential data definitions and functions as data). Offers students an opportunity to practice pair programming and public code review techniques, as found in industry today. No prior programming experience is assumed; therefore, suitable for students with little or no computer science background.
• Prerequisite: MSCS ALIGN students only.
• Corequisite: CS 5003.

CS 5002 Discrete and Data Structures (4 SH)
Introduces the mathematical structures and methods that form the foundation of computer science. Studies structures such as sets, tuples, sequences, lists, trees, and graphs. Discusses functions, relations, ordering, and equivalence relations. Examines inductive and recursive definitions of structures and functions. Covers principles of proof such as truth tables, inductive proof, and basic logic and the counting techniques and arguments needed to estimate the size of sets, the growth of functions, and the space-time complexity of algorithms. Also, discusses data structures such as arrays, stacks, queues, lists, and the algorithms that manipulate them.
• Prerequisite: MSCS align students only.

CS 5003 Recitation for CS 5001 (0 SH)
Provides a small-group discussion format to cover material in CS 5001. Coreq CS 5001.

CS 5004 Object-Oriented Design (4 SH)
Presents a comparative approach to object-oriented programming and design. Discusses the concepts of object, class, metaclass, message, method, inheritance, and genericity. Reviews forms of polymorphism in object-oriented languages. Contrasts the use of inheritance and composition as dual techniques for software reuse—forwarding vs. delegation and subclassing vs. subtyping. Offers students an opportunity to obtain a deeper understanding of the principles of object-oriented programming and design, including software components, object-oriented design patterns, and the use of graphical design notations such as UML (unified modeling language). Illustrates basic concepts in object-oriented design with case studies in application frameworks and by writing programs in Java.
• Prerequisite: MSCS ALIGN students only.
• Corequisite: CS 5005.

CS 5005 Recitation for CS 5004 (0 SH)
Provides small-group discussion format to cover material in CS 5004.
• Corequisite: CS 5004.

CS 5006 Algorithms (2 SH)
Introduces the basic principles and techniques for the design and implementation of efficient algorithms and data representations. Considers divide-and-conquer algorithms, graph traversal algorithms, linear programming, and optimization techniques. Covers the fundamental structures for representing data, such as hash tables, trees, and graphs.
• Prerequisite: MSCS ALIGN students only.

CS 5007 Computer Systems (2 SH)
Introduces the basic design of computing systems, computer operating systems, and assembly language using a RISC architecture. Describes caches and virtual memory. Covers the interface between assembly language and high-level languages, including call frames and pointers; the use of system calls and systems programming to show the interaction with the operating system; and the basic structures of an operating system, including application interfaces, processes, threads, synchronization, interprocess communication, deadlock, memory management, file systems, and input/output control.
• Prerequisite: MSCS align students only.

CS 5010 Programming Design Paradigm (4 SH)
Introduces modern program design paradigms. Starts with functional program design, introducing the notion of a design recipe. The latter consists of two parts: a task organization (ranging from the description of data to the creation of a test suite) and a data-oriented approach to the organization of programs (ranging from atomic data to self-referential data definitions and functions as data). The course then progresses to object-oriented design, explaining how it generalizes and contrasts with functional design. In addition to studying program design, students also have an opportunity to practice pair-programming and public code review techniques, as found in industry today.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Corequisite: CS 5011.

CS 5011 Recitation for CS 5010 (0 SH)
Provides small-group discussion format to cover material in CS 5010.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Corequisite: CS 5010.
CS 5100 Foundations of Artificial Intelligence (4 SH)
Introduces the fundamental problems, theories, and algorithms of the artificial intelligence field. Topics include heuristic search and game trees, knowledge representation using predicate calculus, automated deduction and its applications, problem solving and planning, and introduction to machine learning. Required course work includes the creation of working programs that solve problems, reason logically, and/or improve their own performance using techniques presented in the course.
• Prerequisite: Experience in Java programming; restricted to students in the College of Computer and Information Science.

CS 5150 Game Artificial Intelligence (4 SH)
Offers an overview of classical and modern approaches to artificial intelligence in digital games. Focuses on the creation of believable agents and environments with the goal of providing a fun and engaging experience to a player. Covers player modeling, procedural content generation, behavior trees, interactive narrative, decision-making systems, cognitive modeling, and path planning. Explores different approaches for behavior generation, including learning and rule-based systems. Requires students to complete several individual assignments in these areas to apply the concepts covered in class. Students choose a group final project, which requires a report, to explore one aspect of artificial intelligence for games in further depth. Offers students an opportunity to learn team management and communication.
• Prerequisite: Knowledge of algorithms and experience with object-oriented design or functional programming; restricted to students in the College of Computer and Information Science.

CS 5200 Database Management Systems (4 SH)
Introduces relational database management systems as a class of software systems. Prepares students to be sophisticated users of database management systems. Covers design theory, query language, and performance/tuning issues. Topics include relational algebra, SQL, stored procedures, user-defined functions, cursors, embedded SQL programs, client-server interfaces, entity-relationship diagrams, normalization, B-trees, concurrency, transactions, database security, constraints, object-relational DBMSs, and specialized engines such as spatial, text, XML conversion, and time series. Includes exercises using a commercial relational or object-relational database management system.
• Prerequisite: Restricted to students in the College of Computer and Information Science and in the College of Engineering.

CS 5310 Computer Graphics (4 SH)
Introduces the fundamentals of two-dimensional and three-dimensional computer graphics, with an emphasis on approaches for obtaining realistic images. Covers two-dimensional algorithms for drawing lines and curves, anti-aliasing, filling, and clipping. Studies rendering of three-dimensional scenes composed of spheres, polygons, quadric surfaces, and bi-cubic surfaces using ray-tracing and radiosity. Includes techniques for adding texture to surfaces using texture and bump maps, noise, and turbulence.
• Prerequisite: Knowledge of linear algebra; restricted to students in the College of Computer and Information Science.

CS 5320 Digital Image Processing (4 SH)
Studies the fundamental concepts of digital image processing including digitization and display of images, manipulation of images to enhance or restore image detail, encoding (compression) of images, detection of edges and other object features in images, and the formation of computed tomography (CT) images. Introduces mathematical tools such as linear systems theory and Fourier analysis and uses them to motivate and explain these image processing techniques.
• Prerequisite: Knowledge of linear algebra; restricted to students in the College of Computer and Information Science.

CS 5330 Pattern Recognition and Computer Vision (4 SH)
Introduces fundamental techniques for low-level and high-level computer vision. Examines image formation, early processing, boundary detection, image segmentation, texture analysis, shape from shading, photometric stereo, motion analysis via optic flow, object modeling, shape description, and object recognition (classification). Discusses models of human vision (gestalt effects, texture perception, subjective contours, visual illusions, apparent motion, mental rotations, and cyclopean vision).
• Prerequisite: Knowledge of linear algebra; restricted to students in the College of Computer and Information Science.

CS 5335 Robotic Science and Systems (4 SH)
Introduces autonomous mobile robots with a focus on algorithms and software development, including closed-loop control, robot software architecture, wheeled locomotion and navigation, tactile and basic visual sensing, obstacle detection and avoidance, and grasping and manipulation of objects. Offers students an opportunity to progressively construct mobile robots from a predesigned electromechanical kit. The robots are controlled wirelessly by software of the students’ own design, built within a provided robotics software framework. Culminates in a project that connects the algorithms and hardware developed in the course with a selected topic in the current robotics research literature.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
CS 5336 Lab for CS 5335 (0 SH)
Offers a lab section to accompany CS 5335.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 5340 Computer/Human Interaction (4 SH)
Covers the principles of human-computer interaction and the design and evaluation of user interfaces. Topics include an overview of human information processing subsystems (perception, memory, attention, and problem solving); how the properties of these systems affect the design of user interfaces; the principles, guidelines, and specification languages for designing good user interfaces, with emphasis on tool kits and libraries of standard graphical user interface objects; and a variety of interface evaluation methodologies that can be used to measure the usability of software. Other topics may include World Wide Web design principles and tools, computer-supported cooperative work, multimodal and “next generation” interfaces, speech and natural language interfaces, and virtual reality interfaces. Course work includes both the creation and implementation of original user interface designs, and the evaluation of user interfaces created by others.
• Prerequisite: Knowledge of C programming language/UNIX; restricted to students in the College of Computer and Information Science.

CS 5350 Applied Geometric Representation and Computation (4 SH)
Surveys practical techniques for representing geometric objects in two and three dimensions, for computing their motions and interactions, and for human interfaces to manipulate them. These techniques are useful not only in graphics but also in robotics, computer vision, game design, geographic information systems, computer-aided design and manufacturing, spatial reasoning and planning, physical simulation, biomechanics, and the implementation of many types of human-computer interface.
• Prerequisite: Undergraduate background in algorithms; restricted to students in the College of Computer and Information Science.

CS 5400 Principles of Programming Language (4 SH)
Studied the basic components of programming languages, specification of syntax and semantics, and description and implementation of programming language features. Discusses examples from a variety of languages.
• Prerequisite: CS 5010; restricted to students in the College of Computer and Information Science.

CS 5500 Managing Software Development (4 SH)
Covers software life cycle models (waterfall, spiral, and so forth), domain engineering methods, requirements analysis methods (including formal specifications), software design principles and methods, verification and testing methods, resource and schedule estimation for individual software engineers, component-based software development methods and architecture, and languages for describing software processes. Includes a project where some of the software engineering methods (from domain modeling to testing) are applied in an example.
• Prerequisite: (a) CS 5010 and (b) admission to MS program or completion of all transition courses; restricted to students in the College of Computer and Information Science.

CS 5520 Mobile Application Development (4 SH)
Focuses on mobile application development on a mobile phone or related platform. Discusses memory management; user interface building, including both MVC principles and specific tools; touch events; data handling, including core data, SQL, XML, and JSON; network techniques and URL loading; and, finally, specifics such as GPS and motion sensing that may be dependent on the particular mobile platform. Students are expected to work on a project that produces a professional-quality mobile application and to demonstrate the application that they have developed. The instructor chooses a modern mobile platform to be used in the course.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 5600 Computer Systems (4 SH)
Studies the structure, components, design, implementation, and internal operation of computer systems, focusing mainly on the operating system level. Reviews computer hardware and architecture including the arithmetic and logic unit, and the control unit. Covers current operating system components and construction techniques including the memory and memory controller, I/O device management, device drivers, memory management, file system structures, and the user interface. Introduces distributed operating systems. Discusses issues arising from concurrency and distribution, such as scheduling of concurrent processes, interprocess communication and synchronization, resource sharing and allocation, and deadlock management and resolution. Includes examples from real operating systems. Exposes students to the system concepts through programming exercises.
• Prerequisite: Admission to MS program or completion of all transition courses; restricted to students in the College of Computer and Information Science.
CS 5610 Web Development (4 SH)
Discusses Web development for sites that are dynamic, data driven, and interactive. Focuses on the software development issues of integrating multiple languages, assorted data technologies, and Web interaction. Considers ASP.NET, C#, HTTP, HTML, CSS, XML, XSLT, JavaScript, Ajax, RSS/Atom, SQL, and Web services. Each student must deploy individually designed Web experiments that illustrate the Web technologies and at least one major integrative Web site project. Students may work in teams with the permission of the instructor. Each student or team must also create extensive documentation of their goals, plans, design decisions, accomplishments, and user guidelines. All source files must be open and be automatically served by a sources server.

- **Prerequisite:** Restricted to students in the College of Computer and Information Science.

CS 5620 Computer Architecture (4 SH)
Studies the design of digital computer system components including the CPU, the memory subsystem, and interconnection busses and networks. Explores modern design techniques for increasing computer system capacity. Emphasizes the growing gap between CPU and RAM speed, and the parallel operation of the growing number of functional units in a CPU. Topics include pipelining, cache, new CPU architecture models, memory bandwidth and latency, multiprocessing and parallel processing architectures, cache coherence, and memory consistency.

- **Prerequisite:** CS 5600 or CS 7600; restricted to students in the College of Computer and Information Science.

CS 5650 High Performance Computing (4 SH)
Introduces students to research in the domain of high performance computing. Each instance of this course covers a single topic with broad open questions. The required systems background needed to investigate these questions is covered in the first part of the course. Then, working in teams, students have an opportunity to address different aspects of the open questions so that in combination the entire class may learn more than any single team could accomplish. Example topics include use of new hardware such as GPUs on video boards; use of new software tools for multicore computing; development of check-pointing packages for more robust long computations; software for GUI window systems; and cloud computing.

- **Prerequisite:** CS 5600 or CS 7600; restricted to students in the College of Computer and Information Science.

CS 5700 Fundamentals of Computer Networking (4 SH)
Studies network protocols, focusing on modeling and analysis, and architectures. Introduces modeling concepts, emphasizing queuing theory, including Little’s theorem, M/M/1, M/M/m, M/D/1, and M/G/1 queuing systems. Discusses performance evaluation of computer networks including performance metrics, evaluation tools and methodology, simulation techniques, and limitations. Presents the different harmonizing functions needed for communication and efficient operation of computer networks and discusses examples of Ethernet, FDDI, and wireless networks. Covers link layer protocols including HDLC, PPP, and SLIP; packet framing; spanning tree and learning bridges, error detection techniques, and automatic repeat request algorithms; sliding window and reliable/ordered services; and queuing disciplines including FQ and WFQ. Introduces flow control schemes, such as window flow control and leaky bucket rate control schemes, and discusses congestion control and fairness.

- **Prerequisite:** Knowledge of probability theory; restricted to students in the College of Computer and Information Science and the College of Engineering.

CS 5750 Social Computing (4 SH)
Offers a detailed look at popular social information systems. Studies models (both computational and sociological) of social information systems and the application of them both in theory and by analyzing real data from social network interactions. The recent popularity of online social media underlies a shift in the way people connect, communicate, and share content. When designing social computing systems, one must now understand and carefully consider the structure and use of the underlying social network. Considers questions such as: How does information spread through a social network? What mechanisms work best at encouraging collaboration?

- **Prerequisite:** CS 5600 or CS 5700; restricted to students in the College of Computer and Information Science.

CS 5770 Software Vulnerabilities and Security (4 SH)
Seeks to help students to become aware of systems security issues and to gain a basic understanding of security. Presents the principal software and applications used in the Internet, discussing in detail the related vulnerabilities and how they are exploited. Also discusses programming vulnerabilities and how they are exploited. Examines protection and detection techniques. Includes a number of practical lab assignments as well as a discussion of current research in the field.

- **Prerequisite:** Junior, senior, or graduate standing; restricted to students in the College of Computer and Information Science.
- **Equivalent:** CS 6770.
CS 5800 Algorithms (4 SH)
Presents the mathematical techniques used for the design and analysis of computer algorithms. Focuses on algorithmic design paradigms and techniques for analyzing the correctness, time, and space complexity of algorithms. Topics may include asymptotic notation, recurrences, loop invariants, Hoare triples, sorting and searching, advanced data structures, lower bounds, hashing, greedy algorithms, dynamic programming, graph algorithms, and NP-completeness.
• Prerequisite: Restricted to students in the College of Computer and Information Science and in the network science program.

CS 5850 Building Game Engines (4 SH)
Discusses the components of game engines and strategies for their software implementation. Includes graphics management algorithms (animation, scene graph, level of detail); basic artificial intelligence algorithms (search, decision making, sensing); and related algorithmic issues (networking, threading, input processing). Explores the use of data-driven software design. Offers students an opportunity to use a rendering engine and to build and integrate several software components to create a complete game engine. Requires students to work on individual assignments and then develop a project in a team, which requires a report. Offers students an opportunity to learn team/project management; work division; team communication; and the software development cycle of implementation, testing, critique, and further iteration.
• Prerequisite: Knowledge of computer graphics, differential calculus, operating systems concepts, and algorithms; restricted to students in the College of Computer and Information Science.

CS 5976 Directed Study (2 to 4 SH)
Focuses on student examining standard computer science material in fresh ways or new computer science material that is not covered in formal courses.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated up to 3 times.

CS 5978 Independent Study (2 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated up to 3 times.

CS 5984 Research (2 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated up to 3 times.

CS 6110 Knowledge-Based Systems (4 SH)
Focuses on the acquisition, organization, and use of world knowledge in computers, and the challenge of creating programs with common sense. Topics include knowledge representation and reasoning models beyond predicate calculus, Bayesian inference and other models of reasoning and decision making under uncertainty, rule-based expert systems, case-based and analogical reasoning, and introduction to natural language processing. Course work includes the creation of working programs that store and manipulate world knowledge using techniques presented in the course.
• Prerequisite: CS 5100; restricted to students in the College of Computer and Information Science.

CS 6120 Natural Language Processing (4 SH)
Provides an introduction to the computational modeling of human language, the ongoing effort to create computer programs that can communicate with people in natural language, and current applications of the natural language field, such as automated document classification, intelligent query processing, and information extraction. Topics include computational models of grammar and automatic parsing, statistical language models and the analysis of large text corpuses, natural language semantics and programs that understand language, models of discourse structure, and language use by intelligent agents. Course work includes formal and mathematical analysis of language models, and implementation of working programs that analyze and interpret natural language text.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6130 Affective Computing (4 SH)
Studies affective computing—computing that relates to, arises from, or influences emotions. Offers an overview of the theory of human emotion (how it arises from and influences cognition, the body, and the social environment) and computational techniques for modeling human emotion processes as well as for recognizing and synthesizing emotional behavior. Discusses how these can be applied to application design. Offers students an opportunity to gain a strong background in the theory and practice of human-centered computing as it relates to games, immersive environments, and pedagogical applications. Brings together students from different disciplines to work together and learn from each other.
• Prerequisite: Restricted to students in the College of Computer and Information Science and in the College of Science.
• Cross-list: PSYC 6130.
• Equivalent: PSYC 6130.
CS 6140 Machine Learning (4 SH)
Provides a broad look at a variety of techniques used in machine learning and data mining, and also examines issues associated with their use. Topics include algorithms for supervised learning including decision tree induction, artificial neural networks, instance-based learning, probabilistic methods, and support vector machines; unsupervised learning; and reinforcement learning. Also covers computational learning theory and other methods for analyzing and measuring the performance of learning algorithms. Course work includes a programming term project.
• Prerequisite: CS 5800; restricted to students in the College of Computer and Information Science.

CS 6200 Information Retrieval (4 SH)
Provides an introduction to information retrieval systems and different approaches to information retrieval. Topics covered include evaluation of information retrieval systems; retrieval, language, and indexing models; file organization; compression; relevance feedback; clustering; distributed retrieval and metasearch; probabilistic approaches to information retrieval; Web retrieval; filtering, collaborative filtering, and recommendation systems; cross-language IR; multimedia IR; and machine learning for information retrieval.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6220 Data Mining Techniques (4 SH)
Covers various aspects of data mining, including classification, prediction, ensemble methods, association rules, sequence mining, and cluster analysis. The class project involves hands-on practice of mining useful knowledge from a large data set.
• Prerequisite: CS 5800 or CS 7800; restricted to students in the College of Computer and Information Science.

CS 6240 Parallel Data Processing in MapReduce (4 SH)
Introduces the MapReduce programming model and the core technologies it relies on in practice, such as a distributed file system and the distributed consensus protocol. Also discusses related approaches and technologies from distributed databases and cloud computing. Emphasizes practical examples and hands-on programming experiences. Examines both plain MapReduce and database-inspired advanced programming models running on top of a MapReduce infrastructure.
• Prerequisite: CS 5800 or permission of instructor; restricted to students in the College of Computer and Information Science.

CS 6310 Computational Imaging (4 SH)
Introduces the latest computational methods in digital imaging that overcome the traditional limitations of a camera and enable novel imaging applications. Provides a practical guide to topics in image capture and manipulation methods for generating compelling pictures for computer graphics and for extracting scene properties for computer vision, with several examples.
• Prerequisite: CS 5320 or EECE 7311; restricted to students in the College of Computer and Information Science.

CS 6350 Empirical Research Methods (4 SH)
Presents an overview of methods for conducting empirical research within computer science. These methods help provide objective answers to questions about the usability, effectiveness, and acceptability of systems. The course covers the basics of the scientific method, building from a survey of objective measures to the fundamentals of hypothesis testing using relatively simple research designs, and on to more advanced research designs and statistical methods. The course also includes a significant amount of fieldwork, spanning the design, conduct, and presentation of small empirical studies.
• Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Computer and Information Science.

CS 6410 Compilers (4 SH)
Expects each student to write a small compiler. Topics include parser generation, abstract syntax trees, symbol tables, type checking, generation of intermediate code, simple code improvement, register allocation, run-time structures, and code generation.
• Prerequisite: CS 5400 or CS 7400; restricted to students in the College of Computer and Information Science and in the College of Engineering.

CS 6412 Semantics of Programming Language (4 SH)
Studies mathematical models for the behavior of programming languages. Topics include operational, denotational, and equational specifications; Lambda-calculi and their properties; applications of these techniques, such as rapid prototyping and correctness of program optimizations.
• Prerequisite: (a) CS 5400 or CS 7400 and (b) knowledge of discrete mathematics; restricted to students in the College of Computer and Information Science.
CS 6510 Advanced Software Development (4 SH)
Designed to integrate academic concepts and practical experience of software design by having students work as part of a programming team, with an option to lead a subteam. Offers students an opportunity to study, in-depth, some aspects of the development process. The goal is to have students participate in a large-scale project, taking time to reflect and analyze the work and the process, rather than concentrating exclusively on the final product.

- Prerequisite: (a) CS 5010 and CS 5500 or (b) permission of instructor; restricted to students in the College of Computer and Information Science.

CS 6515 Software Development (4 SH)
Covers proven techniques for constructing maintainable software. Includes problem and data analysis, data definitions, concise specifications, interfaces, example and test data design, program design based on data definitions, and testing. Offers students an opportunity to practice what they learn and learn from what they practice through an evolving semester-long project in the programming language of their choice.

- Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6520 Methods of Software Development (4 SH)
Studies concepts of object-oriented programming that form the basis for components (generic programming, programming by contracts, or programming with metaclasses), software architecture for supporting components (implicit invocation, filters, or reflection), and the concrete realizations of components in some industrial standards (JavaBeans, EJB, CORBA, or COM/DCOM). Also covers selected topics in component research. Students complete a project where some creation, deployment, and evolution methods of software components are applied.

- Prerequisite: CS 5500; restricted to students in the College of Computer and Information Science.

CS 6530 Analysis of Software Artifacts (4 SH)
Addresses all kinds of software artifacts—specifications, designs, code, and so on—and covers both traditional analyses, such as verification and testing, and promising new approaches, such as model checking, abstract execution, and new type systems. Focuses on the analysis of function (for finding errors in artifacts and to support maintenance and reverse engineering), but the course also address other kinds of analysis (such as performance and security).

- Prerequisite: CS 5500; restricted to students in the College of Computer and Information Science.

CS 6535 Engineering Reliable Software (4 SH)
Continues the exploration of several themes from CS 5010: unit testing, random testing, and logical reasoning about software. Specifically revisits the idea of systematic design and its connection to making logical claims about the workings of programs. After an introduction to the ACL2 programming language and theorem prover, offers students an opportunity to redesign interactive games (e.g., “Space Invaders”) and work on turning them into reliable projects.

- Prerequisite: CS 5010 or permission of instructor; restricted to students in the College of Computer and Information Science.

CS 6540 Foundations of Formal Methods and Software Analysis (4 SH)
Covers necessary mathematical background such as first-order logic, and some measure theory. Studies the formal methods in more depth and breadth. Discusses the current state of the art in verification and semantics of probabilistic, real-time, and hybrid systems.

- Prerequisite: CS 6520; restricted to students in the College of Computer and Information Science.

CS 6610 Parallel Computing (4 SH)
Studies the principles of parallel processing, a variety of parallel computer architecture models including SIMD, MIMD, dataflow, systolic arrays, and network of workstations, and algorithms for parallel computation on the various models. Topics include interconnection network design, memory organization, cache and bus design, processor technologies, algorithms for sorting, combinatorial, and numerical problems, graph algorithms, matrix multiplication, and FFT, and the mapping of these algorithms to different architectures.

- Prerequisite: CS 5600 and CS 5800; restricted to students in the College of Computer and Information Science.

CS 6650 Building Scalable Distributed Systems (4 SH)
Covers the essential elements of distributed, concurrent systems and builds upon that knowledge with engineering principles and practical experience with state-of-the-art technologies and methods for building scalable systems. Scalability is an essential quality of internet-facing systems and requires specialized skills and knowledge to build systems that scale at low cost.
CS 6710 Wireless Network (4 SH)
Covers both theoretical issues related to wireless networking and practical systems for both wireless data networks and cellular wireless telecommunication systems. Topics include fundamentals of radio communications, channel multiple access schemes, wireless local area networks, routing in multihop ad hoc wireless networks, mobile IP, and TCP improvements for wireless links, cellular telecommunication systems, and quality of service in the context of wireless networks. Requires a project that addresses some recent research issues in wireless and mobile networking.
* Prerequisite: CS 5700; restricted to students in the College of Computer and Information Science.

CS 6740 Network Security (4 SH)
Studies the theory and practice of computer security, focusing on the security aspects of multiuser systems and the Internet. Introduces cryptographic tools, such as encryption, key exchange, hashing, and digital signatures in terms of their applicability to maintaining network security. Discusses security protocols for mobile networks. Topics include firewalls, viruses, Trojan horses, password security, biometrics, VPNs, and Internet protocols such as SSL, IPSec, PGP, SNMP, and others.
* Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6750 Cryptography and Communications Security (4 SH)
Studies the design and use of cryptographic systems for communications and other applications such as e-commerce. Discusses the history of cryptographic systems, the mathematical theory behind the design, their vulnerability, and the different cryptanalytic attacks. Topics include stream ciphers including shift register sequences; block ciphers, such as DES and AES; public-key systems including RSA, discrete logarithms; signature schemes; hash functions, such as MD5 and SHA1; and protocol schemes including identification schemes, zero-knowledge proofs, authentication schemes, and secret sharing schemes. Discusses key management problems including Needham-Schroeder protocols and certificates.
* Prerequisite: CS 5800 or CS 7800; restricted to students in the College of Computer and Information Science.

CS 6754 Secure Wireless Ad-hoc Robots on Mission (SWARM) 1 (4 SH)
Exposes students to the concepts underlying the design of robust and secure heterogeneous wireless networking of mobile robots: internetworking, security, wireless communication, embedded development, and mobile phone platforms. Students in this project-oriented course form mixed teams with the goal of designing and building rescue-mission-oriented heterogeneous wireless systems operating in adversarial environments. These systems consist of off-the-shelf robots enhanced by the students with a low-power control and sensing embedded system; a low-power digital radio frequency communication network; a coordination unit connected to the Internet; and a messaging and command system based on cell phones. The course culminates in a competition between teams. Students are graded based on their designs, presentations, innovation, robustness, and competition performance. Graduate students are expected to make a research contribution.
* Prerequisite: Open to students from computer/information science, electrical/computer engineering, mechanical engineering, and mathematics.

CS 6756 Secure Wireless Ad-hoc Robots on Mission (SWARM) 2 (4 SH)
Continues CS 6754. Based on the experiences in CS 6754, student teams have an opportunity to build more autonomous systems that can navigate areas where wireless communication or direct visibility are not possible. The systems must be resilient to more sophisticated denial-of-service attacks and need to more carefully account for energy consumption expended on mobility, communication, and meeting the mission task. Graduate students are expected to make a research contribution.
* Prerequisite: CS 6754; restricted to students in the College of Computer and Information Science.

CS 6760 Privacy, Security, and Usability (4 SH)
Challenges conventional wisdom and encourages students to discover ways that security, privacy, and usability can be made synergistic in system design. Usability and security are widely seen as two antagonistic design goals for complex computer systems. Topics include computer forensics, network forensics, user interface design, backups, logging, economic factors affecting adoption of security technology, trust management, and related public policy. Uses case studies such as PGP, S/MIME, and SSL. Introduces basic cryptography and hash function as it is needed. Course work includes analysis of papers, problem sets, and a substantial term project.
* Prerequisite: Restricted to students in the College of Computer and Information Science.
CS 6800 Application of Information Theory (4 SH)
Introduces information theory and its applications to various computational disciplines. Covers the basic concepts of information theory, including entropy, relative entropy, mutual information, and the asymptotic equipartition property. Concentrates on applications of information theory to computer science and other computational disciplines, including compression, coding, Markov chains, machine learning, information retrieval, statistics, computational linguistics, computational biology, wired and wireless networks, and image and speech processing. The course is self-contained; no prior knowledge of information theory is required or assumed.
• Prerequisite: Undergraduate course in probability; restricted to students in the College of Computer and Information Science.

CS 6810 Distributed Algorithms (4 SH)
Covers the design and analysis of algorithms and problems arising in distributed systems, with emphasis on network algorithms. The main concerns are efficiency of computation and communication, fault tolerance, and asynchrony. Topics include leader election, graph algorithms, datalink protocols, packet routing, logical synchronization and clock synchronization, resource allocation, self-stabilization of network protocols, and graph partitions.
• Prerequisite: CS 5800 or CS 7800; restricted to students in the College of Computer and Information Science.

CS 6949 Graduate Cooperative Education Seminar (1 SH)
Intended to prepare graduate students in computer and information science for co-op. Topics include resume writing, interviewing, job search strategy, ethics, professional behavior, and the college’s co-op policies. Students intending to participate in a co-op or internship must satisfactorily complete this course, which is typically taken during the student’s first semester.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated without limit.

CS 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated without limit.

CS 6966 Practicum (2 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 7140 Advanced Machine Learning (4 SH)
Covers topics in advanced machine learning. Presents materials in the current machine learning literature. Focuses on graphical models, latent variable models, Bayesian inference, and nonparametric Bayesian methods. Seeks to prepare students to do research in machine learning. Expects students to read conference and journal articles, present these articles, and write an individual research paper.
• Prerequisite: CS 6140, EECE 7204, or EECE 7313; restricted to students in the College of Computer and Information Science and in the College of Engineering.
• Cross-list: EECE 7397.
• Equivalent: EECE 7397.

CS 7170 Seminar in Artificial Intelligence (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in artificial intelligence. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students; faculty supervisor and topics vary from semester to semester.
• Prerequisite: CS 5100; restricted to students in the College of Computer and Information Science.

CS 7180 Special Topics in Artificial Intelligence (4 SH)
Offers various topics on artificial intelligence.
• Prerequisite: Restricted to students in the College of Computer and Information Science.
• Repeatability: May be repeated up to 2 times.

CS 7270 Seminar in Database Systems (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in database systems. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
• Prerequisite: CS 5200; restricted to students in the College of Computer and Information Science.
CS 7280 Special Topics in Database Management (4 SH)
Offers various topics. Possible areas include object-oriented database systems and distributed database systems.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.
- **Repeatability:** May be repeated up to 2 times.

CS 7370 Seminar in Graphics/Image Processing (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in graphics and image processing. May be repeated for credit for PhD students; faculty supervisor and topics vary from semester to semester.
- **Prerequisite:** CS 5310; restricted to students in the College of Computer and Information Science.

CS 7380 Special Topics in Graphics/Image Processing (4 SH)
Offers various topics on graphics/image processing.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.
- **Repeatability:** May be repeated up to 2 times.

CS 7381 Lab for CS 7380 (0 SH)
Offers a lab section to accompany CS 7380.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.

CS 7400 Intensive Principles of Programming Languages (4 SH)
Studies the basic components of programming languages, specification of syntax and semantics, and description and implementation of programming language features. Discusses examples from a variety of languages.
- **Prerequisite:** Computer science PhD students only.

CS 7470 Seminar in Programming Languages (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in programming languages. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- **Prerequisite:** CS 5400 or CS 7400; restricted to students in the College of Computer and Information Science.

CS 7480 Special Topics in Programming Language (4 SH)
Offers various topics in programming language.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.
- **Repeatability:** May be repeated up to 2 times.

CS 7485 Special Topics in Formal Methods (4 SH)
Offers various topics in formal methods.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.
- **Repeatability:** May be repeated without limit.

CS 7570 Seminar in Software Development (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in software development. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- **Prerequisite:** CS 5500; restricted to students in the College of Computer and Information Science.

CS 7575 Seminar in Software Engineering (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in software engineering. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- **Prerequisite:** CS 6520; restricted to students in the College of Computer and Information Science.

CS 7580 Special Topics in Software Engineering (4 SH)
Offers various topics on software engineering.
- **Prerequisite:** Restricted to students in the College of Computer and Information Science.
- **Repeatability:** May be repeated up to 2 times.

CS 7600 Intensive Computer Systems (4 SH)
Studies the structure, components, design, implementation, and internal operation of computer systems, focusing on the operating system level. Reviews computer hardware and architecture including the arithmetic and logic unit, and the control unit. Covers current operating system components and construction techniques including the memory and memory controller, I/O device management, device drivers, memory management, file system structures, and the user interface. Discusses distributed operating systems, real-time systems, and addresses concurrent processes, scheduling, interprocess communication, and synchronization. Discusses relevant distributed algorithms. Also covers design and analysis techniques for desirable properties in computer systems including functional correctness (in the absence of faults), performance and throughput, fault-tolerance and reliability, real-time response, security, and quality of service. Draws examples from real operating systems. Emphasizes abstraction, while programming exercises are used to facilitate the understanding of concepts.
- **Prerequisite:** Computer science PhD students only.

CS 7670 Seminar in Computer Systems (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in computer systems. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- **Prerequisite:** CS 5600 or CS 7600; restricted to students in the College of Computer and Information Science.
CS 7680 Special Topics in Computer Systems (4 SH)
Offers various topics on computer systems.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated up to 2 times.

CS 7770 Seminar in Computer Networks (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in computer networks. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- Prerequisite: CS 5700; restricted to students in the College of Computer and Information Science.

CS 7775 Seminar in Computer Security (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in cryptography and computer security. Faculty supervisor and topics vary from semester to semester. May be repeated for credit for PhD students.
- Prerequisite: CS 6750; restricted to students in the College of Computer and Information Science.

CS 7780 Special Topics in Networks (4 SH)
Offers various topics on networks.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated up to 2 times.

CS 7785 Special Topics in Network Science (4 SH)
Covers various topics in network science.
- Prerequisite: Restricted to students in the College of Computer and Information Science, the College of Engineering, and the College of Science.
- Repeatability: May be repeated up to 4 times.

CS 7800 Advanced Algorithms (4 SH)
Presents advanced mathematical techniques for designing and analyzing computer algorithms. Reviews some of the material covered in CS 5800 and then covers advanced topics. Emphasizes theoretical underpinnings of techniques used to solve problems arising in diverse domains. Topics include asymptotic analysis, advanced data structures, dynamic programming, greedy algorithms and matroid theory, amortized analysis, randomization, string matching, algebraic algorithms, and approximation algorithms. Introduces Turing machines, P and NP classes, polynomial-time reducibility, and NP completeness.
- Prerequisite: Computer science PhD students only.

CS 7805 Theory of Computation (4 SH)
Examines formal models of computation, notions of undecidability, and basic complexity theory. Models of computation include finite state automata, pushdown automata, and Turing machines. Discusses the properties of regular sets and context-free languages. Also covers partial recursive functions, primitive recursive functions, recursively enumerable sets, Turing decidability, and unsolvable problems. Discusses the concept of reductions, time and space complexity classes, and the polynomial-time hierarchy.
- Prerequisite: CS 7800; computer science PhD students only.

CS 7870 Seminar in Theoretical Computer Science (2 to 4 SH)
Gives students the opportunity to read and present various survey and research papers in theoretical computer science. May be repeated for credit for PhD students; faculty supervisor and topics vary from semester to semester.
- Prerequisite: CS 5800 or CS 7800; restricted to students in the College of Computer and Information Science.

CS 7880 Special Topics in Theories of Computer Science (4 SH)
Covers various topics including advanced cryptography, approximation algorithms, computational algebra, formal verification, network algorithms, online computation, parallel computing, and randomness and computation.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated up to 2 times.

CS 7976 Directed Study (2 to 4 SH)
Focuses on student examining standard computer science material in fresh ways or new computer science material that is not covered in formal courses.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 7978 Independent Study (2 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 7990 Thesis (4 SH)
Offers selected work with the agreement of a project supervisor.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.
CS 7994 Thesis Continuation—Part Time (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
- Prerequisite: CS 7990; restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 7996 Thesis Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
- Prerequisite: CS 7990; restricted to students in the College of Computer and Information Science.

CS 8674 Master's Project (4 SH)
Offers selected work with the agreement of a project supervisor.
- Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 8880 PhD Qualifying Examination Completion (0 SH)
Indicates that the doctoral student has completed the requirements for the qualifying examination. Restricted to students in the College of Computer and Information Science.

CS 8949 Research Work Experience (0 SH)
Provides an opportunity for all doctoral students to engage in industry research in the area of their dissertation. Doctoral students register for this course before starting their off-campus internships.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 8982 Readings (1 to 8 SH)
Offers selected readings under the supervision of a faculty member.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 8984 Research (2 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 8986 Research (2 to 4 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.
- Prerequisite: Restricted to students in the College of Computer and Information Science.

CS 9984 Research (2 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 9986 Research (2 to 4 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
- Prerequisite: Restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.

CS 9990 Dissertation (2 to 4 SH)
Offers selected work with the agreement of a thesis supervisor.
- Prerequisite: Computer science students only.
- Repeatability: May be repeated without limit.

CS 9996 Dissertation Continuation (0 SH)
Continues work with the agreement of a thesis supervisor.
- Prerequisite: CS 9990; restricted to students in the College of Computer and Information Science.
- Repeatability: May be repeated without limit.
CSYE 6200 Concepts of Object-Oriented Design (4 SH)
Introduces object-oriented design and programming via the Java programming language; the use of inheritance, composition, and interface classes in software design; development of Java applets and applications; study of the Java class libraries, including the swing tool kit for building human computer interfaces, the network package for development of client-server systems, and the collections’ package for data structures and sorting algorithms. Requires a course project.

• Prerequisite: Knowledge of C programming; engineering students only.

CSYE 6202 Concepts of Object-Oriented Design with C# (4 SH)
Introduces object-oriented design and programming via the C# (C-sharp) programming language and its underlying .NET platform. Covers the use of inheritance and composition in software design and development of complex C# .NET applications. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features.

• Prerequisite: Engineering students only.

CSYE 6205 Concepts of Object-Oriented Design with C++ (4 SH)
Introduces object-oriented design and programming via the C++ programming language. Covers the use of inheritance and composition in software design and development of complex C++ applications. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features. Requires a course project.

CSYE 6210 Component Software Development (4 SH)
Covers component-based design, development, and implementation. Emphasizes the reusability, flexibility, scalability, and portability of software components. Covers the JavaBeans Component Model in detail and compares it against competing technologies. Requires a component-based software project.

• Prerequisite: CSYE 6200; engineering students only.

CSYE 6220 Enterprise Software Design (4 SH)
Introduces the hypertext markup language (HTML), cascading style sheets (CSS), CSS3, and HTML5 for the design of Web sites. Coverage of HTML5 includes semantic markup and the following application programming interfaces (APIs): canvas, scalable vector graphics, video, audio, Web storage, Web SQL database, geolocation, Web sockets, and Web workers. Requires a project in which students develop a Web site using CSS3 and HTML5.

• Prerequisite: CSYE 6200, CSYE 6202, or CSYE 6205 (any of which may be taken concurrently); engineering students only; not open to information systems students.

CSYE 6225 Network Structures and Cloud Computing (4 SH)
Offers a practical foundation in cloud computing and hands-on experience with the tools used in cloud computing. Designed as a foundation course for cloud-aware, adept professionals. Focuses on the fundamentals of cloud computing, the principal areas of cloud architectures, cloud security, cloud governance, cloud storage, cloud virtualization, and cloud capacity. Discusses the Internet evolution that led to cloud and how cloud applications revolutionized Web applications.

• Prerequisite: CSYE 6200 or INFO 5100; engineering students only.

• Equivalent: INFO 6225.

CSYE 6230 Operating Systems (4 SH)
Covers basic concepts of operating systems and system programming, such as utility programs, subsystems, and multiprogram systems. Main topics include processes, interprocess communication, and synchronization; memory allocation, segmentation, and paging; loading, linking, and libraries; resource allocation, scheduling, and performance evaluation; file systems, storage devices, and I/O systems; and protection, security, and privacy. Emphasizes key concepts through code design and development.

• Prerequisite: INFO 6205.

• Equivalent: INFO 6220.

CSYE 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.

• Prerequisite: ENCP 6000.

• Repeatability: May be repeated without limit.

CSYE 7200 Big-Data System Engineering Using Scala (4 SH)
Covers the fundamentals of functional programming with Scala and seeks to provide a basic, practical foundation for students who want to use it as a language for working with big-data platforms. Scala is one of a new breed of general-purpose functional programming languages that is strongly typed and is object oriented. It runs on the Java virtual machine and is able to share libraries from the vast collection of open-source projects written in Java. For these reasons it is readily accessible by programmers of Java, C++, and similar languages.

• Prerequisite: Engineering students only.
CSYE 7215 Foundations of Parallel, Concurrent, and Multithreaded Programming (4 SH)
 Covers all aspects of concurrent program design, development, and implementation utilizing the Java multithreading API/facilities. Topics covered include thread safety and lifetime issues, block structured versus explicit synchronization, intrinsic versus explicit locking, thread pools, liveness issues, deadlock, livelock, race conditions, atomicity, performance and scalability, execution policies, test strategies. Major Java multithreading API/facilities covered include synchronized blocks, wait sets, intrinsic locks and condition variables, synchronized and concurrent collections, executor framework. Comparisons between the Java multithreading API and the Posix Pthreads multithreading standard are provided.
• Prerequisite: CSYE 6200 or INFO 5100 (either may be taken concurrently); engineering students only.

CSYE 7230 Software Engineering (4 SH)
 Looks at the software life cycle (requirements analysis and specification, software design, coding, testing, and maintenance). Offers verification, validation, and documentation at various stages of the life cycle. Covers the Unified Modeling Language as applied to the software life cycle. Covers applications of design patterns. Overviews user interface design, software metrics, and software development environments. Emphasis is on modular software construction and development of modular libraries. Requires a small software development project.
• Prerequisite: CSYE 6200 or INFO 5100 (either may be taken concurrently); engineering students only.

CSYE 7245 Big-Data Systems and Intelligence Analytics (4 SH)
 Offers students an opportunity to learn a hands-on approach to understanding how large-scale data sets are processed and how data science algorithms are adopted in the industry through case studies and labs. This project-based course builds on INFO 7390 and focuses on enabling students with tools and frameworks primarily to build end-to-end applications. The course is divided into three parts: building the data pipeline for data science, implementing data science algorithms, and scaling and deploying data science algorithms.
• Prerequisite: INFO 7250 or INFO 7390 (either may be taken concurrently); engineering students only.

CSYE 7250 Planning and Management of Big-Data Projects (4 SH)
 Focuses on creating and managing a data-driven enterprise. Geared to current IT technical professionals, data scientists, technical project managers, aspiring IT professionals, and managers who want to understand the complex nature of creating and managing data-driven projects to support the new and legacy data environments. Covers the analysis that is required to design data-driven projects and make appropriate recommendations for the target state of an organization. This analysis is used as input to create a comprehensive road map to achieve the target state and includes current and future uses of data, consumption methods, data sources and categories, and aggregation and quality requirements.
• Prerequisite: INFO 6205, INFO 6210, CSYE 7290, or INFO 7390; engineering students only.

CSYE 7270 Building Virtual Environments (4 SH)
 Covers the basics of three-dimensional graphics programming using the Unity game engine. Includes a built-in terrain editor; a shader development facility; built-in physics; and advanced lighting, shadows, and audio to build 3D virtual environments and serious games. Javascript and C# can be used for scripting. Assets from various 3D modeling programs can be imported. Facilities to publish to the PC, Mac, iPhone and Wii and support for real-time multiplayer games are available. Requires a final project.
• Prerequisite: Engineering students only.

CSYE 7280 User Experience Design and Testing (4 SH)
 Introduces user experience concepts while working on Web design projects. Offers students an opportunity to build the necessary skill sets to make better decisions when designing contemporary websites that cater to customer needs. Students practice interview techniques to understand user requirements while keeping user experience central to the effort. Uses wireframes and user scenarios to drive the creative design process. Various case studies are introduced and discussed in team settings to emphasize user perspectives. Uses quality assurance and usability testing to drive validation and user-acceptance testing and approvals.
• Prerequisite: CSYE 6200 or INFO 5100 (either may be taken concurrently).

CSYE 7374 Special Topics in Computer Systems Engineering (4 SH)
 Offers topics of current interest in computer systems engineering.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.
CSYE 7945 Software Engineering Project (4 SH)
Supports teamwork on a large software project under faculty supervision. The projects are drawn from an engineering field, and involve design, systems engineering, manufacturing, planning, maintenance, reliability, quality control, risk assessment, project control, evaluation of alternatives, and so on. The project may cover either the whole software development life cycle or a significant part of it.
• Prerequisite: CSYE 7230; engineering students only.

CSYE 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

CSYE 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

CSYE 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

CSYE 7996 Thesis Continuation (0 SH)
Offers analytical and/or experimental work conducted under the auspices of the department.
• Prerequisite: Engineering students only.

CO-OP/EXPERIENTIAL EDUCATION (EXED)

EXED 2000 Professional Development for Co-op (1 SH)
Introduces students to the Cooperative Education Program and provides them with an opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, professional behaviors, work culture, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEU in the job-search and referral process. Presents co-op policies, procedures, and expectations of the Department of Cooperative Education and co-op employers.
• Prerequisite: Undeclared students only.

EXED 2010 Internship for Career Decision Making (1 SH)
Offers students an opportunity to gain experience in a field they would like to explore and receive internship credit. Students complete a one-hundred-hour internship during the semester, which they obtain prior to the course. Students attend group meetings and individual appointments with the instructor, maintain a weekly journal, and complete an evaluation of their internship experience.

CO-OP/EXPERIENTIAL EDUCATION IN ARTS, MEDIA, AND DESIGN (EEAM)

EEAM 2000 Professional Development for Co-op (1 SH)
Introduces students to the Cooperative Education Program and provides them with an opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, professional behaviors, work culture, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEU in the job-search and referral process. Presents co-op policies, procedures, and expectations of the Department of Cooperative Education and co-op employers.
• Prerequisite: College of Arts, Media and Design students only.
**EEAM 2010 Internship for Career Decision Making (1 SH)**
Offers students an opportunity to gain experience in a field they would like to explore and receive internship credit. Students complete a one-hundred-hour internship during the semester, which they obtain prior to the course. Students attend group meetings and individual appointments with the instructor, maintain a weekly journal, and complete an evaluation of their internship experience.

**EEAM 2945 College of Arts, Media and Design Co-op Experience (1 SH)**
Offers students an opportunity for work experience.
- **Prerequisite:** Sophomore standing or above; restricted to students in the College of Arts, Media and Design.
- **NU Core:** Experiential learning.
- **Repeatability:** May be repeated up to 3 times.

**EESC 2000 Professional Development for Co-op (1 SH)**
Introduces students to the Cooperative Education Program and provides them with an opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, professional behaviors, work culture, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEU in the job-search and referral process. Presents co-op policies, procedures, and expectations of the Department of Cooperative Education and co-op employers.
- **Prerequisite:** College of Social Sciences and Humanities students only.
- **Equivalent:** EEAM 2000, EESC 2000, and EXED 2000.

**EESC 2010 Internship for Career Decision Making (1 SH)**
Offers students an opportunity to gain experience in a field they would like to explore and receive internship credit. Students complete a one-hundred-hour internship during the semester, which they obtain prior to the course. Students attend group meetings and individual appointments with the instructor, maintain a weekly journal, and complete an evaluation of their internship experience.

**CO-OP/EXPERIENTIAL EDUCATION IN SOCIAL SCIENCES AND HUMANITIES (EESH)**

**EESH 2000 Professional Development for Co-op (1 SH)**
Introduces students to the Cooperative Education Program and provides them with an opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, professional behaviors, work culture, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEU in the job-search and referral process. Presents co-op policies, procedures, and expectations of the Department of Cooperative Education and co-op employers.
- **Prerequisite:** College of Social Sciences and Humanities students only.
- **Equivalent:** EEAM 2000, EESC 2000, and EXED 2000.

**EESH 2010 Internship for Career Decision Making (1 SH)**
Offers students an opportunity to gain experience in a field they would like to explore and receive internship credit. Students complete a one-hundred-hour internship during the semester, which they obtain prior to the course. Students attend group meetings and individual appointments with the instructor, maintain a weekly journal, and complete an evaluation of their internship experience.

**COOPERATIVE EDUCATION (COOP)**

**COOP 3945 Co-op Work Experience (0 SH)**
Provides students an opportunity for work experience.
- **Prerequisite:** Sophomore standing or above.
- **Repeatability:** May be repeated up to 5 times.

**COOP 3948 Co-op Work Experience Abroad (0 SH)**
Provides students with an opportunity for work experience abroad.
- **Prerequisite:** Sophomore standing or above.
- **Repeatability:** May be repeated up to 5 times.

**COOP 3949 Internship Exchange (0 SH)**
Offers students an opportunity to participate in an internship experience.
- **Repeatability:** May be repeated up to 5 times.
CAEP 1235 Vocational, Education, and Career Development (4 SH)
Intends to provide insight into one’s personal and professional life planning, based on knowledge gained through cognitive and social foundations, the occupational world and work behavior, and career choice and development in individuals and organizations. Focuses on the interactions of economic needs, work, class, education, and contemporary social trends as part of human development in a sociohistorical ecological context.

CAEP 2010 Counseling and Applied Educational Psychology in a Global Context (4 SH)
Explores education, college student development, school psychology, and counseling in a global context. Students explore these issues internationally as they are exposed to the current professional standards and practice of fields related to counseling and applied educational psychology. Also studies the impact of the culture of the international site on the profession. Taught abroad.
* Repeatability: May be repeated without limit.

CAEP 2020 International Perspectives on Student Development and Higher Education Administration (4 SH)
Offers students an opportunity to visit colleges and universities abroad and to observe college student development and higher education administration in a global context. Includes lectures conducted by a Northeastern and host-country faculty and administrators on the history of higher education in the international site, the administration of student affairs/services, student development, and other topics as they relate to universities and the community.
* Repeatability: May be repeated without limit.

CAEP 2899 Introduction to College Student Development and Student Affairs (4 SH)
Offers students an opportunity to obtain a basic understanding of the role of the student affairs professional and the theories of college student development that serve as a foundation for practice. Emphasizes the importance of cocurricular educational experiences of students attending institutions of higher education as well as leadership development, problem solving, and career exploration in student affairs.

CAEP 3480 Counseling Theories and Practice (4 SH)
Surveys major theoretical approaches to counseling. Provides training and practice in listening skills to aid in the development of facilitative responses. Combines didactic representations and experiential activities to assist in understanding and implementing a variety of counseling approaches.
* Prerequisite: One introductory social science course.

CAEP 3483 Counseling Skills for the Helping Professions (4 SH)
Introduces the applied and experiential skills used in a wide range of counseling contexts. Counseling is a core skill for human service practitioners. Focuses primarily on developing the trans-theoretical helping skills that underlie the work of successful counselors, social workers, case-managers, psychotherapists, and psychologists. Studies, practices, and applies these skills in a highly experiential, dynamic classroom context. Explores self-reflection, multiculturalism and diversity, professionalism, legal and ethical issues, and career development. Offers students an opportunity to obtain a realistic introduction to work in the counseling field and support in integrating theoretical/academic knowledge of psychology with their own personal orientation toward helping others.
* Prerequisite: Sophomore standing or above.

CAEP 3485 Mental Health and Counseling (4 SH)
Explores those characteristics that constitute a mentally healthy person, factors in society that impact emotional health, the mind-body relationship, stress, and ways to achieve a higher level of emotional well-being. Offers students the opportunity to work in triads, small groups, and large group discussions. Role-play is utilized where appropriate.
* Prerequisite: One introductory social science course.

CAEP 4502 Health Counseling (3 SH)
Geared toward students who intend to pursue counseling work in the healthcare field, such as counselors, social workers, trainers, therapists, and administrators. After covering health issues in general, which may call for counseling interventions, the course assists students in becoming more willing and able to reach out to others. From a base of self-understanding, students deepen their human capacity to recognize and respond to the emotional dimensions of many health-related situations. Non-ATP students should also register for CAEP 4503 concurrently.
* Prerequisite: Junior or senior standing.

CAEP 4503 Experiencing Health Counseling (1 SH)
Meets in conjunction with CAEP 4502. Gives students additional experience and opportunities to view and practice health counseling in various scenarios and settings, to role-play, and to discuss topics from within their interests in health or mental health. This course is not required for ATP students.
* Prerequisite: Junior or senior standing.
CAEP 4525 Introduction to Professional Psychology (4 SH)
Offers students an opportunity to gain an understanding of the roles and functions psychologists have in different work settings and how psychological theory, techniques, and research can be applied in real-world situations. Studies the several different areas of professional psychology, including counseling psychology, school psychology, clinical psychology, early intervention, applied behavior analysis, and organizational psychology. Students also have an opportunity to learn how to prepare themselves for graduate school and how to put together an impressive application to graduate school programs.
- Prerequisite: Junior or senior standing; intended for advanced undergraduate students who are majoring in psychology or human services or who have taken several courses in psychology and related areas.

CAEP 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.

CAEP 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

CAEP 5125 Introduction to Statistics in Mental Health and Education (3 SH)
Covers basic descriptive data analysis, graphing, exploratory data methods, and introduces hypothesis testing. Introduces addition, basic correlation, and regression techniques. Studies the common statistical analysis software in hands-on computer-lab exercises with examples from community mental health and school settings. Also introduces nonparametric approaches and probability.
- Prerequisite: Junior, senior, or graduate standing.

CAEP 5150 Early Intervention: Family Systems (3 SH)
Introduces students to the theory and practice of family interventions with a diverse population including infants, toddlers, and preschoolers with special needs. Discusses family systems, developmental, coping, crisis, and ecological theories and practices. Teaches assessment and intervention skills. Integrates theories of exceptionality as they pertain to family systems into course material.
- Prerequisite: Junior, senior, or graduate standing.

CAEP 5151 Early Intervention: Infant and Toddler Development, Risk, and Disability (3 SH)
Introduces students to the major theories of development and their implications for intervention. Presents and discusses infant/toddler’s development, risk, and disability in the areas of cognition, communication, motor skills, social/emotional development, and adaptive skills, and considers variation in development as a result of multiple factors. Is team-taught by professors drawn from school psychology, special education, speech-language pathology, counseling psychology, nursing, and physical therapy.
- Prerequisite: Junior, senior, or graduate standing.

CAEP 5152 Early Intervention: Planning and Evaluating Services (3 SH)
Comprises a systematic, family-centered, team approach to service delivery. Cases are used as a focal point for learning how to plan and evaluate individualized family services and group service plans. Covers important aspects of teamwork and leadership in early intervention with respect to service and coordination. Addresses practical approaches to assessing needs for group programs, and evaluating the implementation and outcomes of programs. Also considers the impact of legal and financial issues on service coordination and approaches to service delivery.
- Prerequisite: Junior, senior, or graduate standing.

CAEP 5200 Motivational Interviewing in a Healthcare Setting (3 SH)
Designed for clinicians working or who hope to work in interdisciplinary healthcare settings. In today’s rapidly changing healthcare climate, positive health behavior change is a priority. Motivational interviewing (MI) is an important evidenced-based clinical approach useful to healthcare providers trying to help patients reduce smoking or substance use, achieve medication adherence, enhance medical therapy engagement, or manage chronic illnesses. Offers participants an opportunity to learn the foundations of MI as well as practice key MI techniques. The curriculum is based on research describing the conceptualization of MI, its principles, empirical evidence for MI, and methods of MI training.

CAEP 6200 Introduction to Counseling: Theory and Process in an Ecological Context (3 SH)
Provides an overview of counseling and psychology from the ecological perspective. Covers the history, theories, and process of counseling across forces within psychology and across individuals (children and adults), groups, and families. Includes an introduction to counseling skills.
CAEP 6201 Introduction to Assessment (3 SH)
Introduces testing and assessment in psychology and education including group achievement tests. Covers uses of tests in society, the politics and economics of tests, types of tests, test statistics, reliability, validity, item analysis, test construction, new movements in testing, and applications. Introduces descriptive statistics as a basis for understanding the statistical basis for establishing norms, scales, and for understanding approaches to scoring.

• Prerequisite: School counseling students only.

CAEP 6202 Research, Evaluation, and Data Analysis (3 SH)
Introduces topics in research and evaluation from a consumer perspective. Covers types of research studies and methodologies, philosophical bases for perspectives, research design, evaluation and outcomes assessment, data analysis techniques, clinical and qualitative approaches, and interpretation of research findings.

• Prerequisite: Counseling psychology, college student development and counseling, and school counseling students only.

CAEP 6203 Understanding Culture and Diversity (3 SH)
Works from a broad definition of culture and diversity. In addition to traditional culture and ethnic classifications, examines disability, poverty, and gender as culturally defining factors. Also explores the dynamics of culture in social systems, with the perspective of valuing differences in society and sociocultural forces impinging on culture from the ecological perspective.

• Prerequisite: Applied educational psychology, college student development and counseling, counseling psychology, and school psychology students only.

CAEP 6206 Learning Principles (3 SH)
Provides an overview of the theories of learning, cognition, and emotion. Introduces the major theories and relates them to applications and interventions in psychology and education.

CAEP 6210 Advanced Assessment of Individual Domains (3 SH)
Addresses assessment that is clinically useful. Specifically addresses concentrations in the MSCP program. In addition to cognitive and emotional aspects of assessment that relate to counseling of individuals, measures that relate to ongoing clinical intervention may be considered.

CAEP 6215 Groups: Dynamics and Leadership (3 SH)
Presents an overview of the functions of supervision, consultation, prevention and psychoeducation programs, workshops, staff training, action research, social change, and working in professional and community associations using principles of advanced group development and dynamics.

• Prerequisite: Restricted to students in counseling psychology and in college student development and counseling.

CAEP 6218 Infant, Child, and Adolescent Development (3 SH)
Provides an overview of development from birth through late adolescence. Covers the major theories of human development from a culturally informed, gender-sensitive ecological orientation. Reviews stages and theories of development from an interdisciplinary perspective and related to implications for learning. Examines cognitive, language, social/emotional, play, and physical aspects of development.

• Prerequisite: School counseling students only.

CAEP 6220 Development Across the Life Span (3 SH)
Identifies and addresses culturally and gender-sensitive developmental issues throughout the life span, from the conventional stages of childhood through the end of life. Discusses ethnic, economic, gender, relational, and sexual identities, as well as health-medical and aging concerns.

• Prerequisite: Restricted to students in applied educational psychology, counseling psychology, school psychology, pharmacy, and pharmacy studies.

CAEP 6222 Human Sexuality (3 SH)
Designed for the twenty-first century and the critical issues that have evolved in the field. Includes current information on issues in human sexuality (and acts as a forum for the discussion of current trends), which may include HIV/AIDS, abortion, ethics and morality in genetic engineering, sex education in the school and home, teen sexuality and pregnancy, personal behaviors, social aspects of acquaintance rape, early sexual experiences, divorce, and remarriage. Allows for the development of counseling skills needed to deal with various issues.

CAEP 6225 Introduction to Clinical Neuropsychology (3 SH)
Provides an introduction to the neurological and biological substrata of cognition and behavior. Emphasis is on the application of this understanding to the work of the clinician.

CAEP 6226 Neuropsychological and Ecological Perspectives on Cognitive Assessment (3 SH)
Provides a process-oriented analysis and integration of cognitive assessment results within an ecological perspective. Aims to give students analytical tools to assist in diagnostic formulation, treatment planning, and the development of interventions to address areas of difficulty in children and adolescents with learning and behavioral problems, as well as those suspected of neuropsychological involvement. Includes computer-assisted administration and interpretation of test results.

• Prerequisite: CAEP 6330.
CAEP 6230 Health Issues in Counseling (3 SH)
Includes an in-depth exploration of issues relevant primarily to young adults as they begin to make decisions related to their own health behavior and well-being, as these have bearing on them personally, physically, and socially. Topics are timely and critical to the twenty-first century and include health behaviors in sexuality, self-esteem, high-risk behaviors, emotional well-being, alcohol and other drugs of choice including smoking, violence, eating disorders, and others as they become more prevalent as issues for the young adult. Requires students to practice in the clinical setting a minimum of twenty hours per week.
* Prerequisite: School counseling students only.

CAEP 6235 Vocational, Education, and Career Development (3 SH)
Focuses on the interactions of economic needs, work, class, education, and contemporary social trends as part of human development in a sociohistoric ecological context.
* Prerequisite: Restricted to students in counseling psychology, in school counseling, and in college student development and counseling.

CAEP 6240 Family, School, and Community Systems (3 SH)
Addresses the family as a system within an ecological context. Covers parent counseling, the school and family as interactive systems, and school-parent collaboration. Also considers families in early intervention and other family-school interventions.

CAEP 6242 Psychopathology: Diagnosis and Treatment Planning (3 SH)
Identifies categories of human difficulty and abnormal behavior through current DSM terminology. Based in a cultural and gender competent bio-psycho-social model over the life span. Discusses both preventive and individual interventions for each category. Also introduces treatment planning and treatment guidelines.

CAEP 6243 The Severely Disabled (3 SH)
Reviews the causes of disabling conditions. Considers the implications of severe multiple disabilities in home, educational, and community settings, and determines ways to prepare and maintain individuals with severe disabilities in these settings. Reviews services provided by a variety of agencies and procedures to access them. Discusses various alternative-to-school programs including vocational programs, and analyzes referral procedures for them.

CAEP 6247 Child and Adolescent Psychopathology (3 SH)
Covers DSM-IV and major forms of psychopathology including the neuroses (obsessional states, hysteria, anxiety states, and phobias), the psychoses (schizophrenia, mania, depression, and paranoia), psychosomatic, sociopathy, conduct disorders, organic disorders, and mental retardation. Discusses the relationship between categories of special education disabilities (emotional impairment, autism, and so on) and DSM-IV.
* Prerequisite: Applied educational psychology, college student development and counseling, counseling psychology, and school psychology students only.

CAEP 6250 Individual Interventions (3 SH)
Focuses on a variety on individually focused interventions: standard techniques used to achieve change goals as well as crisis intervention and prevention. Use of multimodal interventions (for instance, expressive, action) are joined with specific problems that individuals might face. Also addresses crisis intervention, solution-focused treatment planning, and promoting resiliency and activism.

CAEP 6260 Community Counseling Psychology (3 SH)
Addresses organizational and systems impact, stressors, and change efforts. Draws from the community, consultation, organizational, prevention, and social psychology literature. Considers understanding of health promotion in social and institutional contexts. Also explores crisis, coping, and social change.
* Prerequisite: Counseling psychology students only.

CAEP 6262 Evaluation and Outcomes Assessment of Community, School, and Health-Related Programs (3 SH)
Covers theories and approaches to evaluation and outcomes assessment in community and school-based programs. Reviews evaluation questions, target audiences for evaluation and outcomes, the politics and economics of studying program effects, and qualitative approaches.
* Prerequisite: CAEP 6202 with a grade of B; college student development and counseling students only.

CAEP 6275 Counseling Strategies for Children and Adolescents (3 SH)
Considers a broad range of approaches including but not limited to behavior modification, rational emotive therapy, transactional analysis, and reality therapy strategies. Considers the counselor’s role as a consultant to teachers, parents, and administrators in effecting positive behavior change. Assists in developing skills necessary to dealing with a variety of issues in the counseling situation, especially as they relate to the school setting. Includes an opportunity to learn about as well as practice many of the current strategies used in counseling children. Is intended primarily for those who will counsel in schools or other settings serving children and adolescents.
CAEP 6282 Ethics and Professional Development (3 SH)
Addresses professional development and mental health counseling issues. Also considers professional ethics from ACA, APA, and FTI, with emphasis on the professional functioning of counselors. Discusses current issues in the practice and control of mental health. Also addresses the role of professional organizations and state licensing.

CAEP 6283 Brief Therapies (3 SH)
Discusses brief forms of therapy and counseling. Addresses therapies with each of the theoretical four forces. Discusses advantages and disadvantages of brief therapy. Considers the fit of the therapy with the person or client system as well as the goals and context. Also explores empirical, ethical, pragmatic, and political viewpoints.
* Prerequisite: CAEP 6200 with a grade of B.

CAEP 6285 Advanced Interventions (3 SH)
Using principles of advanced group development, dynamics, and leadership, overviews functions of supervision, consultation, prevention programs, workshops, staff training, action research, social change, and working in professional and community associations.
* Prerequisite: CAEP 6200 with a grade of B.

CAEP 6286 Family Counseling Interventions (3 SH)
Examines the role and social construction of families. Includes a brief overview of theoretical perspectives and especially considers the more recent implications of feminist and multicultural critiques. Discusses relationship building and specific interventions with families in terms of appropriate use of clinical, ethical, and gender/race-ethnic/class competencies.
* Prerequisite: CAEP 6200 with a grade of B.

CAEP 6287 Group Counseling (3 SH)
Covers group design, dynamics, and leadership as well as their application in a range of mental health group activities. Since the conventional theoretical orientations have been covered in the theory course (CAEP 6200), this course approaches group work through a broader perspective. For example, while expressive groups based in a humanistic tradition and insight gained through psychodynamic and cognitive traditions are in the course, such recent developments as adventure and psychoeducation group work are also included.

CAEP 6290 Reality Therapy (3 SH)
Deals with the theory and practice of choice theory and reality therapy. Emphasizes the principles of brief therapy, and provides opportunities to develop implementation plans to use on an individual, group, and systems basis. Utilizes a variety of methods including reading, demonstrations, role-playing, and media. Designed for educators and mental health professionals functioning in a variety of educational and healthcare settings.

CAEP 6300 Introduction to College Student Development (3 SH)
Covers various theories and models of college student development and the principles for translating theory into practice. Provides understanding of the demographics of college student populations, the integration of cognitive and affective education, and the creation of community on campus. Includes developmental theories and models pertaining to subdominant groups, such as women, African-Americans, Asian Americans, Latinos, Native Americans, international, gays and lesbians, and disabled persons.
* Prerequisite: College student development and counseling students only.

CAEP 6301 Planning and Administering Student Affairs (3 SH)
Focuses on assessing developmental needs of college students and designing, delivering, and evaluating educational programs that address those needs. Emphasizes understanding diversity within student and staff populations. Surveys all of the services typically offered by student services departments and divisions. Involves guest lecturers who are department heads within the most important types of student services offices.

CAEP 6302 Law and Ethics in Higher Education (3 SH)
Provides an overview of the law as it applies to higher education administration. Emphasis is on those areas affecting the student affairs professional. Covers the current state of the law, as well as the appropriate skills and resources to stay current in an ever-changing field. Also studies the ethical standards of student affairs.
* Prerequisite: CAEP 6301 with a grade of B.

CAEP 6303 Financial Aspects of Higher Education (3 SH)
Seeks to provide students of higher education administration with information they need to better understand and participate more effectively in the funding, budgeting, and revenue/expenditure processes in higher education. Examines the role of strategic planning and resource allocation in public and private colleges/universities. Also examines various topics, issues, and current trends in the financial arena of higher education.

CAEP 6305 Special Topics in Higher Education (3 SH)
Offers various topics each term the course is offered. Topics are determined by significant events and changes in the field. Can be taken for up to six semester hours as long as topics are different.
* Repeatability: May be repeated without limit.

CAEP 6307 Contemporary Issues in Higher Education (3 SH)
Analyzes and addresses contemporary issues in higher education that arise in student affairs administration and higher education in real time. Offers students an opportunity to analyze, discuss, and synthesize materials from the course in a meaningful way through discussions, writings, and individual presentations.
CAEP 6310 Introduction to Rehabilitation (3 SH)
Provides an orientation to the field of rehabilitation including its historical development, legislative involvement, psychological implications, and sociological dimensions. Emphasizes coordinating and integrating services as they relate to the field of rehabilitation as a community process. Focuses on persons with severe disabling conditions.

CAEP 6311 Principles of Medical Rehabilitation (3 SH)
Explores the wide spectrum of disabilities that could profit from rehabilitation including orthopedic, neurological, medical, surgical, and mental disabilities. Presents basic principles of medical rehabilitation that practitioners and administrators should know. Discusses psychological aspects of disabilities and uses role-play and small-group facilitation to develop techniques for working in the field of rehabilitation.

CAEP 6324 Programmed Learning (3 SH)
Reviews the theoretical and experimental foundations of programmed instruction and errorless learning. Emphasizes the detailed analysis of stimulus control, its measurement, and ways to produce it. Current research on discrimination learning and stimulus equivalence are a major focus.
* Prerequisite: Applied behavioral analysis students only.

CAEP 6325 Biological Basis of Mental Retardation (3 SH)
Considers the relationship between biological anomalies of the brain and disruption of learning and behavior that occur in individuals with mental retardation and other developmental disabilities. Through the use of case studies and student presentations, reviews a variety of syndromes and conditions associated with behavioral excesses and deficits.
* Prerequisite: Applied behavioral analysis students only.

CAEP 6327 Behavior Assessment (3 SH)
Provides an in-depth review of observation and measurement techniques in applied behavior analysis. Introduces key elements of behavioral assessment including systematic assessment of preference, and assessment of behavior function through indirect methods, direct methods, and systematic manipulations.
* Prerequisite: Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.

CAEP 6328 Research and Design Methods (3 SH)
Reviews principles of operant learning, with an emphasis on basic laboratory research. Studies single-subject experimental design in-depth, emphasizing critical analysis of published research reports and the implementation of these methods in service settings. Requires a feasible experimental design project, with actual or hypothetical data, which must be written in the form of a scientific report.
* Prerequisite: Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.

CAEP 6329 Service Administration (3 SH)
Presents a comprehensive overview of general and specific services for individuals with developmental disabilities, from organizational and administrative points of view. Provides in-depth coverage of ethical principles in the design and implementation of behavior analysis services and applied research. Considers issues in staff training, performance management, and program evaluation.
* Prerequisite: Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.

CAEP 6330 Community-Based Treatment (3 SH)
Reviews projects and interventions that have successfully provided effective remediation and rehabilitation in community-based settings for individuals with developmental disabilities, emotional and behavioral disorders, and for the developing individual. Includes observation and evaluation of multiple community-based treatment settings to provide breadth of experience. Requires students to practice in the clinical setting a minimum of twenty hours per week.
* Prerequisite: Applied behavioral analysis students only.

CAEP 6331 Advanced Learning Seminar 1 (3 SH)
Covers theoretical underpinnings of operant and respondent conditioning, with emphasis on relating principles of behavior to problems of reinforcement, motivation, comparative psychophysics, and physiological psychology.
* Prerequisite: Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.

CAEP 6332 Advanced Learning Seminar 2 (3 SH)
Continues the review of theoretical underpinnings started in CAEP 6331. Includes an introduction to conceptual issues in behavior analysis, for example, verbal behavior and language development.
* Prerequisite: Applied behavioral analysis students only.

CAEP 6333 Advanced Learning Seminar 3 (3 SH)
Provides an in-depth focus on a specific advanced topic in operant or respondent conditioning or applied behavior analysis. Topics may include advanced verbal behavior, aversive control, conditioned reinforcement, early intervention in autism, and other conceptual issues.
* Prerequisite: Applied behavioral analysis students only.
CAEP 6334 Applied Programming Seminar 1 (3 SH)
Focuses on the systematic application of principles of behavior analysis to interventions in applied settings. Allows students to design, test, and evaluate instructional programs for remedial application to behavior problems and to test instructional theory. Emphasizes the relationship between behavioral assessment and behavioral intervention. Provides supervision through the weekly research and data seminar in collaboration with the student’s project adviser.
- **Prerequisite:** Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.
- **Repeatability:** May be repeated without limit.

CAEP 6335 Applied Programming Seminar 2 (3 SH)
Focuses on the practical issues surrounding development of an applied thesis research topic. Students develop their thesis topic and prepare a written proposal for their thesis research. Students present the initial thesis proposal and periodic updates during the weekly seminar. Thesis committee members are invited to attend their students’ presentations to provide feedback and critique of the developing proposal.
- **Prerequisite:** Applied behavioral analysis students only.
- **Repeatability:** May be repeated without limit.

CAEP 6336 Systematic Inquiry 1 (3 SH)
Requires each student to collect a comprehensive bibliography on a significant topic in applied behavioral research and complete a thorough written review, which typically serves as the introduction to the student’s thesis. Emphasizes the integration and analysis of experimental findings and theoretical foundations of the research area, critical evaluation of current research, and the identification of potentially fruitful future research. Frequent presentation of current research by students helps develop their oral communication skills and prepares them for becoming contributing professionals in the field of behavior analysis.
- **Prerequisite:** Restricted to students in applied behavior analysis, applied educational psychology, and school psychology.

CAEP 6337 Systematic Inquiry 2 (3 SH)
Requires each student to collect a comprehensive bibliography on a significant topic in applied behavioral research and complete a thorough written review, which typically serves as the introduction to the student’s thesis. Emphasizes the integration and analysis of experimental findings and theoretical foundations of the research area, critical evaluation of current research, and the identification of potentially fruitful future research. Frequent presentation of current research by students helps develop their oral communication skills and prepares them for becoming contributing professionals in the field of behavior analysis.
- **Prerequisite:** Applied behavioral analysis students only.

CAEP 6338 Clinical Practice Supervision (1 to 3 SH)
Offers a seminar for supervision of a clinical experience in practicum, internship, or fieldwork. Meets on campus with instructor/supervisor and complements individual supervision at the practice site.
- **Prerequisite:** Bouvé students only.
- **Repeatability:** May be repeated for up to 6 total semester hours.

CAEP 6340 Issues in School Counseling (3 SH)
Designed specifically to address issues of school counseling in the twenty-first century, looking at a comprehensive Pre-K to 12 developmental guidance approach. Covers the Massachusetts Education Reform Bill, the Massachusetts Comprehensive Assessment System (MCAS), the curriculum frameworks, and relevant school law and ethics.
- **Prerequisite:** School counseling students only.

CAEP 6345 Learning Problems: Educational, Biological, and Ecological Perspectives (3 SH)
Focuses on learning problems in relation to developmental tasks and curriculum frameworks including reading and writing. Examines the types and causes of learning problems and individual learning styles from constructivist, neuropsychological, and ecological perspectives. Reviews methods for assessment of physical, emotional, intellectual, and social development in childhood and adolescence. Emphasizes special education legislation and current service delivery programs.
- **Prerequisite:** Applied educational psychology and school psychology students only.

CAEP 6347 Behavior Management (3 SH)
Covers theory, research, and practice pertaining to management of behavior in preschool, elementary, and high school classrooms. Presents development of practical behavioral interventions using a systematic problem-solving process (including functional behavioral assessment). Includes skills and techniques of preventing and remediating behavior problems.
- **Prerequisite:** Applied educational psychology, school counseling, and school psychology students only.

CAEP 6350 Introduction to Cognitive Assessment (3 SH)
Introduces cognitive assessment and the relationship of cognitive theories to assessment. Also includes practice in administering and interpreting specific tests of cognitive functioning, such as the Wechsler Scales and the Woodcock-Johnson.

CAEP 6352 Personality Assessment (3 SH)
Administers and interprets projective tests, behavior rating scales, and personality tests. Offers advanced level of integrating results from different measures in report writing.
CAEP 6353 Curriculum-Based Assessment and Instruction (3 SH)
Provides curriculum frameworks (reading, mathematics), developmental sequences (language), socialization, and life skills as areas of learning breakdown. Focuses on procedures for evaluating a child’s current level of understanding and performance in these areas, determining goals of intervention, formulation of individualized education programs (IEPs), development of instructional plans, and monitoring progress.
- Prerequisite: Restricted to students in applied educational psychology, counseling psychology, and school psychology.

CAEP 6354 Social, Emotional, and Behavioral Assessment (3 SH)
Uses a problem-solving framework designed to help students develop skills in identifying common school-based social, emotional, and behavioral problems and designing targeted assessment plans. Offers students an opportunity to gain experience in the administration, scoring, and interpretation of relevant measures designed to assess children’s and adolescents’ social, emotional, and behavioral functioning; in the synthesis of multisource/multimethod data; and in psychological report writing.
- Prerequisite: School psychology and applied educational psychology students only.

CAEP 6355 School-Based Counseling (3 SH)
Presents school-based counseling across preschool, elementary, middle, and high school settings. Considers group counseling, crisis intervention, and school-based prevention programs. Offers an introduction to child psychotherapy.
- Prerequisite: CAEP 6200 with a grade of B or CAEP 6399 with a grade of B.

CAEP 6360 Consultation and Program Evaluation (3 SH)
Overviews different consultation theories including behavioral, psychodynamic, and systems perspectives. Offers a focus on skill development with respect to a broad-based and pragmatic approach to client-centered behavioral consultation. Uses computer networks and e-mail in client-centered and peer consultation. Offers evaluation of the implementation and outcomes of consultation and related service delivery programs.
- Prerequisite: CAEP 6347 with a grade of B.

CAEP 6365 Seminar in School Psychology (3 SH)
Covers the philosophical, historical, technical, and school administrative issues contributing to the professional identity of school psychologists. Emphasizes ethical standards, public policy, and legislation that impact school psychology.

CAEP 6370 Seminar in Health Psychology (3 SH)
Intended for graduate students in health-related disciplines and professions. Includes the development and history of health psychology and its use in different agencies and locations. Examines the spectrum of theoretical models along with the range of interventions with health psychology. For example, discusses conventional medical and biopsychosocial models as well as wellness and ecological models. Includes levels of intervention, education, and health promotion as well as some of the paradigm, political, and evaluative tensions that exist within behavioral medicine and health psychology.

CAEP 6371 Student Affairs/Services and College Student Development in Ghana (3 SH)
Examines the administration of student services/affairs and college student development in institutions of higher education in Ghana, West Africa. Explores issues of access, student development, and higher education administration in the context of Ghanaian culture and society. Offers students an opportunity to engage in a comparative analysis of Ghanaian colleges and universities with those of the United States. Also examines college-community collaborations as they relate to addressing the challenges of this developing African country.

CAEP 6372 Families Over the Life Span (3 SH)
Covers issues pertaining to the life span of families and their development and evolution over time. Examines in detail two approaches to family therapy: the narrative family therapy approach and Bowenian family therapy. Involves the presentation of these intervention approaches, including student role-playing.
- Prerequisite: CAEP 6286 with a grade of B.

CAEP 6375 Substance Use and Treatment (3 SH)
Covers use, abuse, and treatment of both legal and illegal psychoactive drug agents. Includes an introduction to psychotropic medications, overview of illicit substance use, differential substance abuse, interventions and treatment, and related social issues.

CAEP 6380 Seminar in Feminist Psychology (3 SH)
Looks at sex-gender socialization and role ascription in the development of women and men. Examines feminine and masculine gender role stereotypes and constructs in mental health theory, procedures, and practices. Introduces the variety of feminist standpoints and explores their impacts on the conceptualization of health and healing. Presents major points in feminist therapy and psychology. The student examines selected areas in-depth within this course.
CAEP 6382 Advanced Family Therapy (3 SH)
Begins with an analysis of the genograms prepared during CAEP 6286. Discusses the usefulness of the genogram and how to include it in the assessment and treatment of a family. Covers the theories and interventions of structural and strategic family therapy. Addresses issues of special events in the family, such as divorce, illness, and special needs, in terms of their effects on family functioning.
• Prerequisite: CAEP 6286 with a grade of B.

CAEP 6390 History and Systems of Psychology (3 SH)
Examines the development of psychological theories in the context of western intellectual development. Attends to the underlying epistemological assumptions and historical and cultural forces on psychology. Also emphasizes some of the potential contributions to psychology of other world civilizations and to paradigmatic strengths and limits.

CAEP 6394 Advanced Multicultural Psychology (3 SH)
Provides critical analyses of “universalist” perspective counseling and development theory. Explores a variety of implications for culturally competent psychological work. Addresses process, procedures, and interventions as well as theory and inquiry. Focuses on individual and cultural differences in counseling and professional psychological services.
• Prerequisite: CAEP 6203 with a grade of B.

CAEP 6399 Clinical Skills in Counseling Psychology (3 SH)
Develops self-awareness, communication skills, and therapeutic and practice procedures.

CAEP 6400 Prepracticum in School Psychology (1 SH)
Requires a minimum of 75 hours of school-based experience. Designed to orient school psychology graduate students to the school psychology profession and the practicum. Offers students an opportunity to understand the role of the school psychologist and the school environment. Seeks to familiarize students with the range of different school psychological services and the range of students who receive services from school psychologists, including students from different cultures and students with and without disabilities. Emphasizes observational learning. Students must complete the entire prepracticum and submit the documentation of its successful completion prior to beginning the practicum experience.
• Prerequisite: School psychology and counseling psychology students only.

CAEP 6401 Counseling Children and Adolescents in Schools 1 (3 SH)
Constitutes the first semester of a two-semester integrated course sequence on child and adolescent counseling interventions. Seeks to give students a foundation in the selection, evaluation, and application of empirically supported counseling interventions for children and adolescents. Topics include individual and group counseling techniques as well as specific clinical issues related to school-age children, families, family-school collaboration, and systems.
• Prerequisite: CAEP 6399.

CAEP 6402 Counseling Children and Adolescents in Schools 2 (3 SH)
Effective Spring 2017
Constitutes the second semester of a two-semester integrated course sequence on child and adolescent counseling interventions. Seeks to give students a foundation in the selection, evaluation, and application of empirically supported counseling interventions for children and adolescents. Topics include individual counseling techniques as well as specific clinical issues related to school-age children, families, and systems.
• Prerequisite: CAEP 6401.

CAEP 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

CAEP 7701 Doctoral Seminar in Counseling Psychology (0 to 1 SH)
Seeks to advance the student’s development as a counseling psychologist based on a scientist-practitioner and ecological model and to ensure that the student is informed regarding the historical and current developments of the discipline of counseling psychology.
• Prerequisite: Counseling psychology students only.
• Repeatability: May be repeated up to 3 times.

CAEP 7710 Advanced Clinical Assessment (3 SH)
Covers contemporary cognitive and personality testing as used in a variety of practice settings. Covers such areas as pain management, risk assessment, and learning styles.
• Prerequisite: PhD students only.
CAEP 7711 Measurement: Advanced Psychometric Principles (3 SH)
Offers students an opportunity to gain an understanding of classical and modern test theory as well as to develop the capability to use these theories to develop tests for their own purposes. Topics include test validity, item statistics useful in test construction, score scales and norms commonly used in educational testing, item bias and test bias, and ideas of fairness and equity in educational and psychological testing. Introduces factor analysis as well as the major extensions and alternatives to classical test theory, generalizability theory, and item response theory (latent trait theory).
• Prerequisite: Counseling psychology and school psychology students only.

CAEP 7712 Intermediate Statistical Data Analysis Techniques (3 SH)
Emphasizes the use of existing theories and models as a basis for the formation of questions and hypotheses and for designing research to address those questions and hypotheses. Covers the logic of design of research and hypothesis testing, regression, general linear model (GLM), statistical model building and testing, hierarchical regression, and analysis of covariance structures. Emphasizes consideration of power and effects. Requires students to do problems on the computer and/or by hand using data sets assigned in class.
• Prerequisite: (a) Course in basic statistics and course in methods of research design or (b) permission of instructor; counseling psychology and school psychology students only.

CAEP 7715 Advanced Research and Data Analyses 1 (3 SH)
Offers the first course in a year-long, two-semester sequence. Studies the relationship between design and analysis in research in the behavioral sciences. Emphasizes the use of existing theories and models as a basis for the formation of questions and hypotheses and for designing research to address them. Covers the logic of design of research, objectivity, and ethical concerns, as well as the role of perspectives on epistemology, such as neopositivism, phenomenology, and pragmatism. Reviews descriptive statistics and correlation techniques to include simple regression and nonparametric methods. Requires students to do problems on the computer and/or by hand using data sets assigned in class. Utilizes SPSS, SAS, and other computer analysis packages including graphic methods of depicting data. Emphasis is on interpretation of the results of quantitative analyses. Emphasizes the analysis of research findings within an ecological context. Student does a research project from a data set and turns in a written report in APA format suitable for publication. Studies how to critique existing published investigations, taking a researcher’s perspective.
• Prerequisite: PhD students only with previous graduate work in research methods and statistics.

CAEP 7716 Advanced Research and Data Analyses 2 (3 SH)
Investigates techniques and models for exploring research questions and testing hypotheses developed in the first semester. Explores structural and advanced correlational models using linear and nonlinear approaches, multivariate data analysis, psychometric statistical theory and techniques, and qualitative inquiry. Requires considerable hands-on experience with real data sets. Explores qualitative and methodological approaches to ecological analysis of systems and contexts. Requires students to do problems on the computer and/or by hand using data sets assigned in class. Utilizes SPSS and other computer analysis packages including graphic methods of depicting data. Also covers specialized applications (text analysis software, survey design and scoring software, or specialized graphing programs). Students do projects, prepare reports of an analysis from the data set, and turn in a written report in APA format suitable for publication.

CAEP 7720 Advanced Clinical Interventions (3 SH)
Considers assessment and intervention from an ecological/systems perspective on a case-by-case basis. Uses individual, group, family, organizational, and community modalities. Emphasizes case conceptualization as a framework for treatment planning and evaluation. Emphasis is on impact of social systems and sociocultural factors.
• Prerequisite: PhD students only with previous work in group and family counseling.

CAEP 7722 Educational and Psychological Assessment and Interventions with Infants, Toddlers, and Children (3 SH)
Introduces students to the theories and practices of educational and clinical interventions with young children, to include play assessment and play therapy. Focuses on the interrelationships between and among developmental domains in the conceptualization and design of interventions. Emphasizes the implementation of interventions in everyday contexts.
• Prerequisite: PhD students only.

CAEP 7723 Rorschach (3 SH)
Offers an advanced class in psychodiagnostic testing, focusing on the Rorschach test. Teaches the administration, scoring, and interpretation of this test, using the Exner scoring system. Students integrate Rorschach data with data from other sources, such as personal history. Trains students to provide clear, pertinent feedback and recommendations, and assumes knowledge of the theory and practice of psychodiagnosis.
• Prerequisite: PhD students only.
CAEP 7730 Advanced Consultation Seminar (3 SH)
Covers theories of consultation in health, mental health, education, and community systems. Organizational structure, power systems, and economic resources are integrated with theories, techniques, and applications of consultation across settings. Explores implications of culture and interdisciplinary perspectives at the community, organizational, and individual levels.
• Prerequisite: PhD students only with previous course in consultation.

CAEP 7732 Legal and Ethical Issues in Community and Educational Settings (3 SH)
Designed to provide a systematic orientation to the ethical and professional issues faced by mental health practitioners in their teaching, research, and practice in a seminar setting. Addresses APA ethical guidelines, legal aspects of psychological practice including licensing, confidentiality in practice and research, historical perspective, supervision and training issues, and current topics of professional concern in counseling and school psychology practice. Considers relevant court decisions affecting psychological practice with children, adults, and family.
• Prerequisite: Applied educational psychology, counseling psychology, and school psychology students only.

CAEP 7741 Advanced Fieldwork 1 (1 or 2 SH)
Offers students training in clinical settings to develop clinical skills in assessment, consultation, and interventions under supervision. Provides support and evaluation of the advanced fieldwork placement that second-year students are involved in throughout the year. Offers a seminar format, which is led by a faculty supervisor who is the official liaison between Northeastern University and the advanced fieldwork sites. The major objectives are an examination and support of clinical work within various assessment and treatment modalities; and an examination of systems issues within placement sites, which include but are not limited to administrative and supervisory issues. Students submit tapes and detailed process notes of sessions, videotape role-playing, and critique the tapes and videos in terms of each student’s previously stated goals. Group discussion of clinical/systems issues focus on critical analysis and provision of a supportive atmosphere to explore treatment and systems issues. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Repeatability: May be repeated once for up to 2 total semester hours.

CAEP 7742 Advanced Fieldwork 2 (1 or 2 SH)
Continues CAEP 7741. Provides students the opportunity, under supervision in a clinical setting, to develop clinical skills in assessment, consultation, and interventions. Designed to provide support and evaluation of the advanced fieldwork placement for second-year students. Uses a seminar format led by a faculty supervisor who is the official liaison between Northeastern University and the advanced fieldwork sites. Seeks to examine and support clinical work and examine systems issues within placement sites, which include but are not limited to administrative and supervisory issues. Students submit tapes and process notes of sessions, videotape role-playing, and critique the tapes and videos in terms of each student’s previously stated goals. Focuses group discussion on critical analysis and provision of a supportive atmosphere to explore treatment and systems issues. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: CAEP 7741 with a grade of B.
• Repeatability: May be repeated once for up to 2 total semester hours.

CAEP 7743 Advanced Fieldwork 3 (1 or 2 SH)
Continues CAEP 7742. May be taken by students who elect to do additional fieldwork to develop better, or deeper, skills or new skill areas. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: CAEP 6355 with a grade of B or CAEP 7742.
• Repeatability: May be repeated once for up to 2 total semester hours.

CAEP 7744 Advanced Fieldwork 4 (1 or 2 SH)
Continues CAEP 7743. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: CAEP 7743 with a grade of B.
• Repeatability: May be repeated once for up to 2 total semester hours.

CAEP 7746 Neuropsychological Practicum Supervision 2 (2 SH)
Trains students in neuropsychological assessment of young and middle-aged adults. Under supervision, students conduct interviews, administer and score tests, write interpretive reports focusing on strengths and weaknesses, and provide recommendations and client feedback. Students must commit to both practicums.
• Prerequisite: CAEP 7745 with a grade of B.
CAEP 7750 Biological Bases of Behavior (3 SH)
Lays the foundations for an understanding of brain-behavior relations, with an emphasis on implications for the clinician. Topics include basic neuroanatomy, the development of the nervous system over the life span, and hormonal and neuropharmacological aspects of behavioral regulation. Reviews perceptual and motor systems, cognition, emotions, and motivational states from the perspective of their biological underpinnings. Underscores the unfolding of these processes within a psychosocial and cultural context.
• **Prerequisite:** Restricted to selected programs in counseling and applied educational psychology.

CAEP 7751 Advanced Clinical Neuropsychology (3 SH)
Reviews common neuropathological conditions from a biopsychosocial perspective. Emphasizes characteristic behavioral presentations, underlying neurobiological processes, and the role of neuropsychological assessment methods in the diagnostic process. Discusses therapeutic interventions, with an emphasis on those most relevant to counselors and rehabilitation specialists. Stresses the importance of incorporating an understanding of cultural, ethnic, and societal factors.
• **Prerequisite:** CAEP 7750 with a grade of B; PhD students only.

CAEP 7752 Neuropsychological Practicum Supervision 1 (2 SH)
Trains students in neuropsychological assessment of young and middle-aged adults. Under supervision, students conduct interviews, administer and score tests, write interpretive reports focusing on strengths and weaknesses, and provide recommendations and client feedback. Students must commit to both practicums.
• **Prerequisite:** CAEP 7710, CAEP 7750, and CAEP 7751, each with a grade of B.

CAEP 7755 Cognitive and Affective Bases of Behavior (3 SH)
Provides students with an in-depth treatment of the theories of the cognitive and affective bases of behavior and their applications. Reviews the impact of thinking, emotions, affect, and temperament on behavior in the context of the ecological model.
• **Prerequisite:** PhD students only.

CAEP 7756 Social Psychology in an Organizational and Ecological Context (3 SH)
Conducted as a seminar designed to meet the needs of doctoral students in school and counseling psychology for a course that spans theory and principles of social psychology from early work in the field-in such topics as social pressure, field theory, cognitive dissonance, and attitude formation-to more modern work in expectations, attitudes, and organizational behavior. Surveys basic concerns in social psychology, and considers material related to application in schools, communities, and organizations in which mental health is practiced. For example, in the study of group dynamics, stresses applications to group learning, administrative leadership, and organization theory. Also covers research paradigms, social change, social influence, system consultation, and community issues as they relate to social psychological considerations.
• **Prerequisite:** PhD students only.

CAEP 7757 Doctoral Seminar in Contemporary Theories of Psychotherapy (3 SH)
Offers a critical examination from an ecological/systems perspective of conceptual developmental and clinical elements of contemporary psychotherapy theories. Emphasis is on object relations, social constructionist, and constructivist theories of personality and therapeutic change. Includes selected theoretical and research readings, lectures in student-led discussion. Evaluates critical issues and future directions of contemporary theoretical schools and considers varied approaches to case examples. The different theoretical approaches are examined through the lenses of gender, class, and cultural adequacy.
• **Prerequisite:** PhD students only.

CAEP 7758 Seminar in Cultural and Ecological Perspectives in Professional Psychology (3 SH)
Should be taken in the last year of doctoral course work when the majority of other course work has been accomplished. The course goals reflect this more mature standing. They include expanding knowledge of multiple facets and developing professional identity(s) in school and counseling psychology; enhancing capacities for critical analyses; and developing the implications of the ecological model of psychology. Offered as a seminar, which aims to help students’ transition from students’ perspectives to professional perspectives. Is designed to articulate multiple professional roles, particularly within an ecological context. Extensive reading and discussion provide the background for individual selection of topics.
• **Prerequisite:** PhD students only.
CAEP 7760 Doctoral Seminar in Vocational Psychology and Career Counseling (3 SH)
Examines the range of knowledge considerations that causally influence human vocational, occupation, and career choice(s) over the life span. Such considerations include physical, psychological, sociological, geographical, economic, and cultural factors. A general model for data collection and consultation with clients of varying ages and backgrounds is analyzed. Its application shall be further demonstrated in simulated microcounseling sessions. Requires students to make seminar presentations on selected topics stated above.
• Prerequisite: PhD students only.

CAEP 7770 Topical Seminar in School and Counseling Psychology (1 SH)
Offers emerging issues in school and counseling psychology.
• Prerequisite: PhD students only.
• Repeatability: May be repeated without limit.

CAEP 7771 Research Team Experience 1 (1 SH)
Offers the first in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: PhD students in counseling psychology and school psychology only.

CAEP 7772 Research Team Experience 2 (1 SH)
Offers the second in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: CAEP 7771 with a grade of B; PhD students in counseling psychology and school psychology only.

CAEP 7773 Research Team Experience 3 (1 SH)
Offers the third in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: CAEP 7772 with a grade of B; PhD students in counseling psychology and school psychology only.

CAEP 7774 Research Team Experience 4 (1 SH)
Offers the fourth in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: CAEP 7773 with a grade of B; PhD students in counseling psychology and school psychology only.

CAEP 7775 Research Team Experience 5 (1 SH)
Offers the fifth in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: CAEP 7774 with a grade of B; PhD students in counseling psychology and school psychology only.
CAEP 7776 Research Team Experience 6 (1 SH)
Offers the sixth in a sequence of six semester-long courses designed to give students practical experience in research as part of their doctoral training. The rationale is that to become a researcher requires active research experience. This sequence offers students an opportunity to participate in various stages of ongoing research leading up to and including the design of their own research projects. At each stage, the students are given additional responsibility for conceptualization, design, implementation, analysis, and interpretation of research. Students are encouraged to tie their research to other aspects of their training as appropriate. A faculty mentor provides direct supervision to the students.
• Prerequisite: CAEP 7775 with a grade of B; PhD students in counseling psychology and school psychology only.

CAEP 7777 Doctoral Seminar: Program Planning and Evaluation (3 SH)
Offers students an opportunity to develop knowledge and skills in program planning and evaluation with a specific focus on promoting the health of children and adolescents. Focuses on program planning and evaluation within the coordinated school health model and the importance of planning, implementing, and evaluating programs within a community-based participatory research (CBPR) framework. Emphasizes the importance of programs that incorporate the intersection of family, school, and community systems. Builds upon the systematic, problem-solving approach to practice woven throughout the curriculum. Emphasizes participatory and context-sensitive approaches to planning and evaluating programs. Seeks to prepare psychologists to plan and evaluate programs systematically in their future work settings.
• Prerequisite: School psychology students only.

CAEP 7778 Doctoral Seminar: Leadership, Consultation, and Supervision (3 SH)
Seeks to provide both knowledge and skills necessary to engage in leadership, consultation, and clinical supervision activities with respect to groups and organizations in a doctoral-level course. Focuses on the nexus of knowledge and skills that pertain to leadership, consultation, and clinical supervision, which can be considered “indirect” approaches to improving service delivery. They help set the organizational, problem-solving, and interpersonal conditions for others to actualize their potential to (a) provide services to children, families, and adults; (b) develop and implement applied research programs; and (c) successfully collaborate across family, school, and community systems. Considers the empirical basis for leadership, consultation, and clinical supervision within a multicultural and ecological context.
• Prerequisite: Counseling psychology and school psychology students only.

CAEP 7798 Doctoral Internship 1 (1 to 3 SH)
Required of all doctoral students in counseling/school psychology PhD programs. Requires a minimum of forty hours per week for twelve months or twenty hours per week for twenty-four months in an accredited (or equivalent by permission) mental health training setting. In addition to internship site supervision and training seminars, interns attend, in person or online, a university-based seminar and complete case assignments.
• Prerequisite: PhD students only.
• Repeatability: May be repeated up to 2 times for up to 3 total semester hours.

CAEP 7799 Doctoral Internship 2 (2 SH)
Continues CAEP 7798.
• Prerequisite: PhD students only.

CAEP 7976 Directed Study (1 to 4 SH)
Allows students to pursue topics of individual interest beyond the scope of formal course work under the direction of faculty.
• Repeatability: May be repeated without limit.

CAEP 7978 Independent Study (1 to 4 SH)
Allows the graduate student to pursue an individualized scholarly project with a faculty member.
• Repeatability: May be repeated without limit.

CAEP 7990 Thesis Research (3 SH)
Provides supervision and oversight of thesis research through seminars in which students present updates of ongoing work to invited faculty, peers, and guests.
• Prerequisite: Applied behavioral analysis students only.
• Repeatability: May be repeated without limit.

CAEP 7996 Thesis Continuation (0 SH)
Offers continuation of thesis work under faculty supervision until thesis is accepted.
• Prerequisite: Applied behavioral analysis students only.

CAEP 8401 Practicum in Counseling Psychology (3 SH)
Includes forty hours of client contact plus supervision. Focuses on developing individual and group skills within mental health and human service agencies.
• Prerequisite: CAEP 6399 with a grade of B.

CAEP 8402 College Student Development Practicum 1 (3 SH)
Offers the first course in a two-semester sequence that involves placement in a field setting from September to June. The student performs three hundred hours of fieldwork over the course of the academic year. Also requires attendance at a weekly practicum seminar.
CAEP 8403 College Student Development Practicum 2 (3 SH)
Offers the second course in a two-semester sequence that involves placement in a field setting from September to June. The student performs three hundred hours of fieldwork over the course of the academic year. Also requires attendance at a weekly practicum seminar.

CAEP 8405 Practicum in Rehabilitation Counseling 1 (3 SH)
Offers the first course in a two-semester sequence that provides a minimum of six hundred hours of supervised practical experience in a rehabilitation counseling service setting over two semesters.

CAEP 8406 Practicum in Rehabilitation Counseling 2 (3 SH)
Offers the second course in a two-semester sequence that provides a minimum of six hundred hours of supervised practical experience in a rehabilitation counseling service setting over two semesters.

CAEP 8410 School Counseling Practicum 1 (3 SH)
Offers the first course in a two-semester sequence that provides a 525-hour experience in a selected school (PreK-9 or 5-12). Practica involve direct experience working with children, teachers, parents, and community leaders. The first seventy-five hours of this course represent prepracticum experiences. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: (a) CAEP 6275 with a grade of B and (b) passing score on the communication and literacy tests of the Massachusetts Tests for Educator Licensure (MTEL); school counseling students only.

CAEP 8411 School Counseling Practicum 2 (3 SH)
Offers the second course in a two-semester sequence that provides a 525-hour experience in a selected school (PK–9 or 5–12). Involves direct experience working with children, teachers, parents, and community leaders. Requires students to practice in the clinical setting a minimum of 20 hours per week.
• Prerequisite: CAEP 8410 with a grade of B.

CAEP 8415 Practicum in School Psychology 1 (2 SH)
Offers supervised school-based field experience coupled with seminar class.
• Prerequisite: Passing score on the communication and literacy tests of the Massachusetts Tests for Educator Licensure (MTEL).

CAEP 8416 Practicum in School Psychology 2 (2 SH)
Offers supervised school-based field experience coupled with seminar class.
• Prerequisite: CAEP 8415 with a grade of B.

CAEP 8417 Intensive Practicum in Applied Behavior Analysis 1 (2 SH)
Offers students supervised experience that is required in order to sit for the BACB exam. Focuses on offering students an opportunity to acquire new behavior analytic skills related to the BACB Task List. Asks students to demonstrate the necessary skills to be a competent behavior analyst in applied settings. Covers preference assessments, task analysis and other skill acquisition programs, and other teaching strategies.
• Prerequisite: Bouvé students only.

CAEP 8418 Intensive Practicum in Applied Behavior Analysis 2 (2 SH)
Continues the work of CAEP 8417 with the primary focus on offering students an opportunity to acquire new behavior analytic skills related to the BACB Task List. Covers functional assessment, behavior reduction programs, conditioned reinforcement, data analysis, and clinical decision making.
• Prerequisite: CAEP 8417; Bouvé students only.

CAEP 8420 Practicum in Special Education (3 SH)
Offers a field-based experience in the role and at the level of the license sought. Requires 300 hours, appropriate to the level sought, divided equally between a general education classroom and a setting with students with moderate disabilities. Alternatively, all 300 hours may be pursued in an inclusive setting.
• Prerequisite: Passing grade on the subject test for moderate disabilities in addition to the communication and literacy tests of the Massachusetts Tests for Educator Licensure (MTEL).

CAEP 8425 Early Intervention Practicum 1 (2 SH)
Provides students from school psychology, special education, speech-language pathology and audiology, physical therapy, nursing, and related fields with supervised field work experience in team-oriented interventions for infants and toddlers with disabilities or at risk for developmental delays and their families from linguistically and culturally diverse backgrounds. The practicum class sessions are conceptualized as the linchpin training experience between what the theory addresses in didactic courses and the student’s fieldwork. Students are expected to master early intervention and team participation core competencies to work effectively with infants and toddlers and their families, interdisciplinary team members, and administrative personnel.
CAEP 8426 Early Intervention Practicum 2 (2 SH)
Provides students from school psychology, special education, speech-language pathology and audiology, physical therapy, nursing, and related fields with supervised field work experience in team-oriented interventions for infants and toddlers with disabilities or at risk for developmental delays and their families from linguistically and culturally diverse backgrounds. The practicum class sessions are conceptualized as the linchpin training experience between what the theory addresses in didactic courses and the student’s fieldwork. Students are expected to master early intervention and team participation core competencies to work effectively with infants and toddlers and their families, interdisciplinary team members, and administrative personnel.

CAEP 8501 Internship in School Psychology 1 (3 SH)
Offers supervised school-based field experience coupled with seminar class.
• Prerequisite: School psychology students only.

CAEP 8502 Internship in School Psychology 2 (3 SH)
Offers supervised school-based field experience coupled with seminar class.

CAEP 8510 Internship in Counseling Psychology 1 (3 SH)
Provides twenty hours per week in a field setting and a two-hour seminar on campus. In addition to providing supervising seminar, addresses practices, procedures, ethics, and policies in professional practice.
• Prerequisite: Counseling psychology students only.

CAEP 8511 Internship in Counseling Psychology 2 (3 SH)
Provides twenty hours per week in a field setting and a two-hour seminar on campus. In addition to providing supervising seminar, addresses practices, procedures, ethics, and policies in professional practice.

CAEP 8550 Advanced Fieldwork in Counseling Specialty 1 (2 SH)
Provides advanced field experience in counseling for students beyond a master’s degree in counseling or with approval supervision. Students work in specialty setting for a minimum of twenty hours per week.

CAEP 8551 Advanced Fieldwork in Counseling Specialty 2 (2 SH)
Provides advanced field experience in counseling for students beyond a master’s degree in counseling or with approval supervision. Students work in specialty setting for a minimum of twenty hours per week.

CAEP 8552 Advanced Fieldwork in Counseling Specialty 3 (2 SH)
Provides advanced field experience in counseling for students beyond a master’s degree in counseling or with approval supervision. Students work in specialty setting for a minimum of twenty hours per week.

CAEP 8553 Advanced Counseling Practicum (1 or 2 SH)
Offers an elective course for doctoral students in the counseling psychology doctoral program who are completing additional years of supervised practical experience (minimum of 20 hours per week for 600 hours) as part of the training for the PhD degree and in clinical preparation for the APPIC/APA internship match process. Offers students training in clinical settings. Includes a seminar to offer students an opportunity to develop clinical skills in assessment, consultation, and interventions under supervision. Provides support and evaluation of the advanced fieldwork placement in which doctoral students are involved throughout the year. Led by a faculty supervisor who is the official liaison between Northeastern University and the advanced fieldwork sites.
• Prerequisite: CAEP 7744.
• Repeatability: May be repeated up to 5 times for up to 6 total semester hours.

CAEP 9000 Comprehensive Exam (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

CAEP 9990 Dissertation (0 SH)
Offers dissertation supervision by individual members of the department.
• Prerequisite: PhD students only.
• Repeatability: May be repeated once.

CAEP 9996 Dissertation Continuation (0 SH)
Supports the continued development of the dissertation.
• Prerequisite: CAEP 9990 with a grade of B.
• Repeatability: May be repeated without limit.

CRIM 1000 Criminal Justice at Northeastern (1 SH)
Designed to help students adjust to college life and become fully acquainted with the resources and services offered by the University. Covers various campus services, studies how to access various library resources, and focuses on study skills and time management. Also explores various careers for which the criminal justice major can prepare students.
• Equivalent: ANTH 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, INTL 1000, LANG 1000, PHIL 1000, POLS 1000, and SOCL 1000.
CRIM 1100 Introduction to Criminal Justice (4 SH)
Surveys the contemporary criminal justice system in the United States. Students examine the phases of the criminal justice system beginning with the detection of crimes by the police, the handling of the case through the courts, and, finally, the disposition and sentencing of offenders. Issues and characteristics of each of the phases (police, courts, and corrections) are examined as well as identifying the key actors (police, judges, prosecutors, correctional officers, and so forth) of each phase of the criminal justice system. Also introduces students to the U.S. juvenile-justice system.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions.

CRIM 1200 Ethics, Values, and Diversity (4 SH)
Focuses on the ethical dilemmas facing key actors in the criminal justice system. Also examines the increasing diversity of society and how these changes are affecting the criminal justice system. Investigates the myths and realities surrounding race, gender, social class, and crime, and the roles these issues have played in criminal sentencing particularly involving the death penalty. Investigates ethical dilemmas faced by police, courts, and correctional authorities in dealing with an increasingly multicultural society.
• NU Core: Comparative study of cultures.

CRIM 1300 The Death Penalty (4 SH)
Reviews the history of the death penalty in the United States from colonial times through the present. Among Western democracies, the United States stands alone in its continued use of capital punishment as a sanction. Examines the contemporary death penalty and the many controversies surrounding its continued use (focusing on U.S. Supreme Court decisions around the constitutionality of the death penalty). Discusses historical and contemporary controversies around the administration of the death penalty including potential innocence, special populations, methods of execution, race and gender biases, costs, deterrence, and international relations.

CRIM 1400 Human Trafficking (4 SH)
Offers an overview of human trafficking in its various forms. Emphasizes understanding the experiences and needs of trafficking victims and the methods of operations of traffickers and their networks across various cultural contexts. The trafficking of persons for sex or labor through force, fraud, or coercion has become an increasingly serious problem in modern society. Federal, state, and local criminal justice authorities have been tasked with the responsibility of identifying and rescuing trafficking victims and prosecuting their perpetrators. Offers students an opportunity to critically evaluate the social and cultural practices that give rise to and support human trafficking in the United States and around the globe.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.

CRIM 1500 Corruption, Integrity, and Accountability (4 SH)
Traces the history, nature, and current effects of corruption using concrete cases and illustrations. Covers international and national laws and standards against corruption (with special emphasis on the U.N. Convention against Corruption and the Foreign Corrupt Practices Act). Discusses efforts to measure corruption, governance, and anticorruption efforts. Focuses on the role of stakeholders from private sector to government, civil society, and individual actors. Corruption affects every aspect of our life and its quality. From bribery and illicit enrichment to obstruction of justice, from abuse of power to clientelism and favoritism, corrupt acts touch global, national, and local communities. Illustrates how fundamental are the values and practice of integrity, responsibility, and accountability.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

CRIM 1600 Crimes against Humanity (4 SH)
Focuses on human rights and abuses of those rights, including torture, war crimes, genocide, and other crimes against humanity. Uses historical and contemporary examples of crimes against humanity to identify the nature and essence of human rights abuses. Discusses the response of international organizations (the United Nations); international tribunals (such as the International Criminal Court); human rights non-governmental organizations, or NGOs (Human Rights Watch); and national governments (in particular, the United States) to critically examine the difficulties in developing appropriate responses and solutions to such international crimes.
• NU Core: Comparative study of cultures.

CRIM 1700 Crime, Media, and Politics (4 SH)
Discusses and critiques contemporary portrayals of crime and justice in the arenas of political debates and campaigns; news reports; and films, television shows, and music. Covers current events as they occur in these arenas. To set up these discussions, students have an opportunity to develop critical tool kits for assessing these images of crime and justice by reading and discussing theories, research, and critiques. Additionally, students are expected to read and discuss historical portrayals of crime and justice with the goal of identifying both parallels and differences between these and current events.
• NUpath: Interpreting culture, understanding societies and institutions.
CRIM 2000 Co-op Integration Seminar 1 (1 SH)
Orients students for co-op. Offers an overview of how to prepare résumés, practice interviewing skills, consider what students can/should expect from their first co-op, and discuss what employers’ expectations are likely to be of them. Prepares students to integrate what they learned in the freshman diversity course into their first co-op. Students are also instructed on how systematically to prepare a journal during the first co-op on issues related to ethics, values, and diversity.

CRIM 2100 Criminal Due Process (4 SH)
Focuses on an historical evaluation of the Fourteenth Amendment of the U.S. Constitution and its use in making rights prescribed under the Bill of Rights applicable to the individual states. Examines constitutional requirements in the administration of criminal justice with particular emphasis on the Fourth, Fifth, and Sixth Amendment requirements and their implications on police practices in the areas of arrests, searches and seizures, right to counsel, and eyewitness identification. Expects students to be familiar with basic concepts and legal language as well as the Court’s changing interpretations of the law. Briefing of cases is required.

CRIM 2200 Criminology (4 SH)
Describes the nature and extent of crime, explains its causes, and examines the reasons for and effectiveness of society’s responses to it. Defines the topic of criminology by discussing the different types of crime. Moreover, to establish the extent of crime in society, measurement issues are addressed. The second half of the course details different theories of criminal causation.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions.

CRIM 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

CRIM 3000 Co-op Integration Seminar 2 (1 SH)
Continues CRIM 2000. Allows students to reflect on what they learned during their first co-op, and use their journal entries as the basis from which to examine real-life issues of ethics, values, and diversity as they experienced them in the workplace.
• Prerequisite: CRIM 2000.

CRIM 3010 Criminal Violence (4 SH)
Surveys the trends, nature, patterns, and causes of criminal violence. Blending sociological and psychological perspectives on violent criminal behavior, focuses on serial and mass murder, sexual predators, youth and school violence, violence among intimates and family members, as well as the impact of media and entertainment violence. The effectiveness of various criminal justice responses are also examined including intervention strategies, police tactics, gun control, incarceration, and capital punishment.
• Prerequisite: CRIM 1100 or CRIM 2200.
• Equivalent: CRIM 4600.

CRIM 3020 Victims of Crime (4 SH)
Examines current theories and research relating to victims of crime. Pays particular attention to special victim groups such as children, the elderly, and women. Explores victim interactions with the criminal justice system. Current victim initiatives such as restitution, mediation, compensation, and victim rights legislation are also assessed.
• Prerequisite: CRIM 1100 or CRIM 2200.
• Equivalent: CRIM 4650.

CRIM 3030 Global Criminology (4 SH)
Seeks to strengthen an understanding of crime and its causes from a comparative, cross-national standpoint. In doing so, it places extant definitions of crime and deviance in a cultural context. Explores existing methods of studying crime on a global scale; offers an overview of various types of criminal and deviant behavior that occur in isolated group contexts as well as those crimes that transcend country boundaries. Examines various strategies designed to address these acts of crime on a national as well as transnational level.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: CRIM 4670.

CRIM 3040 Psychology of Crime (4 SH)
Explores the inner lives of offenders including cognitive, emotional, perceptual, and physiological phenomena. Examines the ecological context of crime, individual and social risk factors for psychological attributes related to offending, how these attributes develop, how they interact with the environment to produce crime, and, most importantly, how knowledge of the psychology of crime can assist in efforts to prevent delinquency or to help offenders desist.
• Prerequisite: CRIM 1100 or CRIM 2200.
• Equivalent: CRIM 4700.
CRIM 3050 Organized Crime (4 SH)
Examines the myths and realities surrounding organized crime. Offers an overview of the nature and extent of organized crime, the factors that contribute to it, as well as the origins and opportunities/motives for criminal enterprises. Discusses the impact of organized crime on U.S. society, both in terms of economy and politics. Also examines the interconnections between organized criminals and legitimate organizations as well as analyzes legislative and policy responses.
• Prerequisite: CRIM 1100 or CRIM 2200.
• Equivalent: CRIM 4620.

CRIM 3100 Criminal Law (4 SH)
Discusses the definition of common crimes and criminal responsibility. Addresses moral, philosophical, constitutional, and public policy considerations in the use of criminal sanctions to regulate conduct. Requires the knowledge of particular criminal law concepts and the ability to identify them in complex fact patterns and discuss their implications and ramifications. Also requires the application of legal principles to fact situations in a logical way. Case briefing is required.
• Prerequisite: Sophomore standing or above or permission of instructor.

CRIM 3200 Juvenile Justice (4 SH)
Introduces students to the history, structure, processes, and philosophies of juvenile justice systems in the United States. Responses to juvenile offenders-ranging from prevention and diversion to institutional corrections and aftercare-are explored in the context of youth policy generally. Focuses on contemporary issues and controversies (system fragmentation, changing conceptions of juvenile offenders, lack of a coherent justice system rationale, racial and gender bias in processing and confinement, and proposals to abolish the juvenile court).
• Prerequisite: CRIM 1100.

CRIM 3300 Corrections (4 SH)
Examines the concept of punishment and its form, function(s), and enforcement throughout history, with an emphasis on current sentencing policies and procedures and their impact on the corrections system and correctional overcrowding. Explores the operation, structure, clientele, and issues confronting the institutions, agencies, and programs encompassing the corrections system including jails, prisons, and community-based corrections.
• Prerequisite: CRIM 1100.

CRIM 3400 Security (4 SH)
Examines the history and evolution of security from a focus on crime prevention to one of loss prevention for business, industry, institutions, and government. Emphasizes the need for analytical, interpersonal, and communications skills in developing cost-effective programs for the protection of assets, personnel, and third parties. Discusses the security/government relationship.
• Prerequisite: CRIM 1100.

CRIM 3500 Policing (4 SH)
Traces the history, evolution, and organization of the police in the United States. Examines the role of police in society, structure and culture of police organizations, function and activities of the police, and police deviance and accountability. The course objectives are to acquaint students with prior research on the police, examine critically the police as a component of the criminal justice system, explore the complex nature of the profession, and assist those who are considering a policing career to understand the realities of the job.
• Prerequisite: CRIM 1100.

CRIM 3600 Criminal Justice Research Methods (4 SH)
Introduces the basic concepts involved in conducting research in the areas of the criminal justice system and criminology. Through lectures, group discussions, and readings, familiarizes students with the scientific methods that are necessary for systematic analysis of crime trends, offender behavior, program effectiveness, and public attitudes about crime and justice. In so doing, students become capable of developing an idea, investigating and critiquing how it has been researched, developing a research design, and administering its implementation.
• Prerequisite: CRIM 1100 and CRIM 2200.
• NU Core: Writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major.

CRIM 3700 Criminal Justice Statistics (4 SH)
Develops the basic foundation for which statistical properties are applied, with an emphasis on applications in criminal justice. Challenges students to understand both descriptive and inferential statistics including hypothesis testing. Develops the knowledge and understanding necessary to comprehend and interpret basic statistics in criminal justice research literature and reports. While an extensive mathematics background is not required, students should be familiar with basic algebra before taking this course.
• Prerequisite: CRIM 3600 and MATH 1215.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: INSH 2104, POLS 2400, and SOCL 2320.

CRIM 3900 Topics in Criminal Justice and Criminology (1 to 4 SH)
Focuses on topics related to criminal justice to be selected by instructor.
• Repeatability: May be repeated without limit.
CRIM 4000 Co-op Integration Seminar 3 (1 SH)
Continues CRIM 3000. Builds upon what students learned in CRIM 3600 and focuses on experiences and research journals from the second co-op. Students discuss their research activities and findings, and begin to do some critical thinking about the nature of organizations. The discussion in this seminar also prepares them for the third co-op experience, in which they keep journals on some other aspect of organizational culture or dynamics. The seminar is pass/fail.
• Prerequisite: CRIM 3000.

CRIM 4010 Gender, Crime, and Justice (4 SH)
Examines the topics of femininities and masculinities and their influence on participants in the criminal justice system. Also explores topics such as gender and criminological theory; the notion of gender and offending; women and men as victims of violence; and women and men as professionals within the criminal justice system.
• Prerequisite: CRIM 1100 or CRIM 2200 or permission of instructor.
• Cross-list: WMNS 4010.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: WMNS 4010.

CRIM 4020 Race, Crime, and Justice (4 SH)
Provides students with an overview of the role and treatment of racial/ethnic minorities in the criminal justice system. Covers historical and theoretical frameworks for understanding the relationship between race, crime, and criminal justice. In so doing, students become familiar with trends and patterns in criminal offending by racial/ethnic minorities, as well as system response to such behavior.
• Prerequisite: CRIM 1100 or CRIM 2200 or permission of instructor.

CRIM 4030 Criminal Justice Organization and Management (4 SH)
Provides students with an overview of issues related to criminal justice organization and management. Covers the manner in which criminal justice agencies deal with crime and criminological issues, as well as how such agencies are organized and managed to find ways to deal with the crime problem. Students become familiar with the operations of criminal justice organization and management, and how individuals navigate and work with criminal justice agencies to deal with crimes.
• Prerequisite: CRIM 1100 or CRIM 2200 or permission of instructor.

CRIM 4040 Crime Prevention (4 SH)
Offers an overview of issues related to crime prevention, both from criminological and criminal justice points of view. Examines crime prevention programs that encompass both the individual and community levels, as well as the integration of such levels. Offers students an opportunity to learn current theories of and leading research on the main approaches to preventing crime, including developmental, situational, and community prevention. Focuses on assessing effectiveness of prevention programs and policies.
• Prerequisite: CRIM 1100 or CRIM 2200 or permission of instructor.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

CRIM 4100 Juvenile Law (4 SH)
Introduces the way society responds to juvenile offenders. Topics may include important legislation, fundamental case law, behavioral research studies, philosophy, history, delinquency, abuse and neglect, transfers and waivers, status offenses, and comparative law. Students may be required to observe actual juvenile cases in the Massachusetts Juvenile Court.
• Prerequisite: CRIM 3100 and junior or senior standing.

CRIM 4110 Legal Philosophy (4 SH)
Explores the great legal philosophers with emphasis on nineteenth- and twentieth-century philosophers and their contributions to legal philosophy in the United States. Examines in depth the development of American legal philosophy and its role in the administration of American justice.
• Prerequisite: Junior or senior standing.

CRIM 4120 Courts and Sentencing (4 SH)
Examines the role of criminal courts in the United States, the structure and organization of the court system, and the flow of cases from arrest to conviction. Focuses on the key actors in the courtroom—prosecutors, defense attorneys, judges, and court clerks—and the decision-making processes in charging a person with a crime, setting bail, pleading guilty, going to trial, and sentencing. Addresses prospects for reforming courts.
• Prerequisite: Junior or senior standing.

CRIM 4300 Community-Based Corrections (4 SH)
Provides an in-depth understanding of the variety of correctional options for law violators that are available within the community. Through lectures, group discussions, presentations, and reading of empirical research, students become knowledgeable about all forms of corrections and correctional facilities outside of jails and prisons, from traditional incarceration programs to the most current programs such as electronic monitoring, house arrest, day treatments, boot camps, and fines. Also discusses the philosophy and effectiveness of different types of community-based corrections while keeping in perspective the impact they have on each component of the criminal justice system.
• Prerequisite: CRIM 3300 and junior or senior standing.
CRIM 4310 Correctional Intervention (4 SH)
Examines the foundations of correctional interventions including overviews of the major systems of therapeutic intervention, diagnosis of mental illness, and correctional assessment and classification. Explores both theoretical and practical knowledge of the methods, strategies, and effectiveness of treating special populations such as sex offenders and substance abusers. Studies special topics such as problems of matching therapists and therapy methods to personality and setting, difficulties in the control and treatment of nonamenable and dangerous offenders, and the short-term reeducational and treatment methods uniquely suited to institutional settings.
• Prerequisite: CRIM 3300 and junior or senior standing.

CRIM 4400 Security Management, Supervision (4 SH)
Covers the duties and responsibilities of security managers and supervisors with special attention paid to planning, organizing, budgeting, staffing, directing, innovating, and overseeing the implementation of cost-effective loss-prevention programs. Examines the manager’s role in security’s professionalization and related issues.
• Prerequisite: CRIM 3400 and junior or senior standing.

CRIM 4500 Police Strategy (4 SH)
Examines current strategies utilized by U.S. police. Topics include the demand for police service, service delivery, missions and goals, resources and tactics, accountability, ethics, and operational effectiveness measurements. Emphasis is on successfully accomplishing the police mission-in a responsible manner and within the many constraints under which officers and departments must operate. Focuses on in-class small-group work centered on a variety of scenarios in which students are charged with creating reasonable, legal, ethical, and effective solutions. A variety of learning formats are applied including written examinations, in-class group projects, a term paper, and written assignments.
• Prerequisite: CRIM 3500 and junior or senior standing.

CRIM 4610 Youth Gangs (4 SH)
Provides students with a theoretical and practical understanding of contemporary youth gangs in the United States. Covers problems in defining gangs; the nature and extent of gangs in the United States; explanations of gang formation and proliferation; variations in gang structure, function, and activities; the relationship(s) between gangs, drugs, and violence; gender, ethnic/racial, and community distinctions in gangs; and policies and programs addressing gangs (including law enforcement and prevention/intervention efforts).
• Prerequisite: Junior or senior standing.

CRIM 4630 Political Crime and Terrorism (4 SH)
Provides students an understanding of what political crime and terrorism is, the nature and extent of the problem historically and currently, as well as prevention efforts designed to combat political crime and terrorism. Students are exposed to several sources of information on political crime and terrorism including the news media, scholarly sources, and video accounts.
• Prerequisite: Junior or senior standing.

CRIM 4640 Corporate and White-Collar Crime (4 SH)
Introduces students to a variety of topics and issues in the areas of white-collar and corporate crime. Examines corporate and white-collar offending through the criminal justice and regulatory justice systems, beginning with detection and prosecution through adjudication and sentencing. A variety of special topics are also covered such as definitional issues, the nature and extent of white-collar crimes, measurement, crime types, case studies, and the etiology of offending.
• Prerequisite: Junior or senior standing.

CRIM 4660 Communities and Crime (4 SH)
Provides students with an overview of issues related to communities and crime. Examines sociological aspects of community context, behavior, and functioning, and how communities are implicated in both crime-generating and crime-preventing processes. Familiarizes students with historical and contemporary literature surrounding the communities and crime relationship, as well as how the study of human behavior generally, and crime particularly, should examine the interaction of persons and places.
• Prerequisite: Junior or senior standing.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

CRIM 4710 Law and Psychology (4 SH)
Examines a broad array of topics, from criminal profiling to an examination of the nature of justice and its relationship to social control. Focuses on five major questions: what forensic psychologists do; how psychologists and lawyers look at the world; how the criminal justice system (police, courts, and corrections) and other institutions involved in social control use psychologists; what psychologists think about the criminal justice system and other institutions of social control; and how psychological (and other behavioral science) research can be used to help prevent crime. Because psychologists and lawyers see the world very differently, the course can help facilitate communication and understanding among present and future practitioners in each field, as well as in criminal justice and delinquency prevention generally.
• Prerequisite: Junior or senior standing.
CRIM 4720 Crime and the Life Course (4 SH)
Introduces students to life-course criminology—the study of individual lives and their experiences of crime. Key topics include understanding how people become involved in crime, why some people commit crime throughout their lives, and how and why others leave it behind. Considers what it means to adopt a life-course perspective and how that perspective differs from other ways of thinking about individuals and crime.
• Prerequisite: (a) CRIM 1100 or CRIM 2200 and (b) junior or senior standing.

CRIM 4800 Crime Mapping (4 SH)
Designed as a practical and hands-on introduction to various GIS techniques. Offers students an opportunity to obtain an understanding of how geographic information systems (GIS) are used by law enforcement agencies. Covers tools that provide a more complete understanding of crime locations and explores how criminological theory and geographic information together can be used to develop crime prevention/reduction strategies. Focuses on the strengths and limitations of various criminological perspectives, how they may be used to inform enforcement decisions, and how to use GIS applications to create maps that convey a clear message regarding the spatial distribution of a given criminal behavior.
• Prerequisite: (a) CRIM 1100 or CRIM 2200 and (b) junior or senior standing.
• NUpath: Engaging with the natural and designed world, analyzing and using data.

CRIM 4900 Advanced Seminar in Criminology and Criminal Justice (4 SH)
Focuses on specialized advanced topic in criminal justice to be selected by instructor.
• Prerequisite: CRIM 2100, CRIM 2200, and junior or senior standing.
• Repeatability: May be repeated without limit.

CRIM 4949 Senior Capstone Seminar (4 SH)
Emphasizes study of organizations and organizational change, with focus on the organizations that comprise the criminal justice system and the environmental contexts in which they operate. Various theories of the structure and processes of organizations and the behavior of groups and individuals within organizations are examined to familiarize students with the different perspectives from which organizations can be studied (the bureaucratic model, the “principles of management” orientation, the human-relations approach, the human-resources approach, and systems theory). Also focuses on understanding change within organizations including a study of principles of organizational change and various approaches to planned change.
• Prerequisite: Senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

CRIM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

CRIM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: CRIM 4970.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

CRIM 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

CRIM 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: CRIM 2100 and CRIM 2200.
• Repeatability: May be repeated without limit.

CRIM 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
CRIM 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CRIM 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

CRIM 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

CRIM 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

CRIM 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

CRIM 7200 Criminology (3 SH)
Provides an overview of the current understanding of the causes of crime from an interdisciplinary perspective. Focuses on the major theories of crime and causation developed over the past two hundred years. Emphasis is on integrating criminological theory and research, assessing the implications of this knowledge base for policies relating to crime control and prevention. Also presents and discusses the most current data regarding the nature and extent of crime in the United States.

CRIM 7201 Global Criminology (3 SH)
Examines how the processes of globalization influence crime and criminal justice around the globe. Analyzes globalization and recent developments in global crime, including global trends in policing and security. Explores the global applicability of dominant criminological theories and transferability of crime control policies. Offers students an opportunity to develop an understanding of international criminal justice, particularly as it pertains to war crimes, crimes against humanity, and the global protection of human rights.

CRIM 7202 The Criminal Justice Process (3 SH)
Introduces students to the operation of the criminal justice system. Covers the components of the system, the process by which defendants are moved through that system, and key issues in the administration of criminal justice.

CRIM 7204 Research and Evaluation Methods (3 SH)
Surveys the basic techniques of research and evaluation methods. Addresses various research strategies including surveys, observation, archival data, experiments, and evaluation designs. Topics include ethical problems and the design, procedures, and politics of research.
• Corequisite: CRIM 7205.

CRIM 7205 Lab for CRIM 7204 (1 SH)
Accompanies CRIM 7204. Covers topics from the course through various experiments.
• Corequisite: CRIM 7204.

CRIM 7206 Statistical Analysis (3 SH)
Introduces probability and statistical analysis. Topics include measures of central tendency and dispersion, probability and probability distributions, sampling distributions and hypothesis testing, and correlation, regression, and forecasting.
• Corequisite: CRIM 7207.

CRIM 7207 Lab for CRIM 7206 (1 SH)
Accompanies CRIM 7206. Covers topics from the course through various experiments.
• Corequisite: CRIM 7206.

CRIM 7208 Law and Society (3 SH)
Focuses on the sociology of law; emphasis is also on jurisprudential thought and the political analysis of legal institutions. Explores the sources of law and functions and dysfunctions of law in action. Reviews institutional roles of courts, legislatures, and administrative agencies. Topics include alternative dispute resolution, how the law can help or impede social change, whether Americans have become too litigious, or race and gender issues in achieving justice.

CRIM 7210 Gender, Crime, and Justice (3 SH)
Examines ways in which criminology, the criminal justice system, and the law contribute to the social construction of gender. Investigates process through which biological females are encouraged to become girls and women by cultural assumptions about female deviance, discourses on female crime, the criminal justice system, and legal assumptions about the meaning of equality. Focuses on feminist approaches to criminal justice that parallel the new feminist jurisprudence.
CRIM 7212 Juvenile Justice (3 SH)
Analyzes critically the policies and practices of the agencies involved in the processing of young persons through the juvenile justice system. Emphasis is on jurisdictional issues, police practices, detention, intake, diversion, adjudication, and dispositions of juveniles within the justice system. Also focuses on the historical development of the juvenile justice system as well as assesses current trends and proposals for reform. Emphasis is on the key policy issues facing juveniles involved with the juvenile justice system today.

CRIM 7214 Corrections Theory and Practice (3 SH)
Reviews the history of our correctional system, said by many to have four central themes (revenge, restraint, reformation, and rehabilitation/reintegration). Defines the role and working relationship of corrections in the greater spectrum of criminal justice, identifies and discusses the issues and problems facing the system today, and evaluates its intended purpose vs. how it actually functions. Explores prison operations, from designing and staffing a prison to responsible reintegration. Discussions regarding the political, social, and economic issues that have impacted correction operations, such as sentencing reform, overcrowding, boot camps, and so on, are taken from the classroom to actual prison settings. Provides an overview of corrections through a blend of theory, practice, and firsthand observations.

CRIM 7224 Law and Psychology (3 SH)
Offers a seminar on conceptual, empirical, historical, and professional aspects of selected topics in forensic psychology including such areas as law and psychology, competence to stand trial, criminal responsibility, and the insanity defense. Topics include jury selection, reliability and validity of eyewitness testimony, truth detection methods, and postconviction pleadings.

CRIM 7228 Criminal Violence (3 SH)
Investigates and analyzes aggression and violence as forms of individual, group, and societal behavior. Includes an assessment of anthropological, biological, philosophical, political, and sociological theories. Combines student presentations and projects with lectures and tutorials.

CRIM 7230 Police and Society (3 SH)
Introduces research, theory, and applications of the causes and consequences of police behavior. Discusses a historical review of the role that police have played in society as well as the structure of large and small police organizations. Topics include community policing, problem-solving methods, police discretion, police misconduct, police crime prevention strategies, and restorative justice.

CRIM 7232 Juvenile Law (3 SH)
Examines the legal relationship between the juvenile offender and the state. Covers case and statutory law as well as constitutional due process standards in juvenile proceedings. Topics include jurisdiction, prejudicial process, waiver of jurisdiction, adjudication, disposition and postdispositional issues, as well as the right to treatment.

CRIM 7234 Criminal Justice Organization and Management (3 SH)
Analyzes the structures, functions, and operations of criminal justice agencies including the police, the court, and corrections (jail, probation, prison, and parole) within the context of the entire criminal justice system. Reviews existing organizational theory and examines the application of these theories within agencies of criminal justice. Discusses interjurisdictional and intrajurisdictional issues facing these organizations and ethical dilemmas facing various decision makers.

CRIM 7240 Race and the Criminal Justice System (3 SH)
Offers a sociohistorical analysis of the effects of race and ethnicity on legitimate social opportunities, criminal behavior, victimization, and differential judicial processing. Discusses the impact of assimilation and acculturation on criminal behavior, victimization, and criminal justice processes. Discusses issues resulting from increasing diversity of both the criminal justice workforce and society in general.

CRIM 7242 Terrorism and International Crime (3 SH)
Provides an overview of the various approaches to terrorism employed around the world. Discusses the theories of terrorism as well as the major international and national approaches to reducing terrorist threats. Also discusses the role of the news media, the political consequences of terrorism, the military as a resource, and the role of hostages.

CRIM 7244 Criminal Law and Procedure (3 SH)
Discusses the fundamental principles, concepts, and development of criminal law and the constitutional provisions that govern it. Focuses on the relationship of the individual to the state and includes an examination of the general framework of criminal law as a means of social control.

CRIM 7246 Security Management (3 SH)
Examines security theories, operations, and practices, emphasizing the administration and management of security. Explores the philosophical background, history, and current role of security as well as the role and status of the security manager in threat assessment, risk prevention, and the protection of assets. Discusses functional-area security systems; law, science, and technology for security; ad issues; and standards, goals, and challenges for the future. Explores security systems, particularly as they relate to criminal justice and the environment.
CRIM 7248 Public and Private Investigations (3 SH)
Explores the development of the investigative process from both a historical and practical perspective. Discusses what constitutes an investigation, by whom investigations are conducted, and the characteristics of good investigators. Examines the actual conduct of investigations; the importance of analytical, communication, and interpersonal skills in dealing with witnesses, subjects, and associates; as well as evidence collection and laboratory usage. Also examines the principal types of criminal and noncriminal investigations and administration and case closings.

CRIM 7250 Victimology (3 SH)
Involves a scientific study of crime victims and public policy responses to them. Focuses on the nature and extent of criminal victimization, the dynamics of victim-offender relationships (e.g., incest and domestic violence), theories of victimization, a historical analysis of the victim's role in the criminal justice process, the restorative justice model, and the contemporary victim rights and victim services movement.

CRIM 7252 White-Collar Crime (3 SH)
Introduces the concept of white-collar crime as an area of scientific inquiry and theory formation. Uses multiple perspectives and reference points to critically examine the latest scholarship on the subject, ranging from focus on the offense, offender, legal structure, organizational structure, individual and organizational behavior, to victimization and guardianship, with special attention on the interaction between these components. Assesses the nature, extent, and consequences of white-collar crime from a national and international perspective. Also focuses on the criminal justice system’s current efforts at controlling white-collar crime and, given the relative ineffectiveness of traditional criminal justice responses, alternative systems of control. Offers many tangible research-based suggestions regarding actions that organizations and businesses can take to reduce the significant losses accrued to white-collar crime.

CRIM 7256 Courts and Sentencing (3 SH)
Designed to provide students with a solid foundational knowledge base in the area of courts and sentencing within a reading- and writing-intensive seminar format. Offers students an opportunity to develop an understanding of the purpose, nature, and structure of courts and their role in the creation and maintenance of law (both domestic and international). Emphasizes the nature and impact of sentencing policy shifts. Also discusses the role of the U.S. Supreme Court and its decisions. Offers students an opportunity to understand the nature and purpose of law; the role of courts in society; the structure of courts and various court processes; the nature and purpose of sentencing; sentencing structure, process, and policy shifts; and appellate court review of sentencing practices.

CRIM 7258 Comparative Criminology (3 SH)
Analyzes crime and criminal justice systems in selected countries and cultures. Focuses on the ways these different societies define and respond to criminal behavior. Specifically addresses how different societies structure their justice systems to meet their goals and reflect their values.

CRIM 7260 Topics in Criminal Justice (3 SH)
Focuses on a particular aspect of the criminal justice system of contemporary interest. This course rotates annually.
- Repeatability: May be repeated without limit.

CRIM 7262 Evidence-Based Crime Policy (3 SH)
Introduces students to the evidence-based paradigm in crime policy. Presents the theory and methods of the evidence-based paradigm, which places systematic research at the center of the policymaking process. Offers students an opportunity to further develop skills in critically assessing leading research findings and policy initiatives in the field of criminology and criminal justice.

CRIM 7264 Immigration and Crime (3 SH)
Introduces students to the study of crime and deviance with a specific emphasis on immigrant populations and/or Latino communities in the United States. Offers students an opportunity to develop an understanding of the historical relationship between patterns of immigration and patterns of crime, to examine the nature and extent of contemporary immigrant crime and victimization, and to assess the social and health consequences associated with crime among Latino and immigrant populations and within immigrant communities.

CRIM 7266 Crimes Against Humanity (3 SH)
Examines crimes against humanity with a specific focus on the role that criminology might play in helping us to understand the causes and consequences. Offers students an opportunity to critically assess the ways in which contemporary criminological theories fail to explain or address the most odious of all crimes—genocide, war crimes, and other crimes against humanity. Introduces students to the development of international criminal law and international criminal tribunals. Examines the International Criminal Court and its role in prosecuting perpetrators and holding individuals and heads of state accountable.
CRIM 7268 Human Trafficking (3 SH)
Provides an overview of the phenomenon of human trafficking as defined in the U.N. Protocol and the U.S. Victims of Trafficking Violence Prevention Act. Emphasizes understanding the experiences and needs of trafficking victims and the methods of operations of traffickers and their networks. Examines various forms of human trafficking victimization, including sex trafficking, forced labor, bonded labor, domestic servitude, and chattel slavery in both the United States and international contexts. Explores the roles of the state, media, culture, and criminal networks in both creating the conditions under which human trafficking exist and eradicating the problem of trafficking.

CRIM 7270 Crime and Community Context (3 SH)
Provides an overview of crime in the context of communities. Covers major theoretical perspectives and introduces students to both major quantitative and ethnographic work on communities. Examines sociological aspects of community context and contrasts aspects of community processes that are implicated in either the generation or the prevention of crime. Considers current criminal justice practices and crime prevention approaches intended to address crime within communities—especially as they interact with neighborhood social processes in ways that deter or facilitate community crime.

CRIM 7272 Justice Policy Research (3 SH)
Seeks to help students integrate knowledge of criminological theory and justice policy with the research skills gained while working toward completion of the graduate degree. Offers students an opportunity to demonstrate their mastery of knowledge in the field of criminology and criminal justice and synthesize this knowledge with practical skills. Requires submission of a comprehensive research paper on a specific subject, as agreed upon by the instructor.

CRIM 7306 Multivariate Analysis (3 SH)
Builds upon the concepts of correlation and inference to present analytic procedures involving several variables, including multiple regression, logistic regression, and factor analysis. Emphasizes data analysis strategies using various available data sets. The use of computers and statistical software is central to the course.  
• Prerequisite: CRIM 7204 and CRIM 7206 or equivalent.  
• Equivalent: CRIM 7304 and CRIM 7715.

CRIM 7308 Seminar in Policing (3 SH)
Examines the police function from a multitude of perspectives. Moves beyond analysis of the institution of the public police to explore the broader meaning and role of policing in modern societies. Emphasizes changes in the organization, structure, strategies, and control of policing. Students are expected to critically analyze existing empirical research that sheds light on the effectiveness of the police.

CRIM 7312 Special Topics in Criminology and Public Policy (3 SH)
Focuses on a particular aspect of criminology and/or public policy of contemporary interest. This course rotates annually.  
• Repeatability: May be repeated without limit.

CRIM 7314 Special Topics in Law and Justice (3 SH)
Focuses on a particular aspect of law and justice of contemporary interest. This course rotates annually.  
• Repeatability: May be repeated without limit.

CRIM 7316 Advanced Topics in Methods (3 SH)
Focuses on particular application methods not covered extensively in other research methods courses. This course rotates annually.  
• Repeatability: May be repeated without limit.

CRIM 7317 Qualitative Methods (3 SH)
Introduces the principles and use of common qualitative methods in social science research with a particular focus on their application in the field of criminology and criminal justice. Offers students an opportunity to engage in primary data collection and to learn how to use a variety of analytic techniques including transcription, field note preparation, memos, development of coding schemes and conceptual frameworks, and data-verifying techniques.

CRIM 7320 Advanced Quantitative Models (3 SH)
Exposes students to a broad array of advanced quantitative modeling techniques including probability theory, stochastic processes, queuing models, time series modeling, survival models, and general linear models.

CRIM 7325 Advanced Seminar in Policing (3 SH)
Exposes students to the most contemporary research on policing both nationally and internationally. Explores in-depth current issues facing policing, which may include community policing, the role of police in antiterrorism efforts, the role of technology in policing, policing diverse communities, and public-private policing partnerships.  
• Repeatability: May be repeated without limit.

CRIM 7330 Punishment and Social Control (3 SH)
Opens with the philosophy of punishment. Discusses at length the purpose of punishment and the most common justifications for sanctioning, or imposing harm, on other citizens. Reviews the history of punishment and social control, with a particular focus on the birth and development of the prison. Although the focus is on the United States, the U.S. experience is contrasted with the European experience. The middle of the course is devoted to punishment and social theory (Foucault, Marx, Weber, Elias, Garland, etc.). The latter portion of the course focuses on contemporary issues in punishment and social control (e.g., the increased use of surveillance, the death penalty, the problem of mass incarceration, and the related problem of prisoner reentry).
CRIM 7332 International Law and Justice (3 SH)
Introduces students to the development of international criminal law and how the international community seeks justice. Focuses on misconduct that concerns more than one state and can only be prevented, suppressed, and sanctioned through international cooperation. Examines problems arising out of the existence of many legal systems and jurisdictions, conflicts of legal traditions, norms or interpretations of international rules. Covers sources of international criminal law, as well as types of international crime, such as aggression, war crimes, genocide, crimes against humanity, crimes against the environment, theft of cultural property, etc. Examines international cooperation issues (extradition, mutual legal assistance, return of corruption-derived assets); the role of Interpol and Europol, as well as other standard-setting organizations; the International Criminal Court; and ad hoc tribunals.

CRIM 7334 Transnational Crime (3 SH)
Offers a comprehensive review of issues relative to misconduct that affects at least two countries at once and to its control. While most criminal justice professionals focus on problems related to domestic and local criminality, another type of serious and harmful criminality occurs at the transnational level. “International crimes” are violations of international laws, while the term “transnational crime” refers to violations of the laws of more than one country. This course covers the second types of law violations and seeks to familiarize students with the distinct types of causation, victimization, and control problems faced in the global age as nation-states become increasingly interdependent. This course brings together analyses from several disciplines, such as law, political science, economics, sociology, and history.

CRIM 7336 Globalization of Crime and Justice (3 SH)
Examines how globalization and internationalization affect crime and crime control in the United States (e.g., human trafficking) and the emerging field of “global criminology”, including the analysis of international and regional trends and differences in law, crime, and justice. Because of the globalization of economic markets, knowledge, information, and transportation, crime and control are changing in extent and nature. Global developments often directly affect and shape local crime problems and crime policies (“glocalization”).

CRIM 7338 Special Topics in Globalization and International Crime (3 SH)
Focuses on a particular aspect of globalization and international crime of contemporary interest. This course rotates biannually.
• Repeatability: May be repeated without limit.

CRIM 7340 Special Topics in Criminal Justice Organizations and Leadership (3 SH)
Focuses on a particular aspect of criminal justice organizations of contemporary interest. This course rotates biannually.
• Repeatability: May be repeated without limit.

CRIM 7400 Graduate Criminal Justice Capstone (3 SH)
Seeks to help students integrate knowledge of criminological theory and justice policy with the research skills gained while working toward completion of the graduate degree. Offers students an opportunity to demonstrate their mastery of knowledge in the field of criminology and criminal justice and synthesize this knowledge with practical skills. Successful completion of this course requires submission of a comprehensive research paper on a specific subject, as agreed upon by the instructor.
• Prerequisite: Criminal justice students and criminology and justice policy students only.

CRIM 7404 Research Methods and Statistics (3 SH)
Offers an integrated introduction to research methods and statistics in the social and behavioral sciences. Illustrates how the basic methods of research design, measurement, and data collection bear directly on how those data can be analyzed empirically. Offers students an opportunity to develop a methodological and statistical toolbox that can be used to read, understand, carry out, and critically analyze scientific research.

CRIM 7500 Internship 1 (3 SH)
Offers field placement in a criminal justice agency involving administrative, research, teaching, and related activities. Provides students with the opportunity to apply theoretical concepts in a practical, applied fashion by observing and contributing to the daily activities of operating agencies and organizations. All students work on at least one specific project at their field placement, and the results of this project are submitted to the graduate director.
• Prerequisite: CRIM 7200.
• Equivalent: CRIM 8400.

CRIM 7502 Internship 2 (3 SH)
Offers field placement in a criminal justice agency involving administrative, research, teaching, and related activities. Provides students with the opportunity to apply theoretical concepts in a practical, applied fashion by observing and contributing to the daily activities of operating agencies and organizations. All students work on at least one specific project at their field placement, and the results of this project are submitted to the graduate director.
• Prerequisite: CRIM 7200.
• Equivalent: CRIM 8402.

CRIM 7700 Practicum in Teaching (1 SH)
Provides weekly meetings for graduate student lecturers and faculty advisers to discuss common concerns and issues arising during the course of teaching. With input from the Center for Effective University Teaching, covers topics such as syllabus preparation, examination preparation and grading, classroom protocol, and student interaction. Required for all doctoral students teaching a class for the first time.
• Prerequisite: Criminal justice students only.
CRIM 7702 Practicum in Policy Analysis (1 SH)
Offers graduate students the opportunity to work with an outside agency and meet weekly with a faculty adviser to discuss common concerns, problems, and ideas related to policy analysis.

CRIM 7704 Practicum in Research (1 SH)
Provides weekly meetings for graduate students and faculty advisers to discuss common concerns, problems, and ideas related to launching their dissertation research projects. Discusses such topics as data access and quality, measurement, and research ethics.
• Prerequisite: Criminal justice students only.

CRIM 7706 Practicum in Writing and Publishing (2 SH)
Offers students an opportunity to develop and improve their academic writing skills while preparing a sole-authored article for potential publication. Requires each student to present a paper in-progress and, through an iterative process of review and revision, have it ready to submit to a journal by the end of the semester. Students comment, orally and in writing, on the papers presented by the other students over the course of the semester. There are regular assignments from leading texts on mechanics and style in writing and reflections on the peer-review and publication processes from multiple perspectives.
• Prerequisite: Restricted to students pursuing the PhD in criminology and justice policy or the MSCJ in criminology and criminal justice.
• Repeatability: May be repeated once.

CRIM 7710 Criminology and Public Policy 1 (3 SH)
Provides detailed coverage of theoretical criminology and its implications for public policy. Approaches the understanding of crime from an interdisciplinary perspective, with special attention given to recent theoretical developments. Emphasizes evaluating theory in light of empirical research, understanding the implications of theory and research for programs and policies of crime prevention and control, and evaluating current approaches to crime prevention and control.
• Equivalent: CRIM 7300.

CRIM 7711 Criminology and Public Policy 2 (3 SH)
Continues CRIM 7710. Provides detailed coverage of theoretical criminology and its implications for public policy. Approaches the understanding of crime from an interdisciplinary perspective, with special attention given to recent theoretical developments. Emphasizes evaluating theory in light of empirical research, understanding the implications of theory and research for programs and policies of crime prevention and control, and evaluating current approaches to crime prevention and control.
• Prerequisite: CRIM 7710; criminal justice students only.
• Equivalent: CRIM 7301.

CRIM 7713 Advanced Research and Evaluation Methods (3 SH)
Deals in detail with all aspects of evaluation research. Includes both process and outcomes evaluation models and a discussion of experimental and quasi-experimental designs. Students review both qualitative and quantitative approaches to evaluation design and discuss financial issues in program evaluation. Exposes students to methods to develop an evaluation research proposal.
• Prerequisite: Criminal justice students only.
• Equivalent: CRIM 7303.

CRIM 7715 Multivariate Analysis 1 (3 SH)
Builds upon the concepts of correlation and inference to present analytic procedures involving several variables, including multiple regression, logistic regression, causal analysis, and multiway ANOVA. Emphasizes the application of these methods with criminal justice data sets using statistical software programs.
• Equivalent: CRIM 7304 and CRIM 7306.

CRIM 7716 Multivariate Analysis 2 (3 SH)
Continues CRIM 7715. Covers more advanced multivariate analytic methods. Topics include principal components and factor analysis, discriminant analysis, MANOVA, time series, and cluster analysis. Emphasizes the application of these methods with criminal justice data sets using statistical software programs.
• Prerequisite: CRIM 7715; criminal justice students only.
• Equivalent: CRIM 7305.

CRIM 7718 Advanced Data Analysis (3 SH)
Designed to build upon the foundations provided by CRIM 7715 and CRIM 7716 with the goal of students becoming proficient with selected quantitative multivariate analysis techniques. Topics covered in this course include various general linear models, hierarchical linear models, and survival analysis. Requires substantial computer use as particular emphasis is placed on analyzing data using a variety of statistical programs. This is a PhD-level course.
• Prerequisite: CRIM 7716.
• Equivalent: CRIM 7310.

CRIM 7976 Directed Study (1 to 4 SH)
Offers the student the opportunity to bring individual, concentrated attention to a particular topic as arranged and agreed upon in advance by a faculty member and the student. This option is generally recommended when the student desires a more intensive analysis of a particular subject.
• Repeatability: May be repeated without limit.

CRIM 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
CRIM 7990 Thesis (6 SH)
Offers students electing to write a master’s thesis the opportunity to select a thesis topic with the advice of a faculty member and receive approval of the thesis topic from the graduate director.
• Repeatability: May be repeated without limit.

CRIM 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty.

CRIM 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare, under faculty supervision, for the PhD qualifying examination.

CRIM 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

CRIM 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

CRIM 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

CRIM 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CRIM 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

CRIM 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

CRIM 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

CRIM 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

CRIM 9990 Dissertation (0 SH)
Provides the student with the opportunity, under close faculty guidance, to conduct an original investigation of a criminal justice issue. Each student identifies a faculty chair and two additional faculty members who comprise the student’s Dissertation Committee. While the student conducts research and develops a dissertation, the committee provides support and direction and, ultimately, approves the final research product.
• Prerequisite: Criminal justice students only.
• Repeatability: May be repeated without limit.

CRIM 9996 Dissertation Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
• Repeatability: May be repeated without limit.

CULTURE (CLTR)

CLTR 1120 Introduction to Languages, Literature, and Culture (4 SH)
Examines the rich interconnections between literature and language and the culture that supports them. Discusses the relationship of language to literature and investigates how language and literatures are embedded in culture. Addresses several very broad and important questions, such as the relationship between language and culture; the relationship between language and thought; the definition of cultural relativism; and how ethical dilemmas are expressed in different cultures. Explores the relationship of esthetic and rhetorical traditions in given languages to the culture from which they sprang. In this context, examines the extremely interesting case of American Sign Language and how a gestural language sheds light on these issues.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture.

CLTR 1140 Italian Society through Film (4 SH)
Explores the past three decades of Italian society through film using screenings, lectures, and discussions. Topics covered include the European immigration crisis; complex Italian politics; the modern-day Mafia; and Italian societal constructs, including gender norms, the family, and workplace dynamics. Examines the relationship of filmmaking and society. Explores positionality from multiple lenses. Seeks to foster student reflection and critical thinking through guided discussions and writing assignments and to broaden students’ awareness of Italian culture and society by considering social and ethical concerns presented in films. Students examine human nature and social behavior in the face of globalization and social change in contemporary Italian society. Includes the works of influential Italian filmmakers, such as Comencini, Virzi, Ozpetek, Muccino, and Moretti.
• NUpath: Interpreting culture.
CLTR 1240 Latin American Film (4 SH)
Examines prizewinning Latin American films based on actual events, such as those that occurred during the Argentine military dictatorship of the 1970s, or works of fiction by well-known authors, such as Nobel Prize winner García Márquez. These films ably depict the history and culture of these countries. Conducted in English and the films are in Spanish with English subtitles.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: CINE 1240.

CLTR 1250 Introduction to Japanese Traditional Culture (4 SH)
Covers Japanese culture from ancient times through the 1930s. Studies and analyzes Japanese cultural practices, history, and texts. Offers a critical understanding and interpretation of the culture. Discusses Japan’s social and political institutions, historical processes, artistic traditions, and cultural exchange.
• NUpath: Interpreting culture, understanding societies and institutions.

CLTR 1260 Japanese Film (4 SH)
Provides an introduction to Japanese film through works by such great masters as Kurosawa, Mizoguchi, and Ozu, as well as works by new directors from the 1980s and 1990s such as Tami, Morita, and Suo. Studies both form and content; relates major works to Japanese culture. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: CINE 1260.

CLTR 1265 Spanish Civil War on Film (4 SH)
Introduces the Spanish film and provides an understanding of the Spanish Civil War (1936-1939). Uses a semiotic approach; studies images of the Spanish Civil War in photographs and posters to show how fictional and historical texts are transferred to the screen. Examines both documentaries and award-winning feature films by prominent Spanish directors. Demonstrates how the realism of the prominent Spanish directors is combined with surrealist imagery and metaphor to create a distinctive visual style. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: CINE 1265.

CLTR 1280 French Film and Culture (4 SH)
Provides an introduction to some of the qualities that have made French film one of the great national cinemas. Focuses on both form and content; relates outstanding directors’ major works to the French culture and society of their period. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture.
• Equivalent: CINE 1280.

CLTR 1290 Realism and Modernism in Italian Film (4 SH)
Examines postwar Italian film as a significant site of cultural production, a site where different—and powerful—social tensions, cultural conflicts, and ideological mandates manifest themselves as discourses and as messages whose goal is to shape and define culture. Uses the concepts of realism and modernism as two central modes of organizing cultural discourse. Examines realism and modernism as complex phenomena—as cultural dynamics, as aesthetic approaches, and as modes of philosophical thought. Analyses Italian films as sites that manifest realism and modernism in each of these dimensions. Seeks, in taking this culturalist approach to film, to place aesthetic production within a broader context than artistic expression—analyzing film style and practice instead as historically specific encounters between film practice and cultural context.
• NU Core: Humanities level 1.

CLTR 1500 Modern Chinese History and Culture (4 SH)
Introduces modern Chinese history and culture through literary works, films, and historical texts. Examines political, social, and cultural changes in China since 1800: the decline of empire; the New Culture Movement of the 1920s; the rise of nationalism and rural revolution; the changing roles of women; the Cultural Revolution of the 1960s; and China’s cinematic, literary, and economic engagement with the world since 1978. Taught in English and open to all undergraduates.
• Cross-list: HIST 1500.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: HIST 1500 and HIST 2350.

CLTR 1501 Introduction to French Culture (4 SH)
Offers a very broad introduction to French “culture,” by which is meant its principal “high” and “low” versions. An attempt is made to reproduce the knowledge base of a typical well-educated French man or woman. Highlights sports, politics, history, intellectual history, and the arts. Also addresses questions of cultural relativism. Students write a major paper on a subject chosen in conjunction with the professor.
• NU Core: Humanities level 1, comparative study of cultures.
CLTR 1502 Introduction to Arabic Culture (4 SH)
Designed to provide students with an in-depth survey of Arabic culture. Familiarizes students with the roots of one of the richest and oldest cultures but also seeks to satisfy their curiosity concerning certain social norms, patterns, and cultural traits in contemporary Arabic societies. Examines cultural manifestations ranging from the hijab (head covering), Jihad (holy struggle), human rights, polygamy, gender relations, public behavior, and many others by providing the historical backgrounds for these customs and traditions as well as exploring how they are now perceived in various Arab societies as well as in the West. Seeks to provide students with an appreciation for this multifaceted culture but most importantly a broad perspective on Arabic culture within the context of the universal human experience.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: CLTR 1150.

CLTR 1503 Introduction to Italian Culture (4 SH)
Examines chronologically the main aspects of Italian culture, concentrating on the Middle Ages, the Renaissance, and the modern, postunification period. Topics include art, philosophy, literature, architecture, film, and historical background. Other topics address significant personages in Italian culture, such as Dante, Boccaccio, Piero della Francesca, Leonardo da Vinci, Alberti, Pico della Mirandola, Michelangelo, and Machiavelli; the differences between northern and southern Italy; and the nature of Italy’s cultural heritage and its influence and status today. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.

CLTR 1504 Introduction to Spanish Culture (4 SH)
Examines chronologically the forces that have forged Spanish culture and have made Spain the nation it is today. Traces the development of Spain from the prehistoric caves of Altamira to the present. Observes past and present concerns such as divorce and abortion in a Catholic country, education, the role of women, linguistic diversity, separatism and terrorism, and the incorporation of Spain into the European Community. Incorporates history, sociology, anthropology, geography, economics, and politics. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.

CLTR 1505 Introduction to Latin American Culture (4 SH)
Introduces students to Latin American culture through the study of a broad array of literary and critical writings by Latin American authors and selected films from Latin America. Authors include Sor Juana, Garcia Marquez, and Jorge Amado. Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.

CLTR 1506 Introduction to Chinese Popular Culture (4 SH)
Provides a comprehensive examination of modern Chinese popular culture in the People’s Republic of China, Taiwan, and Hong Kong. From film to literature, from music to theatre, this course probes popular culture as it has manifested itself and traces its sociopolitical, aesthetic, and affective impact on modern China, with special attention to negotiations between the elite and the popular discourses.

CLTR 1508 Cuban History and Culture through Film (4 SH)
Offers an overview to Cuban history, culture, and society using a variety of films. Begins with the eighteenth century and issues of colonialism, slavery, and the struggle to create an independent Cuba. Features the early period of independence (1902–1925) and the overthrow of Machado (1933), as it is a period of great change and questioning about the island’s cultural and national identity. The latter part of the course focuses on post-1959 Cuba. Topics include colonialism and slavery, the pitfalls of national consciousness, gender relations, the mulatta in Cuba’s national culture, race relations, the importance of music in Cuban identity, aspects of Afro-Cuban culture, the nature of underdevelopment, homosexuality, social and political concerns in a revolutionary society, and Cuba in a new globalized environment.
• NU Core: Humanities level 1, comparative study of cultures.

CLTR 1509 An Introduction to Afro-Cuban Culture (4 SH)
Offers an overview to Afro-Cuban culture and history. Covers arrival of the first Africans, surge in the Atlantic trade, culture of the plantation, and the process of transculturation in Cuba, pre- and postabolition. Examines the philosophical and religious systems on the island: Regla de Ocha (Santería), the Abakuá society, and Regla de Palo (Mayombe, Kimbisa, Briyumba). Discusses slavery and racism in Cuba’s national identity, the intricacies of transculturation (hybrid cultural formations), the African dimensions of Cuban culture, ideas of exclusion and gender, as well as the extraordinary creativity of Afro-Cubans and their centrality to Cuba’s culture and history.
• NU Core: Humanities level 1, comparative study of cultures.
CLTR 1510 French Gastronomy and Culture (4 SH)
Analyze the relationship between gastronomy, good manners, and French society since the Middle Ages, which is deeply ingrained in French cultural fabric and celebrated around the world as French savoir-faire and savoir-vivre. Explores cultural practices and the role of religious, political, social, and economic forces in shaping the formation of self, class distinction and cultural capital, gender roles and identity construction, permanence and change, and myth and reality in times of transition. When relevant, the course compares the French experience with other countries’ modus operandi. Includes films; documentaries; an interview with a French chef; popular culture texts (cookbooks, menus, satirical food critic columns); and philosophical, historical, sociological, and literary texts from Stephen Mennell, Norbert Elias, Pierre Bourdieu, Anthelme Brillat-Savarin, Molière, Alexandre Dumas, and Emile Zola.
* NU Path: Interpreting culture, understanding societies and institutions.

CLTR 1515 Comparative Analysis of the Lusophone World and Culture (4 SH)
Examines the role of the Portuguese culture, with a particular emphasis on the cultural influences that have shaped the development of the Portuguese-speaking world, also called the “Lusophone” world. Addresses the presence of the Portuguese language and culture beyond national borders and the relevant Portuguese contribution for the movement of globalization. The course is conceived as a mixture of lectures and other cultural activities that can better provide students with an idea of what is Portuguese/Lusophone culture today and what it was in the past. Focuses primarily on the Lusophone Black Atlantic as a space of historical and cultural connections between Portugal, Brazil, and Africa.
* NU Core: Comparative study of cultures.

CLTR 1575 Jewish Film and Fiction (4 SH)
Examines books and short stories with Jewish themes, such as Goodbye Columbus and The Chosen, and some of the films based on those works. Offers students an opportunity to develop critical knowledge of key issues in modern Jewish identity—immigration, assimilation and intermarriage, anti-Semitism, and the Holocaust—through the lens of fiction and film.
* Cross-list: JWSS 1575.
* NU Core: Comparative study of cultures.
* Equivalent: JWSS 1575.

CLTR 1700 Introduction to Japanese Pop Culture (4 SH)
Provides an introduction to Japanese popular culture through critical analysis of mass media such as film, television, comics, and animation. Investigates various social and cultural issues, such as gender, family, and education. Films and videos supplement readings. Conducted in English.
* NU Core: Humanities level 1.

CLTR 1700 Introduction to Japanese Pop Culture (4 SH)
Effective Spring 2017
Provides an introduction to Japanese popular culture through critical analysis of mass media such as film, television, comics, and animation. Investigates various social and cultural issues, such as gender, family, and education. Films and videos supplement readings. Conducted in English.
* NU Core: Humanities level 1.
* NU Path: Interpreting culture.

CLTR 2001 World Cultures through Film (4 SH)
Introduces the study of world cinema from the past several decades as a form of artistic and cultural expression. Emphasizes the way that different ethnicities and cultures mix and even clash within national boundaries. Readings cover such topics as the postcolonial inheritance, immigration, the boundaries of class, the pressures of modernization, ethnic identities, and historical memory. Examines storytelling in its multicultural aspects and deals with the diverse influences of entertainment cinema and art cinema, as well as measures taken by countries to limit the influx of foreign films in order to protect their own cultural productivity. One overall concern of the course is the place of film in contemporary global culture.
* NU Core: Comparative study of cultures.
* NU Path: Interpreting culture, understanding societies and institutions.

CLTR 2280 French Film and World War II: The German Occupation of France (4 SH)
Explores the fascinating period of the German occupation of France, the so-called black years (années noires). Resistance, collaboration, national identity, and historical memory are still active subjects of debate in France by intellectuals, historians, novelists, and filmmakers. Offers students an opportunity to read historical and eyewitness accounts as well as short fiction to situate the films in context.

CLTR 2475 Gender in Latin American Film (4 SH)
Explores gender in Latin America as represented in film, which often reflects how society experiences political and social upheavals. Discusses gender in this context as a focus of power and social legitimacy, a means of collective identity formation, a factor in the allegorization of a nation, and as a nexus of change. Discusses how representations of gender, sexuality, and sexual transgression are utilized to facilitate national mythmaking within national cinemas. Discusses different visions of masculinity, femininity, and transgendered identity and looks at films by and for women in Latin America and other non-dominant-gendered identities. Offers students an opportunity to understand how dominant ideology can be questioned, challenged, and revolutionized through filmic representation.
* Prerequisite: CINE 1200 or CINE 1895 (either may be taken concurrently).
* NU Core: Comparative study of cultures.
CLTR 2501 Chinese Film: Gender and Ethnicity (4 SH)
Introduces students to cultural, cross-cultural, intellectual, and social issues that lead them to an informed understanding of Chinese film. Selected films are organized under the topics of gender, ethnicity, and urbanity. Outstanding directors are examined closely to illustrate these topics. Conducted in English.
- NU Core: Comparative study of cultures.
- Equivalent: CINE 2501.

CLTR 2504 Modern German Film and Literature (4 SH)
Introduces contemporary issues in German culture. Studies the importance of the Faust legend. Considers major novels. Also considers stories and poems by Böll, Grass, Mann, and Brecht as adapted by a new generation of filmmakers: Fassbinder, Schlondorff, Sanders-Brahms, and Wenders. Conducted in English.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Comparative study of cultures, writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: CINE 2504.

CLTR 2505 Berlin in German Film and Culture (4 SH)
Focuses on the evolution of Germany’s film aesthetic in relation to German cultural issues and touches on the “new German film” of the postwar era in the West, the influence of neorealism in the East, and the melding of these different traditions in the film of reunified Germany. The centrality of Berlin in Germany’s culture and history is reflected in the many films that have used the city as backdrop, from Ruttman’s silent masterpiece Berlin, Symphony of a Great City through the flowering of German expressionist cinema and on to World War II, divided Germany, and reunification. Studies directors such as Wenders, Klein, Sanders-Brahms, Fassbinder, Dresen, von Trotta, von Donnersmarck, Becker, and Tykwer.
- NU Core: Comparative study of cultures.

CLTR 2510 Brazilian Culture through Film (4 SH)
Offers an overview of Brazilian film that historically covers the period from colonial times to the present. Twentieth-century themes include issues such as youth and street violence, popular culture and music, religion, the role of women, political and social struggles, homosexuality, cultural identity, and human rights.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, understanding societies and institutions.

CLTR 2715 New Literary and Cinematic Narratives in Latin America (4 SH)
Focuses on film, literature, and new media. Offers a panoramic view of the Latin American cultural production of the last twenty-five years, attempting to characterize the variety of styles and trends. Relates the texts and movies to the sociological, political, and economic issues of the moment, i.e., implementation of neoliberal democracies, globalization, neocolonialism, resistance, and new social movements, etc. Studies links between Latin America and the United States and between Latin America and Spain. Concentrates on reading/watching texts written by relatively “young authors.” The course is both international and interdisciplinary and is taught in English.
- NU Core: Comparative study of cultures.

CLTR 2725 Representing Violence and Human Rights in Latin America (4 SH)
Addresses the topics of historical memory and human rights through basic theoretical texts about the concept of violence, memory, and human rights. Students watch films and documentaries and read novels, testimonies, short stories, and poems of several artistic movements, focusing on how violence is represented/visualized in these texts and how it relates to the social, economic, and political situation in Latin America. Studies four moments in recent Latin American history: Mexico 1968; Shining Path and Peru in the 1980s and 1990s; the genocide in Guatemala; and the dictatorships in the Southern Cone. Taught in English.
- NU Core: Comparative study of cultures.

CLTR 3450 Israeli and Palestinian Film (4 SH)
Seeks to open up a dialogue between two cultures that coexist in the same geographical space: the Israeli and the Palestinian. Explores questions of history, identity, conflict, and coexistence through documentary and fiction films. Films are contextualized through extensive readings in secondary sources, poetry, and works of fiction. Requires students to complete several short papers and a final research paper.
- Prerequisite: Sophomore standing or above.
- NU Core: Comparative study of cultures.
- Equivalent: CINE 3450.

CLTR 3500 French Culture and the Arts (4 SH)
Designed to provide students with an overview of French culture with a particular focus on its rich artistic heritage as manifested down through history and in popular culture today. Includes such areas as language, art, architecture, cinema, music, literature, urban and landscape design, fashion, folklore, rites, rituals, and customs. Studies the distinctive characteristics of France’s many regions in light of their contributions to the vast tapestry that comprises French culture. Conducted in French.
- Prerequisite: FRNH 2102 or FRNH 2302.
- NU Core: Comparative study of cultures.
CLTR 3510 Spanish Culture and the Arts (4 SH)
Designed to provide students with an overview of Spanish culture with a particular focus on its rich artistic heritage as manifested down through history and in popular culture today. Includes such areas as language, art, architecture, cinema, music, literature, urban and landscape design, fashion, folklore, rites, rituals, and customs. Studies the distinctive characteristics of Spain’s many regions in light of their contributions to the vast tapestry that comprises Spanish culture. Conducted in Spanish.
• Prerequisite: SPNS 2102 or SPNS 2302.
• NU Core: Comparative study of cultures.

CLTR 3710 Representing Latin American Cities (4 SH)
Examines how several Latin American cities have been imagined, represented, written and sung about, and filmed by studying different cultural artifacts and manifestations. Examines works from the fourteenth century until today (from newspapers and popular poetry to blogs and tweets, from paintings to films, from novels to graffiti, from sports to food) that deal in different ways with the “idea” and “imagination” of the cities from their foundation to the present. This is an interactive course and is taught in Spanish.
• Prerequisite: SPNS 2102.
• NU Core: Comparative study of cultures.

CLTR 3715 New Narratives: Latin America after 1989 (4 SH)
Focuses on film, literature, and new media. This course offers a panoramic view of the Latin American cultural production after 1989, attempting to characterize the variety of styles and trends. Relates the texts and movies to the socio, political, and economic issues of the moment, i.e., implementation of neoliberal democracies, globalization, neocolonialism, resistance, new social movements, etc. Also studies links between Latin America and the United States and between Latin America and Spain. Focuses on texts written by relatively young authors. Taught in Spanish.
• Prerequisite: SPNS 2102.
• NU Core: Comparative study of cultures.

CLTR 3720 Literature, Arts, and Poverty in Latin America (4 SH)
Focuses on the construction, characteristics, and representation of poverty/the poor in Latin American texts from the thirties and sixties and in the works of contemporary Latin American writers and film directors. Discusses the relation of these works to a “realist tradition” by studying social, political, and cultural aspects of Latin America from the nineteenth and twentieth centuries. Considers whether we are facing a new kind of realism. Also engages the problem of representation, the “role of literature” (ethics and literature), and its relation with politics and the global economy (literature and the market) in the Latin American context. Taught in Spanish.
• Prerequisite: SPNS 2102.
• NU Core: Comparative study of cultures.

CLTR 3725 Representing Violence and Human Rights in Latin America (4 SH)
Studies the idea of violence and how it relates to the social, economic, and political situation in Latin America. Students watch films and documentaries and read novels, testimonies, short stories, and poems of several artistic movements to study how violence is represented/visualized in these texts. Also addresses the topics of historical memory and human rights by using basic theoretical texts about the concept of violence, memory, and human rights. Studies four moments in recent Latin American history: Mexico 1968, Shining Path and Peru in the 1980s and 1990s, the genocide in Guatemala, and the dictatorships in the Southern Cone. Taught in Spanish.
• Prerequisite: SPNS 2102.
• NU Core: Comparative study of cultures.

CLTR 3930 Topics in International Cinema (4 SH)
Studies international directors, or the cinema of a specific country or ethnic group outside the United States. Students meet for weekly screenings, discussions, and lectures.
• Repeatability: May be repeated without limit.
• Equivalent: CINE 3930.

CLTR 4507 Afro-Cuban Culture—International Study (4 SH)
Offers students an opportunity to obtain fundamental knowledge of the legacy of African-based cultures in Cuba, from historical to contemporary times. Examines origins of Africans in Cuba, including study of plantation culture, transculturation, African-derived religions, the visual arts, music literature, images of blacks in film and the mass media, and African-derived culture in Cuban daily life. Also includes visits to temples and other ritual spaces, meetings with writers, encounters with artistic troupes, meetings with priests or priestesses, visits to cultural organizations, and possible participation in rituals or ceremonies (tambor, cajón, violin).
• NU Core: Comparative study of cultures.
• Equivalent: AFAM 4507.

CLTR 4508 Cuban History through Film—International Study (4 SH)
Offers an overview of Cuban history using Cuban films. Covers the colonial period through times of slavery and the nineteenth-century struggles for independence. Proceeds to the twentieth century, first the republican period (1902–1959), then the revolutionary period (1959 to the present). Touches on topics such as colonialism, slavery, race, women in Cuban history, the anti-Batista struggles of the fifties, underdevelopment, exile, homosexuality, Cuba in the “Special Period” (1991–2005), problems of personal freedom, and identity in revolutionary societies. Also includes visits to historical museums, buildings, monuments, and parts of Havana that reveal the country’s history.
• NU Core: Comparative study of cultures.
• Equivalent: CINE 4508 and HIST 4508.
CLTR 4944 Cultural Engagement Abroad (4 SH)
Designed for a language-based Dialogue of Civilizations. Complements the intensive language course that students take while on a language-based Dialogue. Offers students an opportunity to obtain an in-depth knowledge of the contemporary culture(s) of the country of the Dialogue and how that culture differs from or is similar to contemporary American cultural values and practices. In addition to regular in-class lectures and activities, offers structured opportunities to engage in dialogue with businesspeople, scholars, educators, artists, government officials, journalists, students, senior citizens, and/or local residents about their perspectives on various topics and issues.
• NU Core: Humanities level 1.
• Repeatability: May be repeated up to 3 times.

CLTR 4983 Special Topics in Culture (4 SH)
Covers special topics in culture.
• Repeatability: May be repeated without limit.

CLTR 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

CLTR 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

LITR 1150 Muslim Writers and the Qur’an (in English Translations) (4 SH)
Covers selected writers who fairly represent a wide range of Muslim attitudes to the Qur’an. Muslim writers use the Qur’an for political and social criticism, question Qur’anic texts related to the status of women, or question the authenticity of the Qur’an itself. After 9/11, however, Muslim writers in the West have presented characters who find in the Qur’an a source of positive powers. Readings are drawn from works such as the following: Leila Aboulela, Minaret; Monica Ali, Brick Lane; Gamal Al-Ghitani, Zayni Barakat; Tehmina Durrani, Blasphemy; Nuruddin Farah, Maps; Taha Hussein, An Egyptian Childhood; Yusuf Idris, “A House of Flesh”; C. H. Kane, Ambiguous Adventure; Hanif Kureishi, The Black Album and “My Son the Fanatic”; Naguib Mahfouz, The Children of the Alley.
• NU Core: Humanities level 1.

LITR 1250 Dante’s Inferno and Medieval Italian Culture (4 SH)
Introduces an overview of Dante’s Commedia focusing on the first book, “Inferno,” read in English translation. Examines the descending stages of hell; their meanings; and their social, political, and historical relevance for Dante’s society. Dante’s Divina Commedia created a powerful world, one that had a deep meaning for both the author and the reader of that time. But can one so easily understand it as constructed by the Commedia in the Middle Ages? Does Dante’s world have relevance today as well? Some scholars may say it does more so than ever. If so, how? Through analysis of selected chapters (Canti), students have an opportunity to attempt to establish their possible relevance to the modern human condition and perhaps even to themselves. 
• NU Core: Humanities level 1.

LITR 1260 Caribbean Literature and Culture (4 SH)
Provides a comparative introduction to the modern literary traditions of the Spanish-, English, and French-speaking Caribbean. Includes authors such as Carpenter (Cuba), Naipaul (Trinidad), Zobel (Martinique), and Cardenal (Nicaragua). Conducted in English.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: LITR 3501.

LITR 3500 International Perspectives (4 SH)
Uses major representative works of fiction from the modern European tradition to introduce students to an array of theoretical and critical perspectives (cognitivism, Marxism, formalism, and identity politics). Major authors include Dostoevsky, Mann, Kafka, Camus, Duras, and Achebe. Team-taught in English by members of the modern language department. Serves as an introduction to literature for language majors, who can get credit in their field of concentration by reading some of the works in the original language.

LITR 3502 Cervantes and His Times (4 SH)
Introduces students to Don Quixote de la Mancha, Cervantes’ major work as well as Spain’s greatest masterpiece and its supreme gift to Western culture. Studies Cervantes’ minor works, The Exemplary Novels and Interludes. Examines literary, sociological, philosophical, and historical matters: the development of the novel, genre and narratology, role-playing and representation, and Spain’s triumphs and defeats. Deals with the Spanish Inquisition and censorship, and examines themes such as madness, truth and lying, and appearance and reality. Conducted in English.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) SPNS 2102 and (c) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
LITR 3503 Russian Literature in Translation (4 SH)
Surveys and analyzes in English the major works of Russian literature of the nineteenth and twentieth centuries, with emphasis on the historical context. Selected writers include Pushkin, Gogol, Turgenev, Dostoevsky, Tolstoy, and Chekhov.
• Prerequisite: Sophomore standing or above.
• Equivalent: HIST 2385.

LITR 4550 From Knights to Revolution (4 SH)
Introduces major works of French literature from the Middle Ages up through the eighteenth century. Textual analysis, examination of the social and historical context of these works, and explanations of literary terms and devices through readings and class discussions are designed to contribute to the understanding and appreciation of this body of French literature.
• Prerequisite: FRNH 3101.

LITR 4551 Modern French and Francophone Literature (4 SH)
Introduces major works of French literature from the nineteenth century on. Textual analysis, examination of the social and historical context of these works, and explanations of literary terms and devices through readings and class discussions are designed to contribute to the understanding and appreciation of this body of French literature.
• Prerequisite: FRNH 3101.

LITR 4555 French Poetry (4 SH)
Provides students with a survey of French poetry through the ages, focusing on representative works of the major French poets. Studies poems in their literary and historical context with an examination of various aspects of French versification. Conducted in French.
• Prerequisite: LITR 4551.

LITR 4560 Masterpieces of Spanish Literature: Eighteenth–Twentieth Century (4 SH)
• Prerequisite: SPNS 3101.

LITR 4561 Masterpieces of Spanish Literature: Twelfth–Seventeenth Century (4 SH)
Traces the development of Spanish literature from the Middle Ages (las jarchas, El poema del Cid, El libro de buen amor, La Celestina) through the Renaissance and Baroque periods or Golden Age (Garcilaso de la Vega, the picaresque novel, the mystics, Cervantes, Lope de Vega, Calderon). Conducted in Spanish.
• Prerequisite: SPNS 3101.

LITR 4565 Spanish Golden Age (4 SH)
Examines plays by the outstanding dramatists of the seventeenth century in Spain: Lope de Vega, Calderón de la Barca, Tirso de Molina, Ruiz de Alarcón, and others. Conducted in Spanish.
• Prerequisite: LITR 4560.

LITR 4565 Latin American Literature (4 SH)
Offers an overview of the major trends in Latin American literature, from Bernal Diaz through Borges and Vargas Llosa. Studies broad cultural and political contexts, especially the effect of colonization. Conducted in Spanish.
• Prerequisite: SPNS 2101.

LITR 4570 The Splendid Century (4 SH)
Presents a study of the golden age of French literature in seventeenth-century France, spanning the baroque and classical periods, and evoking the grandeur of the era of Louis XIV and Versailles. Readings cover a rich and diverse body of literature encompassing poetry, theatre, philosophy, the novel, and epistolary writing. The authors studied include Corneille, Racine, Moliere, Descartes, Pascal, and La Rochefoucauld. Conducted in French, with English permitted.
• Prerequisite: LITR 4551.

LITR 4580 Age of Enlightenment (4 SH)
Studies the eighteenth century in France: the Enlightenment. It was an age of challenge to established authority, institutions, and modes of thought. This intellectual and political vitality is reflected in works of Marivaux, Fontenelle, Montesquieu, and Voltaire. It is followed by the awakening of the Romantic sensibility as found in such authors as Diderot, Rousseau, and Bernardin de St. Pierre. Conducted in French, with English permitted.
• Prerequisite: LITR 4551.

LITR 4587 Romantic Heritage (4 SH)
Treats French Romanticism and its aftermath from a literary and cultural standpoint. Examines Romanticism in poetry and drama, as well as its continuation into the realist novel. Readings include the works of Lamartine, Hugo, Balzac, and Flaubert. Also explores the development of the Parnassian and Symbolist movements. Readings include the works of Baudelaire, Verlaine, Rimbaud, and Mallarmé, precursors of all modern literature. Conducted in French, with English permitted.
• Prerequisite: LITR 4551.

LITR 4983 Special Topics in Literature (4 SH)
Covers special topics in literature.
• Repeatability: May be repeated without limit.
LITR 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

DATA SCIENCE (DS)

DS 4100 Data Collection, Integration, and Analysis (4 SH)
Studies how to collect data from multiple sources and integrate them into consistent data sets. Covers how to use semi-automated and automated classification to integrate disparate data sets; how to parse data from files, XML, JSON, APIs, and structured data stores to construct analyzable data sets that are stored in databases; and how to assess and ensure quality of data. Introduces key concepts of algorithms and data structures, including divide-and-conquer, sorting and selection, and graph traversal and descriptive analysis of data through descriptive statistics and plotting. Analyzes complexity and run-time behavior of programs. Presents approaches for data anonymization and protecting data privacy. Studies data shaping and manipulation techniques for data analysis and the R and Python programming languages.
• Prerequisite: CS 2510.
• NUpath: Analyzing and using data.

DS 4200 Information Presentation and Visualization (4 SH)
Introduces foundational principles, methods, and techniques of visualization to enable creation of effective information representations suitable for exploration and discovery. Covers the design and evaluation process of visualization creation, visual representations of data, relevant principles of human vision and perception, and basic interactivity principles. Studies data types and a wide range of visual data encodings and representations. Draws examples from physics, biology, health science, social science, geography, business, and economics. Emphasizes good programming practices for both static and interactive visualizations. Creates visualizations in Excel and Tableau as well as R, Python, and open web-based authoring libraries. Requires programming in Python, JavaScript, HTML, and CSS. Requires extensive writing including documentation, explanations, and discussions of the findings from the data analyses and the visualizations.
• Prerequisite: DS 4100.
• NUpath: Analyzing and using data, writing intensive in the major.

DS 4300 Large-Scale Information Storage and Retrieval (4 SH)
Introduces data and information storage approaches for structured and unstructured data. Covers how to build large-scale information storage structures using distributed storage facilities. Explores data quality assurance, storage reliability, and challenges of working with very large data volumes. Studies how to model multidimensional data. Implements distributed databases. Considers multitier storage design, storage area networks, and distributed data stores. Applies algorithms, including graph traversal, hashing, and sorting, to complex data storage systems. Considers complexity theory and hardness of large-scale data storage and retrieval. Requires use of nonrelational, document, key-column, key-value, and graph databases and programming in R, Python, and C++.
• Prerequisite: CS 3200 and DS 4100.
• NUpath: Analyzing and using data.

DS 4400 Machine Learning and Data Mining 1 (4 SH)
Introduces supervised and unsupervised predictive modeling, data mining, and machine-learning concepts. Uses tools and libraries to analyze data sets, build predictive models, and evaluate the fit of the models. Covers common learning algorithms, including dimensionality reduction, classification, principal-component analysis, k-NN, k-means clustering, gradient descent, regression, logistic regression, regularization, multiclass data and algorithms, boosting, and decision trees. Studies computational aspects of probability, statistics, and linear algebra that support algorithms, including sampling theory and computational learning. Requires programming in R and Python. Applies concepts to common problem domains, including recommendation systems, fraud detection, or advertising.
• Prerequisite: (a) DS 4300 and (b) ECON 2350, ENVR 2500, MATH 3081, or PSYC 2320.
• NUpath: Analyzing and using data.

DS 4420 Machine Learning and Data Mining 2 (4 SH)
Continues with supervised and unsupervised predictive modeling, data mining, and machine-learning concepts. Covers mathematical and computational aspects of learning algorithms, including kernels, time-series data, collaborative filtering, support vector machines, neural networks, Bayesian learning and Monte Carlo methods, multiple regression, and optimization. Uses mathematical proofs and empirical analysis to assess validity and performance of algorithms. Studies additional computational aspects of probability, statistics, and linear algebra that support algorithms. Requires programming in R and Python. Applies concepts to common problem domains, including spam filtering.
• Prerequisite: DS 4400.
• NUpath: Analyzing and using data.
**DS 4900 Data Science Senior Project (4 SH)**
Designed to help students develop a sophisticated understanding of data collection, integration, storage, statistical analysis, visualization, and machine-supported analysis and modeling. Requires students to analyze a substantial data set using statistical and visual methods and to build machine-learning models to discover patterns in the data. Results must be communicated in writing. Requires substantial programming in R, Python, Java, or C++.
- **Prerequisite:** DS 4200 and DS 4420 (which latter may be taken concurrently).
- **NUpath:** Analyzing and using data, writing intensive in the major, demonstrating thought and action in a capstone.

**DS 6020 Collecting, Storing, and Retrieving Data (4 SH)**
Studies how to build large-scale information repositories of different types of information objects so that they can be selected, retrieved, and transformed for analytics and discovery, including statistical analysis. Analyzes how traditional approaches to data storage can be applied alongside modern approaches that use nonrelational data structures. Through case studies, readings on background theory, and hands-on experimentation, offers students an opportunity to learn how to select, plan, and implement storage, search, and retrieval components of large-scale structured and unstructured information repositories. Emphasizes how to assess and recommend efficient and effective large-scale information storage and retrieval components that provide data scientists with properly structured, accurate, and reliable access to information needed for investigation.
- **Prerequisite:** Not open to MSCS students.
- **Equivalent:** DSCS 6020.

**DS 6030 Introduction to Data Mining/Machine Learning (4 SH)**
Introduces the fundamental techniques for data mining, combining elements from CS 6140 and CS 6220. Discusses several basic learning algorithms, such as regression and decision trees, along with popular data types, implementation and execution, and analysis of results. Lays the data analytics program foundation of how learning models from data work, both algorithmically and practically. The coding can be done in R, Matlab or Python. Students must demonstrate ability to set up data for learning, training, testing, and evaluating.
- **Prerequisite:** Not open to MSCS students.
- **Equivalent:** DSCS 6030.

**DEAF STUDIES (DEAF)**

**DEAF 1500 Deaf People in Society (4 SH)**
Focuses on Deaf communities as linguistic and cultural minorities. Topics include perspectives on Deaf communities, attitudes toward Deaf people and sign languages, technology and communication, the contributions of Deaf people to society, professional and social organizations of and for Deaf people, Deaf clubs as a locus of Deaf culture, communication issues, perspectives on legislation affecting the Deaf community, legislative and political concerns of the Deaf community, and the impact of educational options for Deaf children.
- **NU Core:** Humanities level 1, comparative study of cultures.
- **NUpath:** Interpreting culture, engaging difference and diversity.

**DEAF 1550 Dynamics of the Deaf/Blind Community: Culture, History, and Communication (4 SH)**
Explores the multidimensional aspects of the Deaf/Blind community, culture, communication, and history (dynamics of how society has handled individuals who are Deaf/Blind). Topics are studied from the Deaf/Blind perspective and include oppression and its power structures; empowerment vs. “rescue or fix it”; the loss of sight and its impact on communication; and learning about empathy and the courage of vulnerability. Explores Deaf/Blind culture and the grieving process as an ongoing component of life; different types of Deaf/Blindness and diverse styles of communication; and mobility issues and maintaining independence. A brief introduction to sighted guide techniques and technology available.
- **NU Core:** Humanities level 1, comparative study of cultures.

**DEAF 2500 Deaf History and Culture (4 SH)**
Surveys the history and culture of the American Deaf community and Deaf people in the Western world. Focuses on educational, political, and technological forces and events that have positively and negatively affected the American Deaf community. Focuses on the American Deaf community as a linguistic and cultural minority. Also examines contemporary values and factors that shape and define the American Deaf community and compares and contrasts American Deaf cultural values with those of American society in general.
- **NU Core:** Comparative study of cultures.
- **NUpath:** Interpreting culture, engaging difference and diversity.
DEAF 2700 ASL Linguistics (4 SH)
Introduces the basic issues in linguistics by examining the structural properties of American Sign Language and comparing it with other languages having similar properties. Includes phonology (formational properties of signs), morphology (word formation, rules, derivation, inflection, complex verbs, classifiers, and verb modulations), semantics (the meaning structure of signs), and syntax (the structure of ASL utterances in terms of old vs. new information and the structure of ASL narratives).
- Prerequisite: (a) LING 1150 or ENGL 1150 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: LING 2700.

DEAF 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

EARTH AND ENVIRONMENTAL SCIENCES (ENVR)

ENVR 1000 Marine and Environmental Sciences at Northeastern (1 SH)
Intended for first-year students in the College of Science. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
- Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, INSC 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

ENVR 1101 Environmental Science (4 SH)
Focuses on the complex array of topics that collectively form the discipline of environmental science. Emphasizes the problems facing today’s natural, human-managed, and coupled human/natural ecosystems and the solutions to those problems. Studies the human dimensions of environmental science, including culture, politics, worldviews, ethics, and economics, particularly within the context of global climate change. Offers students an opportunity to learn to analyze data as a means of exploring relationships among societal and ecological drivers affecting economic, ecological, and socioeconomic stability; to learn how the scientific method is used to separate fact and data from opinion; and to apply these methods to explore the causes and solutions to global climate change.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world, analyzing and using data.
- Equivalent: EVRN 1101 and GEOL 1101.

ENVR 1103 Age of Dinosaurs (4 SH)
Utilizes evidence from the sedimentary rock record to evaluate and to interpret significant biological and physical events in Mesozoic earth history. Changes in the Earth’s landscape due to variations in climate, plate tectonics, and sea level provide the background for detailed consideration of Mesozoic life. Emphasizes the evolutionary history of dinosaurs and provides detailed data for testing hypotheses of evolutionary mechanisms, paleobiogeography, functional anatomy, ecology and community structure, and extinction and extinction models.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: GEOL 1103.

ENVR 1104 Natural Disasters and Catastrophes (4 SH)
Provides an overview of what we know about the causes, locations, and effects of some of the most important natural disasters such as earthquakes, floods, and hurricanes. Also examines how loss of life and property damage can be minimized by implementing geologic knowledge. Briefly examines less common but possibly more devastating catastrophes such as large volcanic eruptions, large meteorite impacts, and rapid climate change.
- NU Core: Science/technology level 1.
- Equivalent: GEOL 1104.
ENVR 1110 Global Climate Change (4 SH)
Analyzes Earth’s modern climate system and natural climate change over Earth’s 4.5-billion-year history. Examines ongoing and future climate change. Includes expected impacts of the predicted climate changes as well as mitigation and adaptation options.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world, analyzing and using data.
- Equivalent: GEOL 1110.

ENVR 1111 Weather and Climate (4 SH)
Discusses the patterns and processes that combine to produce our daily weather and how weather integrates over time to define climate. Identifies natural and human-made causes of climate change.
- NU Core: Science/technology level 1.
- Equivalent: GEOL 1111.

ENVR 1112 Environmental Geology (4 SH)
Investigates geologic processes such as flooding, volcanic eruptions, and earthquakes, as well as strategies for safer land use incorporating geologic information. Exercises completed and discussed in class offer hands-on experience with evaluating geologic factors that impact land use and formulating hazards mitigation strategies. Offers students an opportunity to increase their understanding of problems resulting from the interaction of humans with the geologic environment and how we can more appropriately interact with it.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world, analyzing and using data.
- Equivalent: GEOL 1112.

ENVR 1120 Oceans and Coasts (4 SH)
Explores the marine and coastal realm and the problems that arise from the human-marine relationship. Begins by studying the history of the ocean and ends with how to create a more sustainable marine world. Topics covered include ocean and estuarine circulation, climate change and ocean response, and the plant and animal life thriving in different parts of the ocean. Includes reading and analyzing the scientific literature, developing and presenting research projects, and group work.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: GEOL 1120.

ENVR 1121 Marine Resources (4 SH)
Provides a qualitative and quantitative survey of renewable and nonrenewable resources from the sea. Topics include coral reefs, shellfish, marine mammals, sharks, sport and recreational fishing, clams, lobsters, shrimp, toxic seafood, energy from the ocean, ocean pollution, shore erosion, beaches, coastal zone recreation, marine law, and law of the sea.
- NU Core: Science/technology level 1.
- Equivalent: GEOL 1121.

ENVR 1140 Physical Geography (4 SH)
Introduces physical geography for students in history, political science, economics, or other social sciences who intend to pursue a career in education or other social sciences.
- NU Core: Science/technology level 1.
- Equivalent: GEOL 1140.

ENVR 1145 Volcanoes (4 SH)
Offers students an opportunity to understand how volcanoes work, why volcanoes occur, where volcanoes occur, and what their impacts have been throughout human history and prehistoric times. Also address strategies for safer land use around active volcanoes.
- NU Core: Mathematical/analytical thinking level 1, science/technology level 1.
- NUpath: Engaging with the natural and designed world.

ENVR 1200 Dynamic Earth (4 SH)
Offers a systematic study of the materials and systems comprising the earth. Emphasizes the processes that form, transport, alter, and destroy rocks, as well as the nature and development of landscape. Plate tectonics theory is introduced as a guiding paradigm in geology.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: GEOL 1200.

ENVR 1201 Lab for ENVR 1200 (1 SH)
Accompanies ENVR 1200. Covers exercises pertaining to mineral and rock identification and topographic and geologic map interpretation. Required for environmental geology and geology majors.
- Prerequisite: ENVR 1200 (which may be taken concurrently).
- Equivalent: GEOL 1201.
ENVR 1202 History of Earth and Life (4 SH)
Traces biological and environmental development of the earth over the past 4.6 billion years using evidence preserved in the rock record. A primary goal is to understand how geoscientists interpret earth history by learning how to test hypotheses and develop explanations for events that occurred far in the geologic past. Examination of major earth systems, the biosphere, lithosphere, atmosphere and hydrosphere, reveals how they interact to control the origin of earth, the origin and evolution of life, the causes and effects of extinction, plate tectonics and mountain building, and climate change over earth history.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: GEOL 1202.

ENVR 1203 Interpreting Earth History (1 SH)
Focuses on students using sedimentary rocks, fossils, and geologic maps and stratigraphic sections to record and to interpret events in earth history.
- Equivalent: GEOL 1203.

ENVR 1445 Environment and Humankind (4 SH)
Offers an ecological analysis of human interaction with other organisms. Presents the necessary foundation of biological principles.
- NU Core: Science/technology level 1.
- Equivalent: BIOL 1145.

ENVR 2310 Earth Materials (4 SH)
Describes the physical and chemical characteristics of common rock-forming minerals and geologic processes that form rock and soils in the igneous, sedimentary, and metamorphic environments. Focuses on commonly encountered minerals, soil, and rock types and how these are used to interpret past and present earth processes. This is a writing-intensive course with a required term paper.
- Prerequisite: (a) ENVR 1101, ENVR 1112, or ENVR 1200 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: GEOL 2310.

ENVR 2311 Lab for ENVR 2310 (1 SH)
Accompanies ENVR 2310. Cover topics from the course through various experiments.
- Equivalent: GEOL 2311.

ENVR 2340 Earth Landforms and Processes (4 SH)
Focuses on the origin and evolution of landscape features by processes operating at or near the earth’s surface. Exercises introduce interpretation of air photos, topographic maps, remotely sensed data, and digital elevation models.
- Prerequisite: ENVR 1200.
- Corequisite: ENVR 2341.
- Equivalent: GEOL 2340.

ENVR 2341 Lab for ENVR 2340 (1 SH)
Accompanies ENVR 2340. Covers topics from the course through various experiments.
- Corequisite: ENVR 2340.
- Equivalent: GEOL 2341.

ENVR 2500 Biostatistics (4 SH)
Offers an overview of traditional and modern statistical methods used to analyze biological data using the free and open-source R programming environment. Lectures describe core statistical approaches and discuss their suitability for understanding patterns that arise at different levels of biological organization, from cellular processes to whole ecosystems. Supervised lab sessions offer students an opportunity to develop the R programming skills required to analyze the complex datasets that often emerge when addressing cutting-edge questions in biology. Topics include basic probability and sampling theory, experimental design, null hypothesis significance testing, t-tests and ANOVA, correlation and regression, Monte Carlo simulations, likelihood, generalized linear models, model selection, and information theory.
- Corequisite: ENVR 2501.
- NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

ENVR 2501 Lab for ENVR 2500 (1 SH)
Accompanies ENVR 2500. Offers supervised lab sessions demonstrating how topics covered in the lectures can be addressed in the R programming environment.
- Corequisite: ENVR 2500.

ENVR 2900 Special Topics in Environmental Studies (4 SH)
Studies various topics on environmental issues.
- Prerequisite: Sophomore standing or above.
- Repeatability: May be repeated without limit.
ENVR 2940 Oceans in the Global Carbon Cycle (4 SH)
Examines the role of the oceans in the climate system, addressing topics such as the global carbon cycle, the thermohaline circulation, and aspects of global change including warming and sea level rise. As a sink and a buffer for carbon dioxide in the atmosphere, and as a major mechanism of heat transport between the equator and high latitudes, the role of the oceans in setting the Earth’s climate is indisputable.
• Prerequisite: Acceptance into the SEA Semester Program and completion of three lab science courses.
• Equivalent: GEOL 2940.

ENVR 2941 Ocean Science and Public Policy (4 SH)
Provides students with a fundamental understanding of the intersection between climate change and government policy. After an introduction to the development of maritime law and sovereignty on the high seas, students examine why societies funded oceanic research, far from home territory, in the first place. The course also explores the interrelationship between science and government policy through selected case studies including the UN Conference on the Law of the Sea, the Intergovernmental Panel on Climate Change, the Kyoto Protocol, and cases presented in the World Court relating to industrialized nations’ greenhouse gas emissions and sea level change in the Pacific.
• Prerequisite: Acceptance into the SEA Semester Program.
• Equivalent: GEOL 2941.

ENVR 2942 Maritime History and Culture: The Caribbean (4 SH)
Explores political, cultural, and social changes in the Caribbean since before Europeans arrived at the end of the fifteenth century. Starting from the maritime landscape of winds, currents, islands, and harbors, we see how the physical nature of the region has influenced patterns of settlement and development from the time of the Arawaks and Caribs to the commodification of the Caribbean as a modern tourist destination. Other topics include the impact of European expansion on peoples throughout the Atlantic world, especially at the transportation of some 5 million enslaved Africans into the Caribbean region; at the technology that underpinned European expansion; and at the cultural expressions that document the extraordinary demographic changes that transformed the islands.
• Prerequisite: Acceptance into the SEA Semester Program.
• Equivalent: GEOL 2942.

ENVR 2943 Marine Environmental History: The Caribbean (4 SH)
Explores the interaction of ecological factors in ocean, coastal, and island environments; the impact of human actions on those environments; and the need for local, regional, and international responses and strategies to mitigate and manage that impact. The enormous environmental changes that have taken place in the Caribbean Islands over the last five centuries provide us with a regional example of global issues. Looks at issues of resource exploitation, pollution, development, and the introduction of non-native species and attempts to understand the process by which we come to an intelligent understanding of these issues.
• Prerequisite: Acceptance into the SEA Semester Program.
• Equivalent: GEOL 2943.

ENVR 3000 Igneous Petrology and Volcanology (4 SH)
Examines the origin and nature of igneous rocks in general and volcanoes in particular. Surveys the characteristics and classification of igneous rocks, with a special emphasis on studying volcanic eruptive products and the nature of volcanic eruptions. Also covers the environmental impact and monitoring of volcanic activity.
• Prerequisite: ENVR 1200, ENVR 1201, and ENVR 2310.
• Corequisite: ENVR 3001.
• Equivalent: GEOL 3000.

ENVR 3001 Lab for ENVR 3000 (1 SH)
Accompanies ENVR 3000. Exercises emphasize the identification and classification of igneous rocks as seen in hand specimen and with the aid of a petrographic microscope.
• Corequisite: ENVR 3000.
• Equivalent: GEOL 3001.

ENVR 3100 Oceanography (3 SH)
Introduces students to the scientific study of the ocean. Teaches basic understanding of global ocean processes and a more in-depth understanding of the waters through which students sail during their subsequent Sea Component. Covers the four interrelated disciplines of oceanography—physics, chemistry, biology, and geology. The development of proposals for independent student research projects to be carried out at sea is a key component of this shore-based course. Opportunities are provided to discuss current research with scientists working at the cutting edge of marine science. Includes lectures, labs, and field trips. Labs may include study of a coastal pond or salt marsh as an introduction to data collection, processing, chemical analyses, and microscopy that are used onboard ship. Part of the SEA Semester Program.
• Prerequisite: Acceptance into the SEA Semester Program and completion of one lab science course.
• Equivalent: GEOL 3100.
Course Descriptions

**ENVR 3101 Nautical Science (3 SH)**
Provides the theoretical background necessary for operating vessels at sea through lectures, lab sessions, field trips, and student projects. Covers the principles of navigating a vessel within sight of land; discussions include the earth’s coordinate system of latitude and longitude, nautical charts, and the magnetic compass. Students are also introduced to electronic navigation, including radar and GPS (Global Positioning System), and celestial navigation to fix the navigator’s position at sea. Topics include Archimedes’ principle, Newton’s laws, the Bernoulli effect, Boyle’s law, and mechanical advantage as applied to the study of vessels and their operation; vessel handling under sail; center of effort; operations under power; and vessel design. Classroom lectures, discussions, and student projects focus on learning about global, regional, and local weather. Part of the SEA Semester Program.

- **Prerequisite:** Acceptance into the SEA Semester Program.
- **NU Core:** Experiential learning.
- **Equivalent:** GEOL 3101.

**ENVR 3102 Maritime Studies (3 SH)**
Focuses on a multidisciplinary study of the sea and sea voyage in the Western tradition and the role of the sea in the historical development of the modern world system of labor, trade, and scientific resource management. Tales of the sea from literature are supplemented with classic films, paintings, and songs. Together, students explore the expectations that they, as products of American popular and high culture, bring to their impending sea voyage. Through further readings, lectures, and field studies, students explore the uses we have made of the sea—from fishing and whaling to scientific exploration and warfare—with an eye toward understanding the roots of contemporary maritime affairs. Part of the SEA Semester Program.

- **Prerequisite:** Acceptance into the SEA Semester Program.
- **Equivalent:** GEOL 3102.

**ENVR 3103 Oceanographic Field Methods (4 SH)**
Exposes students to the skills and knowledge of the practicing oceanographer by observation and application of the concepts and sampling techniques introduced onshore. Tasks include carrying out routine lab procedures; extracting physical data for students’ research projects and for SEA’s ongoing oceanographic studies; processing chemical and biological samples; safely programming, deploying, and recovering oceanographic equipment; and maneuvering and positioning the vessel for each research station. Each day students participate in lectures, discussions, or hands-on study of specific topics in oceanography and nautical science. Part of the SEA Semester Program.

- **Prerequisite:** Acceptance into the SEA Semester Program.
- **Equivalent:** GEOL 3103.

**ENVR 3104 Advanced Oceanographic Field Methods (4 SH)**
Continues ENVR 3103. Focuses on the completion of student research projects and increasing responsibility for routine lab work, the sampling program, and operation of the vessel. The goal is for students to oversee the lab watch, direct their peers, plan and carry out station work with minimal staff supervision, finish analyzing and interpreting their data, complete written research papers, and present their research in a formal seminar format. May culminate with one or more ship’s missions, which usually involves study of a particular area, either for SEA’s data collections or at the request of another scientific agency, and allows students to integrate their nautical and science knowledge and to direct the vessel and its operation. Part of the SEA Semester Program.

- **Prerequisite:** ENVR 3103 and acceptance into the SEA Semester Program.
- **Equivalent:** GEOL 3104.

**ENVR 3105 Practical Oceanographic Research (3 SH)**
Guides students at sea from an introductory learning phase to increasing responsibility in station planning, equipment deployment, and data interpretation. Each day, students participate in lectures, discussions, or hands-on study of specific topics in oceanography, nautical science, or maritime studies. Students also receive individual and small-group instruction by the scientific and nautical staff during regular watches in the lab and on deck. Focuses on analyzing and interpreting data, completing a written research paper, and presenting the research to the ship’s company in a formal seminar format. The end of the cruise may also culminate in one or more missions, allowing students to integrate their nautical and science knowledge and to direct the vessel and its operation. Part of the SEA Semester Program.

- **Prerequisite:** Acceptance into the SEA Summer Session Program.
- **Equivalent:** GEOL 3105.
ENVR 3125 Global Oceanic Change (4 SH)
Explores major changes in physical, biological, and chemical properties of the ocean over geological and human timescales. Includes origin and early evolution of the oceans; sea-level change; global warming; ocean acidification; the role of plate tectonics in driving long-term oceanic change; the role of atmospheric carbon dioxide in driving short-term oceanic change; tipping points in the oceans; snowball earth theory; marine pollution; oil exploration; and social, economic, and political implications of global oceanic change. Themes include differentiating drivers of change across multiple temporal and spatial scales; evaluating change from different and sometimes conflicting perspectives (social, economic, political, environmental); differentiating local and global change; and establishing linkages between physical, chemical, and biological processes in the ocean.
- Prerequisite: One laboratory science course or permission of instructor.
- NUpath: Engaging with the natural and designed world.

ENVR 3200 Water Resources (4 SH)
Offers students who wish to work in the area of water resources an opportunity to understand the issues related to water’s availability and behavior at the Earth’s surface. Topics covered include (1) the hydrologic cycle, including global and regional patterns of water movement; (2) characteristics of surface and groundwater systems, including the linkage between streams, rivers, lakes, wetlands, groundwater, and the sea; (3) water management issues and regulations that have been enacted to control the use of water as a resource; (4) water quality measures for surface water and groundwater; and (5) examples of water use conflicts and emerging water issues. Case studies include examples from California, New England, New York, the southwestern United States, China, Africa, and the Middle East.

ENVR 3300 Geographic Information Systems (4 SH)
Studies how to use a geographic information system (GIS). Explores the practical application of GIS to support scientific and social inquiry, analysis, and decision making. Topics include spatial data collection; data accuracy and uncertainty; cartographic principles and data visualization; geographic analysis; and legal, economic, and ethical issues associated with using GIS. Investigates case studies from geology, environmental science, urban planning, architecture, social studies, and engineering. Provides extensive hands-on experience with a leading commercial GIS software package. Offers students an opportunity to conceive their own research problem that can be addressed using GIS and reach conclusions that are summarized in a professional report.
- Prerequisite: ENVR 1101, ENVR 1112, or ENVR 1200 (any of which may be taken concurrently), or permission of instructor.
- Corequisite: ENVR 3301.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Exploring creative expression and innovation, analyzing and using data.
- Equivalent: GEOL 3300.

ENVR 3301 Lab for ENVR 3300 (1 SH)
Accompanies ENVR 3300. Covers topics from the course through various experiments.
- Corequisite: ENVR 3300.
- Equivalent: GEOL 3301.

ENVR 3302 Introduction to Remote Sensing (4 SH)
Explores the fundamental concepts of remote sensing of the environment. Topics include digital imagery from spacecraft, conventional and high-altitude aerial photography, orthophotography production, and surface modeling systems. Offers hands-on experience with basic functions of industry standard image processing software.
- Prerequisite: ENVR 1200 or permission of instructor.
- Corequisite: ENVR 3303.
- NU Core: Mathematical/analytical thinking level 2.
- Equivalent: GEOL 3302.

ENVR 3303 Lab for ENVR 3302 (1 SH)
Accompanies ENVR 3302. Covers topics from the course through various applied activities.
- Corequisite: ENVR 3302.
- Equivalent: GEOL 3303.
ENVR 3400 Field Geology (4 SH)
Provides hands-on training in field mapping techniques for geologic applications. Emphasizes making field observations of rocks and geologic structures and depicting them on geologic maps, cross sections, and in field notes. Meets at various field locations in the area. Fulfills the college’s experiential education requirement for geology majors.
• Prerequisite: (a) ENVR 1112, or (b) ENVR 1200 and ENVR 1201.
• NU Core: Experiential learning.
• Equivalent: GEOL 3400.

ENVR 3410 Environmental Geochemistry (4 SH)
Provides a context for understanding environmental problems through studies in atmospheric, terrestrial, freshwater, and marine geochemistry. Topics include aqueous geochemistry, environmental chemical analysis, nature and source of hazardous wastes (environmental chemistry, reduction, treatment and disposal), acid rain, ozone hole, nuclear winter, green engineering, and alcohol production.
• Prerequisite: (a) ENVR 1101, ENVR 1112, or ENVR 1200 and (b) CHEM 1101 or CHEM 1211.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: GEOL 3410.

ENVR 3418 Geophysics (4 SH)
Studies the basic techniques of reflection and refraction seismology and earthquake analysis; gravity and magnetic surveying methods; radioactive decay principles and Earth’s heat flow; and how information from these methods are used to interpret the nature and age of the Earth’s surface and interior. Emphasizes near-surface exploration, data collection methods, data analysis, and using data to constrain mathematical models of the subsurface distribution of geologic units.
• Prerequisite: (a) ENVR 1112 or ENVR 1200 and (b) MATH 1241, MATH 1251, or MATH 1341.
• NUpath: Analyzing and using data.
• Equivalent: GEOL 3418.

ENVR 4106 Coastal Processes (4 SH)
Examines the effect of coastal marine processes and the resultant coastal responses. Topics include the dynamics of waves and currents and the associated erosion, transportation, and deposition of sediment-forming beaches, barrier islands, and cliffed shorelines.
• Prerequisite: ENVR 1101, ENVR 1112, ENVR 1200, BIOL 1101, or BIOL 1111.
• Corequisite: ENVR 4107.
• Equivalent: GEOL 4106.

ENVR 4107 Lab for ENVR 4106 (1 SH)
Accompanies ENVR 4106. Covers topics from the course through various experiments.
• Corequisite: ENVR 4106.
• Equivalent: GEOL 4107.

ENVR 4500 Applied Hydrogeology (4 SH)
Covers the origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems emphasizing rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeologic mapping and analysis; and introduces well testing and well hydraulics. Uses methods of collecting data about the physical distribution and properties of water and its interaction with geologic materials in the subsurface, including its chemical composition, and mathematical models to interpret the direction and velocity of groundwater flow. Considers remediation strategies for dealing with contaminated water in the subsurface.
• Prerequisite: (a) ENVR 1112 or ENVR 1200 and (b) MATH 1241, MATH 1251, or MATH 1341.
• Corequisite: ENVR 4501.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.
• Equivalent: GEOL 4500.

ENVR 4501 Lab for ENVR 4500 (1 SH)
Accompanies ENVR 4500. Covers topics from the course through various experiments.
• Corequisite: ENVR 4500.
• Equivalent: GEOL 4501.

ENVR 4504 Environmental Pollution (4 SH)
Surveys pollution in our atmosphere, on land, and in our oceans. Offers students an opportunity to develop the skills to understand the sources, processes, and fate of environmental contaminants in surface and groundwater, soils, sediment, and biota, with special focus on organic contaminants. Links environmental chemistry with ecotoxicology through an understanding of bioaccumulation, food web models, and risk assessment. Uses case studies and real-world scenarios to illustrate important concepts. Emphasizes innovative solutions for pollution remediation. Discusses current pollution issues and how to clearly communicate these issues to a broad audience.
• Prerequisite: (a) ENVR 1101 and CHEM 1211 or (b) ENVR 1112 and CHEM 1211 or (c) ENVR 1200 and CHEM 1211 or (d) permission of instructor.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world, analyzing and using data.
• Equivalent: GEOL 4504.
ENVR 4505 Wetlands (4 SH)
Provides an interdisciplinary overview of the physical, biological, and cultural aspects of wetlands. Topics covered include definitions, classification systems, origins, human use, and natural processes of wetland environments. Offers students an opportunity to learn about wetland hydrology, soils, and vegetation and their relationship to ecosystem processes, societal values, and management. Includes reading and analyzing the scientific literature and conducting in-class activities.
• Prerequisite: ENVR 1101, ENVR 1112, or ENVR 1200.
• NUpath: Analyzing and using data.
• Equivalent: GEOL 4505.

ENVR 4515 Sustainable Development (4 SH)
Focuses on the development of communities in an environmentally sustainable way and on the division of natural resources within these communities and the global system. Defines and discusses “sustainable development” and its global role today. Exposes students to a history of developmental methods while learning about the interconnectedness of development and the environment. Encourages students to draw conclusions about the environmental impacts of these methods and to consider more equitable uses of natural resources.
• Prerequisite: ENVR 1101 and sophomore standing or above.
• NUpath: Understanding societies and institutions, writing intensive in the major.
• Equivalent: ENVR 4925.

ENVR 4563 Advanced Spatial Analysis (4 SH)
Provides an in-depth evaluation of theoretical, mathematical, and computational foundations of geographic information systems (GIS). Topics include spatial information theory, database theory, mathematical models of spatial objects, and GIS-based representation. Examines advanced concepts and techniques in raster-based GIS and high-level GIS modeling techniques.
• Prerequisite: ENVR 3300.
• NU Core: Mathematical/analytical thinking level 2.
• Repeatability: May be repeated without limit.
• Equivalent: ENVR 4926.

ENVR 4565 Undergraduate Teaching Experience 1 (4 SH)
Offers an opportunity for qualified undergraduate students to serve as undergraduate teaching assistants. Requires various assignments closely directed by the assigned course instructor. These may include holding office hours, light grading, maintaining the records for the course, proctoring—but not solely administering—exams and quizzes, holding recitation/tutorial sessions, and (very) limited lecturing or leading class discussions.
• Prerequisite: Junior or senior standing, minimum overall GPA of 3.333, and grade of A– or better in course assignment; permission to enroll is further subject to the availability of an appropriate course assignment and instructor.
• NU Core: Experiential learning.

ENVR 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

ENVR 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ENVR 4970 and junior or senior standing.
• Repeatability: May be repeated without limit.

ENVR 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
ENVR 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

ENVR 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ENVR 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ENVR 4997 Senior Thesis (4 SH)
Offers students an opportunity to prepare an undergraduate thesis under faculty supervision.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: IDSC 4997.

ENVR 5105 Geophysics (4 SH)
Examines the physical processes of sediment erosion, transportation, and deposition and the origin of sediment. Emphasis is on the effect of coastal marine processes and resultant responses of the coast. Topics include the dynamics of waves and currents and such coastal landforms as beaches, barriers, salt marshes, and bluffed and rocky coasts. (a) ENVR 1112, ENVR 1200, or graduate standing and (b) MATH 1241, MATH 1251, MATH 1341, or graduate standing and (c) junior, senior, or graduate standing.
• Equivalent: GEOL 5105.

ENVR 5110 Coastal Sedimentation (4 SH)
Examines a current environmental issue or topic through an understanding of the scientific principles controlling the process, review of alternative actions, and inquiry into societal implications of the issue. Topics include groundwater supply, groundwater contamination, coastal erosion and flooding, or impacts of land development.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: GEOL 5110.

ENVR 5115 Advanced Topics in Environmental Geology (4 SH)
Examines selected topics in geology through an understanding of the basic processes, materials, and evolution. Topics include basin analysis, landform evolution, volcanology, or regional geology.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: GEOL 5115.

ENVR 5120 Advanced Topics in Geology (4 SH)
Introduces spatial data analysis through geographical information system (GIS) systems. Topics include basics of cartography, cartographic transformations on the computer, data input, data sorting and presentation, and statistical analysis. Emphasis is on practical applications of GIS methods.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: GEOL 5120.

ENVR 5190 Soil Science (4 SH)
Provides a description and evaluation of the physical, chemical, and biological properties of soils. Includes soil formation, soil types, and processes that occur in soil including the importance of these processes for the soil productivity and management of soil. Also covers sources, reactions, transports, and fates of chemical species in soils and associated water and air environments, as well as the chemical behavior of elements and compounds and the phenomena affecting natural and anthropogenic materials in soils.
• Prerequisite: (a) ENVR 1112, ENVR 1200, ENVR 2310, or graduate standing and (b) junior, senior, or graduate standing.
• Equivalent: GEOL 5190.

ENVR 5200 Geology Seminar (4 SH)
Offers an analysis of selected topics in geology for advanced study. Topics are selected from current areas of active research in the field.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: GEOL 5200.

ENVR 5201 Geologic Field Seminar (4 SH)
Studies aspects of geology/environmental science associated with a particular field setting, in the classroom, followed by an intensive field investigation. Examples include carbonate petrology and reef ecology, then field studies in the Bahamas; glacial geology and volcanology, followed by field studies in Iceland; or stratigraphy of the U.S. Southwest, with field studies in the Grand Canyon. Focuses on using field observations and field data to interpret modern and ancient geologic processes.
• NUpath: Engaging with the natural and designed world, analyzing and using data, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
• Equivalent: GEOL 5201.
ENVR 5202 Environmental Science Field Seminar Abroad (4 SH)
Offers an intensive environmental science field study experience associated with a particular off-campus geographic setting, such as Iceland, Newfoundland, Bahamas, etc. Offers students an opportunity to learn the principles of field study, to learn to recognize and record significant data, and to reach conclusions about a range of field-based problems being studied.
  • NUpath: Engaging with the natural and designed world, integrating knowledge and skills through experience.
  • Repeatability: May be repeated without limit.

ENVR 5210 Environmental Planning (4 SH)
Examines aspects of surface runoff from geomorphic and hydrologic perspectives. Develops methods for description and calculation of major river and drainage basin processes and applies the results to the planning process. Examines human modification of these systems—including urbanization, dams, and channelization—and applies this information to an understanding of regulatory processes. This is a writing-intensive course.
  • Prerequisite: (a) Junior or senior standing and ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102, or (b) graduate standing.
  • NU Core: Writing intensive in the major.
  • NUpath: Writing intensive in the major.
  • Equivalent: GEOL 5210.

ENVR 5230 Structural Geology (4 SH)
Focuses on the description and origin of rock structures, with emphasis on interpretation of the mechanics of deformation. Lab analyses of structural features and problems utilize geologic maps, structural models, stereograms, petrographic microscope, rock specimens, and field exercises.
  • Prerequisite: (a) ENVR 1200, ENVR 1201, and junior or senior standing or (b) graduate standing.
  • Corequisite: ENVR 5231.
  • Equivalent: GEOL 5230.

ENVR 5240 Sedimentary Basin Analysis (4 SH)
Presents the analysis of sedimentary basins based on detailed study of sedimentary petrology, sedimentary structures, and stratigraphic sequences and fossils.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5241.
  • Equivalent: GEOL 5240.

ENVR 5241 Lab for ENVR 5240 (1 SH)
Accompanies ENVR 5240. Lab work uses geologic sections, suites of sedimentary rocks and thin sections, and drill cores and bore hole logs to interpret and analyze the geologic history and environmental and economic potential of sedimentary basins.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5240.
  • Equivalent: GEOL 5241.

ENVR 5242 Ancient Marine Life (4 SH)
Begins with a survey of major events, processes, and important invertebrate phyla preserved in the fossil record. This knowledge of paleontology is then utilized to evaluate evolutionary principles and the nature of function and adaptation in the history of life. Organization of populations into paleocommunities and their relationships to changes in environments through time permit the assessment and evaluation of paleoecology in Earth history.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5243.
  • Equivalent: GEOL 5242.

ENVR 5243 Lab for ENVR 5242 (1 SH)
Accompanies ENVR 5242. Introduces invertebrate fossil morphology by study of fossil specimens of all major groups. Principles of paleoecology and evolutionary theory are illustrated by analysis of suites of fossil specimens.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5242.
  • Equivalent: GEOL 5243.

ENVR 5244 Sedimentation (4 SH)
Describes the physical processes of sedimentation and their role in the interpretation of sedimentary environments.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5245.
  • Equivalent: GEOL 5244.

ENVR 5245 Lab for ENVR 5244 (1 SH)
Accompanies ENVR 5244. Concentrates on the interpretation and description of the physical properties of sediments and sedimentary environments.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: ENVR 5244.
  • Equivalent: GEOL 5245.

ENVR 5248 Marine Geology (4 SH)
Compares the balance between major sedimentary and tectonic forces in ocean basins and margins to the resulting ocean form. Topics include origin of continental margins, shelf sedimentation and transport, deep-sea processes, and sediments. Evaluates resource development of OCS oil, sand and gravel, and manganese nodules.
  • Prerequisite: Junior, senior, or graduate standing.
  • Equivalent: GEOL 5248.
ENVR 5250 Geology and Land-Use Planning (4 SH)
Studies the causes and solutions of geologic environmental problems related to land use. Emphasizes geologic-based land-use planning solutions to problems related to landslides, ground subsidence, coastal erosion, stream erosion, flooding, soil erosion, and groundwater pollution. Assignments are based on actual examples requiring application of concepts covered in the course.
- **Prerequisite:** (a) ENVR 1200 (may be taken concurrently) or graduate standing and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students with junior, senior, or graduate standing.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Analyzing and using data, writing intensive in the major.
- **Equivalent:** GEOL 5250.

ENVR 5260 Geographical Information Systems (4 SH)
Examines geographical information systems (GIS), a way to input, store, analyze, and display spatial data (data with a geographic location). Introduces the major components and applications of this exciting new tool. Consists of two lectures and one laboratory period a week. Laboratory exercises introduce methods of data analysis as well as practical issues of how to manipulate various GIS software packages.
- **Equivalent:** GEOL 5260.

ENVR 5262 GIS Workshop (2 SH)
Studies the basic techniques of reflection and refraction seismology, gravity, aeromagnetic and heat-flow processes, and the information they provide on the structure, composition, and dynamics of the earth’s interior.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Equivalent:** GEOL 5262.

ENVR 5270 Glacial and Quaternary History (4 SH)
Examines the environmental conditions conducive to forming glaciers, the processes of ice movement, glacial erosion, modes of deposition, and the resulting landforms created under and around glaciers. Introduces the natural climate change of the ice age cycles and the major events of the Quaternary period.
- **Prerequisite:** (a) ENVR 1112, ENVR 1200, or ENVR 5190 and (b) junior, senior, or graduate standing.
- **Corequisite:** ENVR 5271.
- **NUpath:** Engaging with the natural and designed world, analyzing and using data.
- **Equivalent:** GEOL 5270.

ENVR 5271 Lab for ENVR 5270 (1 SH)
Accompanies ENVR 5270. Covers topics from the course through various experiments.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Corequisite:** ENVR 5270.
- **Equivalent:** GEOL 5271.

ENVR 5280 Groundwater Modeling (4 SH)
Uses computers to solve problems in the flow of groundwater. Develops concepts of groundwater flow. Uses the finite difference method to model steady-state and transient flow. Programs are supplied by the instructor so programming skill is not a prerequisite.
- **Prerequisite:** (a) ENVR 4500 and junior or senior standing or (b) graduate standing.
- **Equivalent:** GEOL 5280.

ENVR 5282 Groundwater Geochemistry (4 SH)
Investigates important geological processes that occur when groundwater interacts with rock or soil, modifying groundwater chemistry and affecting water quality. Examines groundwater contamination and dispersion, isotope tracer studies, field sampling, and analytical methods.
- **Prerequisite:** (a) ENVR 1101, ENVR 1112, ENVR 1200, or graduate standing and (b) CHEM 1101, CHEM 1153, CHEM 1211, or graduate standing and (c) junior, senior, or graduate standing.
- **Equivalent:** GEOL 5282.

ENVR 5290 Engineering Geology (4 SH)
Explores engineering geology, the interdisciplinary study of how geology is applied to engineering projects. Covers the application of geologic thought and geophysical methods to the site selection and planning of human-constructed features, such as foundations, landfills, highways, dams, tunnels, power plants, and mines. An individual research project augments class activities.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Equivalent:** GEOL 5290.

ENVR 5300 Graduate Research (4 SH)
Offers an individual research project under the direction of a faculty member.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.
- **Equivalent:** GEOL 5300.
ENVR 5400 Marine Science Policy and Ethics (3 SH)
Offers ethics training for a critical review of marine policies in the following topical areas: marine environmental ethics (conservation and preservation), conflicts of interest/research integrity, human subjects/mammal protections, ethical challenges in marine science modeling, ethics of fishing governance (marine conservation and regulations), sustainability models for marine sciences, data management, and new models of comanagement and community engagement with marine research. Reviews critical environmental policies affecting marine resources (NEPA, CERCLA, RCRA, Endangered Species, Marine Mammal Protection, and Oil Pollution acts, Magnuson-Stevens Act, etc.). Critically evaluates case studies and ethical review of coastal management for sustainability and pollution control, marine fisheries, and energy development.
• Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Science.
• NUpath: Employing ethical reasoning.

ENVR 5976 Directed Study (1 to 4 SH)
Offers independent study of a specific topic not normally contained in the regular course offerings but within the area of competence of a faculty member.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENVR 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENVR 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENVR 6220 Applied Hydrology (4 SH)
Covers the origin, distribution, and flow of groundwater in permeable sediments and bedrock; hydrological and geological characteristics of aquifers; regional flow systems that emphasize rock structure, stratigraphy, and other aspects of the geological environment; principles of hydrogeologic mapping and analysis; and an introduction to well testing and well hydraulics. An individual research project augments class activities.
• Corequisite: ENVR 6221.
• Equivalent: GEOL 6220.

ENVR 6221 Lab for ENVR 6220 (1 SH)
Accompanies ENVR 6220. Covers topics from the course through various experiments.
• Corequisite: ENVR 6220.
• Equivalent: GEOL 6221.

ENVR 6255 Introduction to Remote Sensing (4 SH)
Explores the fundamental concepts of remote sensing of the environment. Topics include digital imagery from spacecraft, conventional and high-altitude aerial photography, orthophotography production, and surface modeling systems. Offers hands-on experience with basic functions of industry-standard image-processing software.

ENVR 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

ENVR 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ENVR 6976 Directed Study (1 to 4 SH)
Offers independent study of a specific topic not normally contained in the regular course offerings but within the area of competence of a faculty member.
• Repeatability: May be repeated without limit.

ECOLOGY, EVOLUTION, AND MARINE BIOLOGY (EEMB)

EEMB 1122 Physical Oceanography (4 SH)
Provides a description of the physical properties and composition of seawater, waves, tides, and ocean currents. Discusses how these properties are measured by oceanographers and how they influence the earth’s environment and climate.
• NU Core: Science/technology level 1.
• Equivalent: ENVR 1122 and GEOL 1122.

EEMB 1123 Biological Oceanography (4 SH)
Covers the productivity of plant and animal life in the various zones of the ocean and the growing economic importance of the oceans as a source of food for the expanding world population.
• NU Core: Science/technology level 1.
• Equivalent: ENVR 1123 and GEOL 1123.

EEMB 1145 Beginning Scuba (1 SH)
Focuses on basic skin diving and scuba diving skills, with emphasis on safety. Requires lab fee.
• Equivalent: BIOL 1105.
EEMB 1450 Introduction to Marine Biology (4 SH)

Presents the major physical, chemical, and geological properties of the ocean. Focuses on life in the marine environment as well as the structure and function of marine ecosystems. Includes the study of human interactions with the sea such as the acquisition of marine resources, human impacts, and marine biotechnology.

- NU Core: Science/technology level 1.
- Equivalent: BIOL 1151.

EEMB 2290 Ecology and Evolution of Behavior (4 SH)

Studies fundamental biological principles at behavioral, ecological, and evolutionary levels. Covers ethology, ecology, genetics, and comparative psychology, all within the conceptual framework of evolutionary theory. Explores both scientific practice and progress through readings, discussion, and projects. Illustrates the process by which biologists study questions about the evolutionary origin of behavior through a series of in-class activities, computer modeling assignments, interpretation of graphical data, collection and statistical analyses of behavioral data, as well as the generation and presentation of research. Does not focus on the neurological basis of behavior. Offers students an opportunity to become critical thinkers, critical readers, and to attain tools to interpret the world in a unique way.

- NUpath: Engaging with the natural and designed world, analyzing and using data.
- Equivalent: ENVR 2290.

EEMB 2302 Ecology (4 SH)

Offers students an opportunity to learn about the environmental and biological processes that control the distribution and abundance of species and controlling factors that operate on individuals, populations, and communities. The lecture and laboratory introduce a set of generalizable concepts that are of fundamental importance to plant and animal life on the land and in the sea and provide hands-on experiential learning that reinforce concepts covered in lecture. Offers students an opportunity to become proficient in the following: (a) understanding research results the primary literature; (b) conducting a research experiment; (c) interpreting the results of in-class research; (d) communicating results as manuscript.

- Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, ENVR 2400, or EEMB 2400 and (b) CHEM 1151, CHEM 1211, or CHEM 1217 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Corequisite: EEMB 2303.
- NU Core: Writing intensive in the major.
- NUpath: Conducting formal and quantitative reasoning, writing intensive in the major.
- Equivalent: BIOL 2311.

EEMB 2303 Lab for EEMB 2302 (1 SH)

Accompanies EEMB 2302. Covers topics from the course through various experiments.

- Corequisite: EEMB 2302.
- Equivalent: BIOL 2312.

EEMB 2400 Introduction to Evolution (4 SH)

Introduces evolutionary thinking, including contemporary examples of evolution. To understand the evolution of Charles Darwin’s “endless forms most beautiful,” the course adopts an integrative approach that includes information from ecology, genetics, molecular biology, biogeography, and paleobiology. Considers mechanisms of evolutionary change—how does it happen? Examines adaptation, the process by which attributes of an organism change to enhance fitness and the evolutionary history of life on our planet—what was the first living thing, how does speciation occur, what have we learned about evolution of life in the distant past, and how did humans evolve. Includes student presentations and analysis of scientific literature.

- Prerequisite: Sophomore standing or above.
- NUpath: Engaging with the natural and designed world.
- Equivalent: ENVR 2400.

EEMB 2410 Fish Biology and Ecology (4 SH)

Covers fish evolutionary relationships, functional morphology, global biogeography, reproductive behavior, and basic ecology. Considers how fishes interact with each other and with their environment across multiple scales. Focuses on how basic life requirements such as habitat use, behavior, foraging, and reproduction lead to variation among individuals, affect population dynamics, and impact the structure and function of community organization and ultimately how these processes influence broad-scale patterns and dynamics at the ecosystem level.

- Corequisite: EEMB 2411.
- NU Core: Mathematical/analytical thinking level 2.
- Equivalent: ENVR 2410.

EEMB 2411 Lab for EEMB 2410 (1 SH)

Accompanies EEMB 2410. Covers topics from the course through various experiments.

- Corequisite: EEMB 2410.
- Equivalent: ENVR 2411.
EEMB 2420 Fisheries Biology, Policy, and Conservation (4 SH)
Focuses on the study and management of economically valuable fish species. Studies the basic biology and ecology of fisheries species, quantifying and modeling their population biology to their interactions with each other and the environment. Requires students to read and analyze the scientific literature, to complete worksheets and writing assignments, and to develop and present research projects. Covers traditional stock assessment methods as well as how fisheries science and management has evolved more recently to integrate community- and ecosystem-level information. Reviews fisheries and how fishers are managed, their involvement in the management process, and the future fisheries in the United States and elsewhere.

• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Engaging with the natural and designed world, analyzing and using data, writing intensive in the major.
• Equivalent: ENVR 2420.

EEMB 2610 Plant Biology (4 SH)
Examines the biology and diversity of plants and plant-like organisms. Explores the relationships between humans and plants by looking at plants through three different perspectives: feeding a starving world; curing a sick world; and engineering a better world. Employs case studies to highlight major themes.

• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, or EEMB 2290 and (b) ENGW 1111, ENgw 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: BIOL 2313.

EEMB 2611 Lab for EEMB 2610 (1 SH)
Accompanies EEMB 2610. Covers topics from the course through various experiments.
• Equivalent: BIOL 2314.

EEMB 2616 Invertebrate Zoology (4 SH)
Surveys the tremendous diversity of invertebrates, emphasizing their form and function in ecological and evolutionary contexts. Explores functional morphology, systematics, phylogenetic relationships, ecology, and economic importance of the major invertebrate phyla. Discusses comparisons among phyla to enhance understanding of evolutionary relationships.

• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, or EEMB 2290 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: EEMB 2617.
• NU Core: Writing intensive in the major.
• NUpath: Engaging with the natural and designed world, analyzing and using data, writing intensive in the major.
• Equivalent: BIOL 2315.

EEMB 2617 Lab for EEMB 2616 (1 SH)
Accompanies EEMB 2616. Covers topics from the course through various experiments.
• Corequisite: EEMB 2616.
• Equivalent: BIOL 2316.

EEMB 2618 Vertebrate Zoology (4 SH)
Explores functional morphology, systematics, ecology, and phylogenetic relationships of the major vertebrate phyla.

• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or EEMB 2400 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: EEMB 2619.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: BIOL 2317.

EEMB 2619 Lab for EEMB 2618 (1 SH)
Accompanies EEMB 2618. Covers topics from the course through various experiments.
• Corequisite: EEMB 2618.
• Equivalent: BIOL 2318.

EEMB 2700 Marine Biology (4 SH)
Examines biological aspects of natural ocean ecosystems and the physical processes that regulate them. Covers distributions, abundances, and interactions of marine organisms; interactions between organisms and the transformation and flux of energy and matter in marine ecosystems; and aspects of physiology related to marine species distributions, abundances, and roles. Students generate, evaluate, discuss, and present data from primary research and apply their knowledge of the scientific method and biological concepts through the creation of a written grant proposal.

• Prerequisite: (a) BIOL 1107, BIOL 1111, BIOL 2297, BIOL 2299, EEMB 2290, or ENVR 1214 or CHEM 1220 (either of which may be taken concurrently) and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Corequisite: EEMB 2701.
• NU Core: Writing intensive in the major.
• NUpath: Engaging with the natural and designed world, writing intensive in the major.
• Equivalent: BIOL 2325.

EEMB 2701 Lab for EEMB 2700 (1 SH)
Accompanies EEMB 2700. Covers topics from the lecture course through discussions and experiments.
• Corequisite: EEMB 2700.
• Equivalent: BIOL 2326.
EEMB 3120 Physical Biology of Marine Organisms (4 SH)
Introduces principles from the physical sciences (fluid and solid mechanics, mass and heat transfer theory) applied to the analysis of form, function, ecology, and evolution of marine organisms. Topics covered include suspension and deposit feeding in invertebrates, allometry of metabolic processes, drag and lift in sessile organisms, locomotion of nekton (fishes, marine mammals) and plankton, diffusive limitations to metabolic transactions in marine invertebrates and algae, thermal transactions in intertidal organisms, the biology of the benthic boundary layer, and the properties of biomaterials and biological structures. Presents engineering methods and measurement techniques applicable to biomechanical investigations.
• Prerequisite: (a) BIOL 1101, BIOL 1107, or BIOL 1111 and (b) sophomore standing or above.
• Equivalent: ENVR 3120.

EEMB 3450 Physiological Adaptations to the Environment (4 SH)
Explores the evolutionary mechanisms by which organisms adapt physiologically to survive, and thrive, in diverse, often seemingly “hostile,” habitats. Examines paleo- and modern examples of adaptation with the goal of predicting species success or failure as our planetary environment changes rapidly. Topics include adaptation of cellular metabolism, adaptations to variable oxygen availability and to changes in pH, the roles of water and microsolute in regulation of the internal environment of cells, and the effects of temperature on cellular function and the biogeographic distribution of organisms. Includes student presentations and analysis of scientific literature.
• Prerequisite: (a) BIOL 1103, BIOL 1107, BIOL 1113, ENVR 2400, or EEMB 2400 and (b) CHEM 1214 or CHEM 1220 and (c) junior or senior standing; sophomores admitted by permission of instructor.
• NU Core: Writing intensive in the major.
• NUpath: Engaging with the natural and designed world.
• Equivalent: ENVR 3450.

EEMB 3460 Conservation Biology (4 SH)
Explores conservation biology, an interdisciplinary science that focuses on conservation of biological diversity at multiple levels. Emphasizes the causes and consequences of biodiversity loss and demonstrates how ecological and evolutionary principles are applied to conservation problems. Covers sustainability; climate change; introduced species; conservation of threatened and endangered species; and pollution, disease, and habitat restoration using examples from marine, aquatic, and terrestrial systems. Offers students an opportunity to read, discuss, evaluate, and present data from primary research through written assignments and oral debates and to apply this knowledge to conservation issues. Emphasizes critical thinking, problem solving, and recognizing multiple perspectives.
• Prerequisite: (a) BIOL 1101, BIOL 1107, or BIOL 1111 and (b) sophomore standing or above.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: ENVR 3460.

EEMB 3465 Ecological and Conservation Genetics (4 SH)
Offers an overview of ecological and conservation genetics, an interdisciplinary science that focuses on understanding the processes that determine genetic diversity at the individual to population level. Focuses on fundamental concepts in evolutionary ecology and population and quantitative genetics, then applies those concepts to solving real-world problems in conservation science. Covers harvested populations, inbreeding, climate change, introduced species, conservation of threatened and endangered species, adaptation, and habitat restoration. Exposes students to multiple sides of these issues and the science that underpins them. Offers students an opportunity to develop the R programming skills required to analyze the complex data sets that often emerge when addressing cutting-edge questions in genetics. Includes writing and coding exercises and mathematical derivations. Emphasizes critical thinking and problem solving.
• NUpath: Engaging with the natural and designed world, analyzing and using data.

EEMB 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
EEMB 5130 Ecological Dynamics (4 SH)
Offers a comprehensive overview of mathematical and computational concepts needed to construct (meta)population, (meta)community, and (meta)ecosystem models. Focuses on how to mathematically derive and model processes (growth, trophic and nontrophic species interactions, dispersal, and environmental variability) to understand patterns of population abundance and species diversity. Emphasizes the mathematical tools required to analyze the dynamical behavior of ecological models (stability, invasion, graphical, and numerical analyses) and validate model predictions using empirical data (via maximum likelihood and optimization methods).
• Prerequisite: (a) MATH 1241, MATH 1251, MATH 1341 (any of which may be taken concurrently,) or graduate standing and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to juniors, seniors, and graduate students; sophomores admitted by permission of instructor.
• Corequisite: EEMB 5131.
• NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: ENVR 5130.

EEMB 5131 Lab for EEMB 5130 (1 SH)
Accompanies EEMB 5130. Offers supervised lab sessions designed to show how the topics covered in the lectures can be addressed in industry-standard programming environments.
• Corequisite: EEMB 5130.
• Equivalent: ENVR 5131.

EEMB 5132 Marine Biology Careers Seminar (1 SH)
Covers the information and tools needed to begin pursuing career opportunities in marine biology. Encourages students to explore a variety of career paths, construct résumés, contact potential employers for their internship and permanent positions. Presents invited speakers from state and federal agencies, and from private consulting firms, to talk about their work and career track.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5103.

EEMB 5500 Marine Botany (4 SH)
Studies the structure, taxonomy, ecology, and evolution of marine plants. Lectures include relationships to other plants, ecological role, and economic importance of marine algae. Includes field trips to a variety of local habitats.
• Prerequisite: (a) BIOL 2311, EEMB 2302, CHEM 2315, or graduate standing and (b) junior, senior, or graduate standing; not open to students who have taken EEMB 5534.
• Corequisite: EEMB 5501.
• Equivalent: BIOL 5501.

EEMB 5501 Lab for EEMB 5500 (1 SH)
Accompanies EEMB 5500. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5500.
• Equivalent: BIOL 5502.

EEMB 5502 Marine Invertebrate Zoology (4 SH)
Examines the morphology, physiology, life history, systematics, and ecology of marine invertebrates at the phylum and class level, using the comparative approach. Laboratories emphasize functional morphology and identification.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing; not open to students who have taken EEMB 5534.
• Corequisite: EEMB 5503.
• Equivalent: BIOL 5503.

EEMB 5503 Lab for EEMB 5502 (1 SH)
Accompanies EEMB 5502. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5502.
• Equivalent: BIOL 5504.

EEMB 5504 Biology of Corals (3 SH)
Focuses on the biology of Scleractinian reef-building corals and associated anthozoans found in coral reef ecosystems. Topics include systematics, anatomy, physiology, and population biology of corals, with an emphasis on the latest techniques employed by coral molecular biologists and physiologists.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• NUpath: Analyzing and using data.
• Equivalent: BIOL 5505.

EEMB 5506 Biology and Ecology of Fishes (3 SH)
Presents an examination of the systematics, functional morphology, and behavioral, larval, and community ecology of reef fishes through lectures. Field and laboratory experiments focus on morphology, behavior, and community ecology of reef fishes.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5507.
EEMB 5508 Marine Birds and Mammals (2 SH)
Studies principles of classification, anatomy, physiology, behavior, and evolution of seabirds and marine mammals. Also addresses conservation and protection of animals and essential habitat. Includes field trips to observe local species.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5509.
• Equivalent: BIOL 5509.

EEMB 5509 Lab for EEMB 5508 (1 SH)
Accompanies EEMB 5508. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5508.
• Equivalent: BIOL 5510.

EEMB 5511 Adaptations of Aquatic Organisms (3 SH)
Explores the adaptive responses of marine organisms to variations in environmental factors. Focuses on physiological responses to a variety of natural and anthropogenic conditions. The laboratory component includes a combination of field and laboratory experiments.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5511.

EEMB 5512 Tropical Terrestrial Ecology (1 SH)
Studies the animals, plants, and ecosystems of the new world tropics, with the community structure and diversity of terrestrial Jamaican habitats as an example. Includes field trips to lowland forests, carbonate caves, and the Blue Mountain mist-montane forest. The issue of land use and development vs. conservation is a recurring theme.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5513.

EEMB 5514 Marine Ecology (4 SH)
Examines processes and interactions in ocean ecosystems. Topics include an introduction to major ocean ecosystems; the biotic and abiotic factors influencing the distributions, abundances, and interactions of marine organisms; and the transformation and flux of energy and matter in marine systems. Particularly emphasizes local coastal habitats, which are used to demonstrate quantitative field research methods.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5515.
• Equivalent: BIOL 5515.

EEMB 5515 Lab for EEMB 5514 (1 SH)
Accompanies EEMB 5514. Covers topics from the course through various experiments.
• Corequisite: EEMB 5514.
• Equivalent: BIOL 5516.

EEMB 5516 Oceanography (4 SH)
Offers an integrated overview of physical, chemical, biological, and geological processes operating in the world ocean. Seemingly unrelated topics like plate tectonics, oscillating currents and waves in the atmosphere, the activities of microbes and phytoplankton, and land-use practices in the middle of the continent have global reach and interact with each other in surprising yet understandable ways. Examines how new technologies have allowed stunning insights into global weather and climate, the deep sea, biodiversity, and how the biogeochemistry of the oceans can be measured and understood. Presents data use and analysis and formal reasoning used in marine science. Views the ocean as a “system of systems” where integration of experience from disparate disciplines is key.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5517.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: ENVR 5516.

EEMB 5517 Lab for EEMB 5516 (1 SH)
Accompanies EEMB 5516. Offers experiential field and laboratory exercises in oceanography. The New England rocky intertidal, subtidal, wetlands, barrier islands, and dunes provide opportunities for field exercises in marine geology, physical oceanography, and marine ecology. Investigates processes affecting changes in the global ocean, such as ocean acidification; temperature stress in organisms; hydrodynamic drag and lift; suspension feeding; and the ecophysiology of reef corals, boreal invertebrates, and macroalgae.
• Corequisite: EEMB 5516.
• Equivalent: ENVR 5517.

EEMB 5518 Ocean and Coastal Processes (2 SH)
Examines the coupling between physical and biological processes on coral reefs and adjacent habitats. Focuses on biophysical, oceanographic, and benthic-pelagic processes acting in coral reef and associated nearshore ecosystems. Specific topics include oceanographic forcing mechanisms, organismal biomechanics, hydrodynamics, and nutrient dynamics.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5519.
EEMB 5520 Coral Reef Ecology (2 SH)
Examines the ecology and paleoecology of coral reefs. This course highlights the ecological importance of coral reefs and associated nearshore communities, ecosystem function, changes in reef biotas through geologic time, and the causes and consequences of reef degradation worldwide.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5520.

EEMB 5522 Experimental Design Marine Ecology (4 SH)
Includes introduction to and application of observational methods in three local marine habitats, experimental design, statistical analysis, R statistical computing and graphics software, and principles of marine ecology. Combines lecture, hand-on research experience, and computer laboratory and includes reading and analyzing the scientific literature and developing research projects. At the end of the semester, students are expected to demonstrate an integrative mastery of course topics by writing a scientific manuscript about a class experiment. Seeks to prepare students for practicing ecology in new environments and to provide students with the foundational knowledge necessary for pursuing more complex concepts in experimental design, statistical analysis, and marine ecology.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5523.
• NUpath: Analyzing and using data, writing intensive in the major.
• Equivalent: BIOL 5521.

EEMB 5523 Lab for EEMB 5522 (1 SH)
Accompanies EEMB 5522. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5522.
• Equivalent: BIOL 5522.

EEMB 5524 Molecular Marine Biology (3 SH)
Uses molecular approaches (electrophoresis and DNA) to determine genetic relationships at the population and species level for the study of ecological and evolutionary questions. Techniques learned are applied to research projects.
• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5523.

EEMB 5526 Marine Microbial Ecology (2 SH)
Examines the diversity of marine microorganisms and recent advances in the area of microbial ecology. Emphasizes the structure and function of microbial food webs in marine communities.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5527.
• Equivalent: BIOL 5525.

EEMB 5527 Lab for EEMB 5526 (1 SH)
Accompanies EEMB 5526. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5526.
• Equivalent: BIOL 5526.

EEMB 5528 Marine Conservation Biology (3 SH)
Examines several critical issues facing marine ecosystems, including invasive species, marine pollution and eutrophication, fisheries impacts, physical alteration of habitats, and global climate change. Offers students an opportunity to spend field time surveying intertidal and subtidal habitats within the San Juan Islands and Friday Harbor Marine Reserve and to conduct independent research projects.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• NUpath: Analyzing and using data, employing ethical reasoning.
• Equivalent: BIOL 5527.

EEMB 5530 Molecular Ecology and Evolution (4 SH)
Exposes students to the molecular techniques and analyses used to examine the genetic relationships among individuals, populations, and species.
• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5531.
• Equivalent: BIOL 5531.

EEMB 5531 Lab for EEMB 5530 (1 SH)
Accompanies EEMB 5530. Covers topics from the course through various experiments.
• Corequisite: EEMB 5530.
• Equivalent: BIOL 5532.

EEMB 5532 Physiological and Molecular Marine Ecology (3 SH)
Explores the physiological responses of marine organisms to variations in environmental factors. Uses complementary techniques, including molecular and physiological approaches, to determine genetic relationships at the species and population level and elucidate the mechanistic basis of organismic responses to environmental conditions at the level of genes and gene products.
• Prerequisite: (a) Either BIOL 2311 or EEMB 2302 and junior or senior standing or (b) graduate standing.
• Equivalent: BIOL 5529.
EEMB 5534 Marine Invertebrate Zoology and Botany (4 SH)
Surveys the major groups of marine invertebrates, algae, and plants, in addition to their ecological roles and relationships. Offers students an opportunity to learn to identify these groups and understand the mechanisms they use to survive and adapt to changing oceans. Topics include ecological and evolutionary importance, ecosystem engineering, adaptive physiology, and climate change effects. Emphasizes interrelationships among major taxa. Hands-on learning includes field identification; visits to intertidal and subtidal marine environments; and specimen dissection, preparation, and cataloging. Offers students an opportunity to improve skills in reading and discussing scientific literature, experimental design, and scientific communication.
• Prerequisite: Junior, senior, or graduate standing; Three Seas students only; not open to students who have taken EEMB 5500 or EEMB 5502.
• Corequisite: EEMB 5535.
• NUpath: Analyzing and using data, writing intensive in the major.

EEMB 5535 Lab for EEMB 5534 (1 SH)
Accompanies EEMB 5534. Covers topics from the course through various experiments.
• Corequisite: EEMB 5534.

EEMB 5536 Ocean and Coastal Sustainability (3 SH)
Offers students advanced training in the expanding field of sustainability, with a combined focus on the practical aspects of systems management and the theoretical understanding of whole-systems design and resiliency. Seeks to train future leaders capable of creating innovative solutions to sustainability issues at local and global levels. Key interdisciplinary themes discussed include the social and political aspects of ocean and coastal sustainability (i.e., education and communication), sustainable development and ecosystem stability, the impacts of climate change on ocean and coastal resilience, and the economic and entrepreneurial possibilities in the field of sustainability.
• Prerequisite: Junior, senior, or graduate standing; Three Seas students only.
• NUpath: Engaging with the natural and designed world, analyzing and using data, integrating knowledge and skills through experience.

EEMB 5538 Sociobiology (4 SH)
Studies sociobiology, a field of biology that strives to understand the biological basis of social behavior in animals. Sociobiology is a multidisciplinary science, meshing together ethology (animal behavior), ecology, genetics, population biology, and comparative psychology, all within the conceptual framework of evolutionary theory. Why do animals live in societies? Why do animals cooperate? Why do they sometimes show extreme forms of altruism? What are the costs and benefits of group living? Reviews studies on nonhuman animals that demonstrate sociobiological principles by using a series of in-class activities, computer modeling assignments, interpretation of graphical and tabulated data, collection and statistical analyses of behavioral data, as well as the generation and presentation of research.
• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.
• NUpath: Analyzing and using data.
• Equivalent: BIOL 5547.

EEMB 5560 Entomology (4 SH)
Studies the biology of insects and related arthropods including their anatomy, morphology, physiology, development, taxonomy, ecology, behavior, and life histories. Includes field and laboratory study of insect biology.
• Prerequisite: (a) BIOL 2301 and junior or senior standing or (b) graduate standing.
• Corequisite: EEMB 5561.
• Equivalent: BIOL 5539.

EEMB 5561 Lab for EEMB 5560 (1 SH)
Accompanies EEMB 5560. Covers topics from the course through field and laboratory study, including insect collection.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: EEMB 5560.
• Equivalent: BIOL 5560.

EEMB 5562 Herpetology (4 SH)
Offers a survey of the amphibians and reptiles of the world, with emphasis on eastern North America. Topics include morphology, physiology, systematics, paleontology, ecology, zoogeography, and behavior. Includes field trips to observe the habitats and behavior of local herpetofauna. Laboratory emphasizes systematics and ecology.
• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or graduate standing and (b) junior, senior, or graduate standing.
• Equivalent: BIOL 5561.

EEMB 5563 Lab for EEMB 5562 (1 SH)
Accompanies EEMB 5562. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5562.
EEMB 5564 Ornithology (4 SH)
Offers a survey of the birds of the world including morphology, physiology, systematics, behavior, ecology, zoogeography, and paleontology. Laboratory focuses on the identification and ecology of the avifauna of the Northeast, with field trips in eastern Massachusetts.
• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or graduate standing and (b) junior, senior, or graduate standing.
• Equivalent: BIOL 5563.

EEMB 5565 Lab for EEMB 5564 (1 SH)
Accompanies EEMB 5564. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5564.

EEMB 5566 Mammalogy (4 SH)
Provides a survey of the mammals of the world including morphology, physiology, systematics, behavior, ecology, zoogeography, and paleontology. Laboratory focuses on the identification of the mammals of eastern North America and techniques used to study them. Includes a three-day field trip to observe mammals and employ techniques.
• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or graduate standing and (b) junior, senior, or graduate standing.
• Equivalent: BIOL 5565.

EEMB 5567 Lab for EEMB 5566 (1 SH)
Accompanies EEMB 5566. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5566.

EEMB 5568 Wildlife Biology (4 SH)
Presents concepts and techniques utilized in the conservation and study of wild animals including the sociological aspects of management. Topics include habitat management, nonnative species, zoonoses, endangered species, legislation, and financing. Includes extended field trips to observe various ecosystems and wildlife.
• Prerequisite: (a) BIOL 1103, BIOL 1113, BIOL 2297, BIOL 2299, ENVR 2290, EEMB 2290, or graduate standing and (b) junior, senior, or graduate standing.
• Equivalent: BIOL 5567.

EEMB 5569 Lab for EEMB 5568 (1 SH)
Accompanies EEMB 5568. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5568.

EEMB 5589 Diving Research Methods (2 SH)
Presents experimental design, sampling methodology, statistical analysis, techniques, and the use of underwater equipment to conduct subtidal research.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: BIOL 5589.

EEMB 6402 Concepts and Trends in Evolution and Ecology (4 SH)
Presents key concepts and important recent advances in evolution and ecology, including interdisciplinary approaches to understanding the distributions, abundances, and diversity of species, organisms, and molecules. Topics include natural selection, adaptation, speciation, molecular evolution, global change, and perspectives on communities and ecosystems. Discusses and critiques current literature and methods.
• Prerequisite: Biology and marine biology students only.
• Equivalent: BIOL 6403.

EEMB 7100 Colloquium (1 SH)
Offers a seminar-style course that includes weekly lectures and presentations of selected topics.
• Prerequisite: Restricted to PhD students in ecology, evolution, and marine biology.
• Repeatability: May be repeated once.

EEMB 8507 Marine Biology Graduate Co-op Tutorial (1 SH)
Designed to complement learning during co-op. Offers students an opportunity to participate in activities to integrate academic learning and experiential learning including written reflections. Helps students share their experiences in the workplace through class discussions moderated by the instructor.
• Repeatability: May be repeated without limit.
• Equivalent: BIOL 8507.

EEMB 8674 Marine Biology Research Project (1 SH)
Offers an opportunity to design and implement a scientifically rigorous independent research project that builds upon current knowledge from the primary literature, under the supervision of a faculty advisor from the program. Students conduct research at any of the program’s locations and are then required to analyze data using rigorous statistical methods, write a journal-style research paper, and present their results in a research seminar.
• Equivalent: BIOL 8674.

EEMB 8960 Exam Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Restricted to PhD students in ecology, evolution, and marine biology.
• Repeatability: May be repeated once.
ECON 1000 Economics at Northeastern (1 SH)
Intended for freshmen in the College of Social Sciences and Humanities. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

ECON 1101 Economic Problems and Perspectives (4 SH)
Studies the economic concepts and methods that are useful to an informed citizen for an understanding of modern social issues such as unemployment, inflation, poverty, crime, the environment, medical care, and international competitiveness. Not recommended for students who have completed either ECON 1115 or ECON 1116.

ECON 1115 Principles of Macroeconomics (4 SH)
Introduces macroeconomic analysis. Topics include the flow of national income, economics growth and fluctuation, the role of money and banking, and monetary and fiscal policies. Emphasizes the development of conceptual tools to analyze the economic problems facing modern society.

ECON 1116 Principles of Microeconomics (4 SH)
Focuses on development of basic theory of demand, supply, and market price. Explores applications to selected microeconomic problems, such as basic monopoly and competition, and other issues that relate to the role of the pricing system in resource allocation and income distribution.

ECON 1120 Learning Economics through Games (4 SH)
Introduces students with little or no background in economics to methods of economic analysis and some of the topics that economists study. Many games have economic themes, and even the ones that do not often have aspects that can be analyzed using the methods of economics. Covers concepts such as marginal analysis, game theory, and sources of growth through the play and analysis of board and computer games. Explores topics in economic history in this context as well. Note: This course does not count toward economics major or minor elective requirements.

ECON 1121 Lab for ECON 1120 (4 SH)
Accompanies ECON 1120. Covers course topics through experimentation with games. Note: This course does not count toward economics major or minor elective requirements.

ECON 1125 Recitation for ECON 1115 (0 SH)
Provides small-group discussion format to cover material in ECON 1115.
ECON 1126 Recitation for ECON 1116 (0 SH)
Offers small-group discussion format to cover material in ECON 1116.

ECON 1230 Healthcare and Medical Economics (4 SH)
Enables students to recognize the relevance of economics to health and medical care and apply economic reasoning to understand health-related issues better; to understand the mechanism of healthcare delivery in the United States within broad social, political, and economic contexts; to explore the changing nature of health and medical care and its implications for medical practice, medical education and research, and health policy; and to analyze public policy in health and medical care from an economic perspective.
• NU Core: Social science level 1.

ECON 1240 Economics of Crime (4 SH)
Covers economic analysis of crime and the criminal justice system. Topics include theoretical and empirical analysis of the economic causes of criminal behavior, the social costs of crime and its prevention, and the design of enforcement policies.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions.

ECON 1250 Game Theory in the Social Sciences (4 SH)
Introduces modern game theory. Games describe individuals’ actions and offer tools for understanding and predicting how rational players will make choices, given their preferences, information, and available actions. The course considers games in which players know the payoffs and preferences but may have imperfect information about actions. Covers tools for predicting behavior, including iterative dominance, rationalizability, Nash equilibrium, backward induction, and subgame perfection. Introduces games of asymmetric information in which players do not know each others’ payoffs and preferences. The tools are applied to a range of fields in economics (industrial organization, labor, public finance, insurance, auctions, bargaining, and macroeconomics); business (incentive design, organizational design, pricing, product-line decisions, marketing); political science; sociology; and law.
• NU Core: Mathematical/analytical thinking level 1.

ECON 1260 Contested Issues in the U.S. Economy (4 SH)
Covers many of the contested economic issues that the United States faces as a nation—the size of government, the national debt, the war on drugs, national healthcare, taxation, and many more. An important social system in any society is the economic system—the allocation of scarce resources. In the large and complex economy of the United States, there is controversy over what goods and services are produced and how they are distributed. To understand the nature and causes of these issues requires a course where theory is a tool of analysis, not the focus. Economics is not value free. Attention is given to the role of ethics and how our moral values shape policy. Course topics vary from semester to semester.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

ECON 1270 Economic Status of Ethnic Minorities (4 SH)
Examines the economic conditions and processes as they impact minorities within the U.S. economy. Considers the role of national economic policies undertaken to address general economic and social conditions, as well as policies targeted at minority markets and institutions. Emphasis is on empirical analysis; historical and cultural materials may be incorporated.
• NU Core: Comparative study of cultures, social science level 1.
• Equivalent: AFAM 1270.

ECON 1281 Economics of the Creative Industries (4 SH)
Presents an overview of the economic aspects of creative industries. Examines the production and consumption of creative goods and services. Topics include consumer demand, economic models of nonprofit and for-profit production of creative goods, competition and market structure, artists and other creative workers as members of the labor force, productivity issues in the performing arts, government support for the creative sector, and the role and impact of public and private subsidies.
• NU Core: Social science level 1.

ECON 1290 History of the Global Economy (4 SH)
Covers ideological biases in economics; the extent of global disparities around 1800; evolution of global disparities since 1800; evolution of international integration and international trading and monetary regimes, 1800–2000; theories explaining global disparities: classical, neoclassical, Marxian, neo-Marxian, and structuralist; import-substituting industrialization: Latin America, Asia, and Africa; international debt crises: nineteenth and twentieth centuries; the new global regime; structural adjustment: GATT (General Agreement on Tariffs and Trade) and WTO (World Trade Organization); and socialist interlude: a socialist experience and transition to capitalism.
• NU Core: Comparative study of cultures, social science level 1.
ECON 1291 Development Economics (4 SH)
Covers ideological biases in economics; origins of the Industrial Revolution; the evolution of global disparities, and how markets, imperialism, and racism affected this process; theories of growth: neoclassical, institutional; growth and structural change; growth and demographic change; growth, income distribution, and welfare; development policies: import-substitution vs. outward-orientation; growth based on primary exports and the socialist experience and transition to capitalism.
- NU Core: Comparative study of cultures, social science level 1.
- NUpath: Understanding societies and institutions.

ECON 1292 Economic History of the Middle East (4 SH)
Provides an historical account of the economies of the Middle East from the sixth century C.E. to the present. Conceives of the area between the Nile and Oxus as forming the core of the Middle East; besides the core, the region includes Turkey and North Africa. Identifies the major economic and demographic trends in the region, or segments of the region, to examine the ecological bases of the economies and the connection between political history and the economic trends and to understand the ways in which economies of the region articulated with other major economic regions including Europe, West Africa, and the economies of the Indian Ocean. Studies the systems of government and laws, agriculture, commerce, and manufacturing.
- NU Core: Comparative study of cultures, social science level 1.

ECON 1293 European Economic History (4 SH)
Covers European economic history from ancient times to the twentieth century. A brief survey of early Greek and Roman economic life provides the context for more in-depth analysis of medieval, mercantilist, and modern economic institutions. Emphasis is on the role of technology, trade, and natural resources in the development of modern European economies.
- NU Core: Social science level 1.
- NUpath: Understanding societies and institutions.

ECON 1915 Introductory Selected Topics in Macroeconomics (4 SH)
Covers selected topic matter in the field of macroeconomics. The specific topic is chosen by the instructor.
- NU Core: Social science level 1.
- Repeatability: May be repeated up to 3 times.

ECON 1916 Introductory Selected Topics in Microeconomics (4 SH)
Covers selected topic matter in the field of microeconomics. The specific topic is chosen by the instructor.
- NU Core: Social science level 1.
- Repeatability: May be repeated up to 3 times.

ECON 2315 Macroeconomic Theory (4 SH)
Presents several theoretical approaches to the study of short-run economic instability and long-run growth. Uses conceptual and mathematical tools to examine what economists believe to be the major determinants of fluctuations in employment and price level, as well as the rate of economic growth. The theoretical models are used to evaluate the operation and impact of various macroeconomic policy tools.
- Prerequisite: (a) ECON 1115 and (b) MATH 1231, MATH 1241, MATH 1242, MATH 1251, MATH 1340, MATH 1341, or MATH 1342.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Understanding societies and institutions, analyzing and using data.

ECON 2316 Microeconomic Theory (4 SH)
Examines supply-and-demand analysis, various elasticity concepts and applications, theories of demand and production, and derivation of cost curves. Analyzes pricing and output behavior in the several market structures with their welfare and the pricing of resources.
- Prerequisite: (a) ECON 1116 and (b) MATH 1231, MATH 1241, MATH 1242, MATH 1251, MATH 1340, MATH 1341, or MATH 1342.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Engaging with the natural and designed world.

ECON 2325 Recitation for ECON 2315 (0 SH)
Offers small-group discussion format to cover material in ECON 2315.

ECON 2326 Recitation for ECON 2316 (0 SH)
Offers small-group discussion format to cover material in ECON 2316.

ECON 2350 Statistics (4 SH)
Discusses basic probability, descriptive statistics, estimation techniques, statistical hypotheses, sampling, analysis of variance, correlation, and regression analysis in the context of economics. Computer applications are an integral part of the course.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
ECON 3404 International Food Economics and Policy (4 SH)
Covers basic concepts in economic and political dimensions of food production, consumption, and trade, with particular emphasis on the global food system. Topics include market and consumption analysis, the agriculture and food industries, types of food policy and other political instruments related to food, and how these affect consumer food choices, environment, diet, nutrition, and health. Discusses and analyzes factors driving the rapid evolution of the way food is produced, processed, distributed, and consumed, and its implications, in the context of the global food environment. Reviews current empirical evidence on the world food situation and discusses issues such as hunger, food security, obesity, and food safety.
• Prerequisite: ECON 1116.
• NUpath: Understanding societies and institutions.
• Equivalent: INTL 3404.

ECON 3405 A Critique of Capitalism (4 SH)
Examines the origins, workings, successes, and failures of capitalism, defined as an economic system where capital is privately owned (for the most part) and markets solve the economic problem (again, for the most part). Examines, in addition, several variants of private-ownership economies (with varying levels of market activities), such as slavery, feudalism, land-tenancy, putting-out system, self-employment, etc. Also examines some alternatives to capitalism, such as command socialism, market socialism, worker-ownership of capital, cooperatives, Islamic economy, and Christian economy.
• Prerequisite: ECON 1116 or permission of instructor.

ECON 3406 Critical Perspectives on Economics (4 SH)
Examines the assumptions, concepts, theories, tools, and tests employed by neoclassical economics; identifies the biases and limits of these methods; and explores alternative economic approaches that might overcome these failings. Also develops an ethical critique of markets, the profit motive, corporations, efficiency, innovation, and economic growth. Offers students an opportunity to develop critical perspectives on neoclassical economics and other approaches to economics.
• Prerequisite: ECON 1116 and junior or senior standing.

ECON 3410 Labor Economics (4 SH)
Emphasizes an economic analysis of the labor market, the labor force, and wages and earnings. Explores the differences that have existed and continue to exist in the labor market with regard to race, ethnicity, and gender and the theories behind why they have existed and continue to exist. Covers supply, development, and efficient use of human resources; demand for labor by businesses and industries; wage inequality and its determinants; changing occupational and industrial structure; nature, causes, and incidence of unemployment; economic impact of unions; and influence of related labor-market institutions and relevant public policies including minimum wages, wage subsidies, and earned-income tax credits; health and safety regulations (OSHA); and antidiscrimination and affirmative action policies and programs.
• Prerequisite: ECON 1115 or ECON 1116.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

ECON 3410 Labor Economics (4 SH)
Emphasizes an economic analysis of the labor market, the labor force, and wages and earnings. Explores the differences that have existed and currently exist in the labor market with regard to race, ethnicity, and gender and the theories behind why they have existed and continue to exist. Covers supply, development, and efficient use of human resources; demand for labor by businesses and industries; wage inequality and its determinants; changing occupational and industrial structure; nature, causes, and incidence of unemployment; economic impact of unions; and influence of related labor-market institutions and relevant public policies including minimum wages, wage subsidies, and earned-income tax credits; health and safety regulations (OSHA); and antidiscrimination and affirmative action policies and programs.
• Prerequisite: ECON 1115 or ECON 1116.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

ECON 3414 Economics of Human Capital (4 SH)
Explores theoretical and empirical treatment of economic issues related to investments in human capital including formal education (preschool through postsecondary), vocational education, on-the-job training, work experience and government-sponsored employment and training programs, and their impacts on individuals and society. Emphasizes studies of public policies to promote human capital investments including cost-effectiveness analysis and benefit-cost analysis for determining the effectiveness of investments in literacy, education, and training from a private and social standpoint.
• Prerequisite: ECON 1116.
• NUpath: Understanding societies and institutions.

ECON 3415 Poverty and Income (4 SH)
Focuses on economic analysis of inequalities in incomes, earnings, and wealth; poverty; and discrimination. Examines the causes of economic inequality and the nature, causes, and effects of poverty; explores an array of public policies to reduce poverty and inequalities in income, earnings, and wealth.
• Prerequisite: ECON 1115 or ECON 1116.

ECON 3420 Urban Economic Issues (4 SH)
Studies urban growth and development, focusing on economic analysis of selected urban problems such as housing, poverty, transportation, education, health, crime, and the urban environment. Discusses public policies related to such problems.
• Prerequisite: ECON 1116.
• NUpath: Understanding societies and institutions.
ECON 3422 Economics of Transportation (4 SH)
Covers transportation and land-use patterns; externalities; special costs and social benefits of various modes of transportation, ownership, regulations, and financing of various modes of transportation; and economics of new technology in transportation.
• Prerequisite: ECON 1116.

ECON 3423 Environmental Economics (4 SH)
Applies the tools of economics to environmental issues. Explores taxonomy of environmental effects; externalities; the commons problem; taxation, regulations, marketable permits, and property rights as a solution; measuring benefits of cleaner air and water, noise abatement, and recreational areas; global issues including tropical deforestation and acid rain; and the relevance of economics to the environmental debate.
• Prerequisite: ECON 1116.

ECON 3424 Law and Economics (4 SH)
Focuses on how an understanding of the law is furthered by an awareness of the economic background against which it operates. Draws from economic principles, developing concepts such as efficiency, property rights, regulation, and income distribution. Applications of these ideas may include health and safety, the environment, the legal services and insurance industries, and zoning and land use, among others.
• Prerequisite: ECON 1116.

ECON 3425 Energy Economics (4 SH)
Introduces theoretical and empirical perspectives on energy demand and energy supply. Energy is vital to modern economies. Emphasizes the role markets play in determining how to use energy and its sources and the scope for public policy to address market imperfections. Discusses oil, natural gas, coal, nuclear power, and renewable energy (such as hydro-, wind, and solar power). Covers the public policy issues around greenhouse gas emissions and energy security.
• Prerequisite: ECON 1116.

ECON 3440 Public Finance (4 SH)
Presents an overview of the economics of government and the role of public policy. Develops guidelines to determine which economic activities are best performed by government and which are not. Also examines the impact of tax policies on efficiency, economic growth, and equity. Topics include market failures, public choice, the personal income tax, the corporate tax, sales tax, and taxation of capital and wealth, and options for reform of the tax structure. Major spending programs such as social security and education and healthcare are analyzed.
• Prerequisite: ECON 1116.

ECON 3442 Money and Banking (4 SH)
Covers the nature and functions of money, credit, and financial markets in the modern international economy. Analyzes financial markets and institutions, central banking, and the effects of interest and foreign exchange rates on the real economy.
• Prerequisite: ECON 1115.

ECON 3460 Managerial Economics (4 SH)
Explores the application of economic principles to the solution of managerial decision-making problems in areas such as demand estimation, cost estimation and control, pricing and marketing strategies, employee incentives, financing of capital investments, and responses to government regulation and taxation. Case studies and simulation models are typically used as pedagogical tools.
• Prerequisite: ECON 1116.

ECON 3461 Government and Business (4 SH)
Examines the government’s role in regulating economic activity. Discusses factors behind the trends of market deregulation and increasing social regulation. Develops criteria to determine when regulation and antitrust law is desirable. Topics include antitrust laws and their enforcement; regulation of public utilities, transportation, and communication industries; and regulation of environmental, health, product, and workplace safety.
• Prerequisite: ECON 1116.

ECON 3462 Bubbles, Busts, and Bailouts: Market and Regulatory Failures in the Financial Crisis (4 SH)
Investigates economic and financial bubbles together with the busts and bailouts that usually follow. Analyzes how and why bubbles form in markets such as housing and stocks, emphasizing the financial crisis of 2007–2008 but covers others as well. Also examines the lasting effects on markets and the economy from the collapse of such bubbles and the need for bailouts and other policies that are often used. Applies a range of perspectives to identify the market failures and regulatory failures that can cause bubbles—failures of assumptions about information, about incentives, and about oversight. Includes perspectives from microeconomics, behavioral economics, finance, and public policy.
• Prerequisite: ECON 1116.

ECON 3470 American Economic History (4 SH)
Covers the economic history of the United States from the colonial period to the present. Includes studies of the development of major economic institutions and the effects of technological change. Examines economic reasons for the spread of an industrial market economy in the nineteenth century and the successes and failures of this economy in the twentieth century.
• Prerequisite: (a) ECON 1115 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NU Path: Understanding societies and institutions, writing intensive in the major.
ECON 3481 Economics of Sports (4 SH)
Investigates what economics has to say about sports as an economic activity: what tools of economic analysis apply to sports, whether sports require different economic tools, what the evidence has to say about key questions. Focuses on professional team sports, although some attention is paid to college sports and to individual professional sports.
• Prerequisite: ECON 1116.

ECON 3490 Public Choice Economics (4 SH)
Studies public choice economics—the scientific analysis of government behavior—and is divided into two parts: institutional political economy and social choice theory. Public choice economics applies this neoclassical economic analysis to political issues such as rent seeking, tax reform, logrolling, voting behavior, the function of government, the intersection between public and private interests, and federalism. The point of departure from political science is that economists have based this analysis on the assumption that utility functions do not change once a person enters the realm of public service and that the argument of their utility functions is still their own self-interest and not the interest of the social system in which they operate.
• Prerequisite: ECON 1115 and ECON 1116.
• NUpath: Understanding societies and institutions.

ECON 3520 History of Economic Thought (4 SH)
Traces the evolution of Western economic thought. Covers several important periods and schools of economic thought including mercantilism, physiocracy, classical, Marxist, neoclassical, and Keynesian. Emphasizes the relationship between historical changes in society and economic thought, focusing on changes in the types of questions economists ask and the analytical tools they use.
• Prerequisite: (a) ECON 1115 and (b) ECON 1116 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ECON 3560 Applied Econometrics (4 SH)
Examines research methods used by practicing economists. Discusses typical problems from applied areas of economics including choice of modeling framework, problems of data collection, review of estimation techniques, interpretation of results, and development of static and dynamic adaptive policy models. A research paper utilizing computer applications is an integral part of the course.
• Prerequisite: (a) ECON 2315 and (b) ECON 2316 and (c) ECON 2350, MATH 2280, MATH 3081, POLS 2400, MGSC 1201, or MGSC 2301 and (d) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (e) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Analyzing and using data, writing intensive in the major.

ECON 3915 Intermediate Selected Topics in Macroeconomics (4 SH)
Covers selected topic matter in the field of macroeconomics. The specific topic is chosen by the instructor.
• Prerequisite: ECON 1115.
• Repeatability: May be repeated up to 5 times.

ECON 3916 Intermediate Selected Topics in Microeconomics (4 SH)
Covers selected topic matter in the field of microeconomics. The specific topic is chosen by the instructor.
• Prerequisite: ECON 1116.
• Repeatability: May be repeated up to 5 times.

ECON 4634 Comparative Economics (4 SH)
Describes the uniqueness of modern market economies in terms of social institutions that serve limited economic ends. Begins with a presentation of traditional economic analyses of the advantages and disadvantages of market economies. Examines these theories in light of evidence from economic anthropology regarding the evolution of market institutions and from the problems encountered in contemporary transitional economies as they move from command to market institutions.
• Prerequisite: ECON 1115 and ECON 1116.

ECON 4635 International Economics (4 SH)
Covers Ricardian and neoclassical theories of trade; trade policies; tariffs, quotas, voluntary export restraints, and customs union; global trade regime; GATT (General Agreement on Tariffs and Trade) and WTO (World Trade Organization); balance-of-payments accounts; foreign exchange markets; monetary and portfolio balance approaches to external balance; fixed or flexible exchange rates; and international monetary system.
• Prerequisite: ECON 1115 and ECON 1116.

ECON 4640 Financial Economics (4 SH)
Introduces students to the theory of investments, including the principles of risk and return, the theory of portfolio selection, asset pricing models such as the capital asset pricing model (CAPM) and arbitrage pricing theory (APT), valuation of stocks, bond pricing and the term structure of interest rates, and options (what they are and how to use them). Geared toward nonbusiness majors who are interested in a rigorous course in finance.
• Prerequisite: (a) ECON 2315 or ECON 2316 and (b) ECON 2350, MATH 3081, POLS 2400, MGSC 1201, or MGSC 2301.
ECON 4650 Economic Growth and Applications (4 SH)
Explores the theory as well as the empirics of economic growth. Emphasizes international comparisons of economic performance in terms of aggregate income and long-run growth. Presents the neoclassical model of economic growth as well as endogenous growth theory. Covers econometric application of the growth models. Topics include the role of ideas and technology, population dynamics, government policy, culture, the environment, income inequality, international trade, democracy, international aid, foreign investment, and the rule of law. One of the purposes of this class is to allow economics majors to apply and extend their knowledge of macroeconomic theory and applied econometrics.
• Prerequisite: ECON 2315 and ECON 3560.

ECON 4653 Mathematics for Economics (4 SH)
Introduces basic tools of mathematics, matrix algebra, differential and integral calculus, and classical optimization, with special reference to economic applications. Computer applications are an integral part of the course.
• Prerequisite: ECON 1115 and ECON 1116.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

ECON 4680 Competition Policy and Regulation (4 SH)
Provides an analytic framework and empirical study of how the structure of industries and the conduct of sellers affect performance. Includes examples and case studies from both the “old economy” and the “new economy.” Examines antitrust as a public policy designed to promote better market performance.
• Prerequisite: ECON 2316.
• Equivalent: ECON 3480.

ECON 4681 Information Economics and Game Theory (4 SH)
Offers an advanced course on the economics of information, including moral hazard and adverse selection; game theory; and mechanism design. Designed for students with some prior exposure to game theory. Formally considers alternative solution concepts, such as Nash equilibrium and rationalizability for simultaneous move and sequential move games under complete information about payoffs and preferences, as well as solution concepts such as Bayesian-Nash equilibrium to analyze selection, screening, and incentives in games of incomplete or asymmetric information. Covers optimal incentives or mechanism design, including the optimal design of contracts, auctions, and other mechanisms.
• Prerequisite: (a) ECON 2350, MATH 3081, MGSC 1201, MGSC 2301, or POLS 2400 and (b) ECON 2316; prior exposure to game theory recommended.

ECON 4692 Senior Economics Seminar (4 SH)
Incorporates aspects of real-world and academic experiences of students into an analytical context, enabling students to demonstrate their ability to apply economic concepts, methodology, and data to economic issues and problems of personal and philosophical significance.
• Prerequisite: (a) ECON 2315 and (b) ECON 2316 and (c) ECON 2350, MATH 2280, MATH 3081, POLS 2400, MGSC 1201, or MGSC 2301 and (d) senior standing; economics majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

ECON 4915 Advanced Selected Topics in Macroeconomics (4 SH)
Covers selected topic matter in the field of macroeconomics. The specific topic is chosen by the instructor.
• Prerequisite: ECON 2315.
• Repeatability: May be repeated without limit.

ECON 4916 Advanced Selected Topics in Microeconomics (4 SH)
Covers selected topic matter in the field of microeconomics. The specific topic is chosen by the instructor.
• Prerequisite: ECON 2316.
• Repeatability: May be repeated without limit.

ECON 4965 Undergraduate Teaching Experience 1 (4 SH)
Offers an opportunity for qualified undergraduate students to serve as undergraduate teaching assistants. Requires various assignments closely directed by the assigned course instructor. These may include holding office hours, light grading, maintaining the records for the course, proctoring—but not solely administering—exams and quizzes, holding recitation/tutorial sessions, and (very) limited lecturing or leading class discussions.
• Prerequisite: Junior or senior standing, minimum overall GPA of 3.333, and grade of A– or better in course assignment; permission to enroll is further subject to the availability of an appropriate course assignment and instructor.
• NU Core: Experiential learning.
• Equivalent: ECON 4925.
ECON 4966 Undergraduate Teaching Experience 2 (1 SH)
Offers an opportunity for qualified undergraduate students to serve as undergraduate teaching assistants. Requires various assignments closely directed by the assigned course instructor. These may include holding office hours, light grading, maintaining the records for the course, proctoring—but not solely administering—exams and quizzes, holding recitation/tutorial sessions, and (very) limited lecturing or leading class discussions. May incur a one-credit overload charge.
• Prerequisite: ECON 4925 or ECON 4965, junior or senior standing, minimum overall GPA of 3.333, and grade of A– or better in course assignment; permission to enroll is further subject to the availability of an appropriate course assignment and instructor.
• Equivalent: ECON 4926.

ECON 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Prerequisite: ECON 2315, ECON 2316, and ECON 2350.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

ECON 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ECON 4970.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

ECON 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

ECON 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. May not be substituted for requirements leading to a BA or BS in economics.
• Prerequisite: Senior standing and approval of department chair; economics majors only.
• Repeatability: May be repeated without limit.

ECON 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

ECON 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ECON 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ECON 5105 Math and Statistics for Economists (4 SH)
Offers an intensive study of the statistical methods and techniques and mathematical fundamentals necessary for quantitative economics. Statistical topics include descriptive statistics, probability theory, fundamentals of estimation and hypothesis testing, and regression and correlation analysis. Mathematical topics include linear algebra and differential and integral calculus. Computer applications are an integral part of the course.
• Prerequisite: Graduate standing.

ECON 5110 Microeconomic Theory (4 SH)
Presents a survey of microeconomic theory at the beginning graduate level. Topics include theories of the consumer, firm, and market (including input and output markets), welfare economics, and market failures. Includes applications of theory to public policy questions in such fields as industrial organization and public finance.
• Prerequisite: Knowledge of undergraduate microeconomic theory and graduate standing.

ECON 5120 Macroeconomic Theory (4 SH)
Examines theories of the short-run determination of output, employment, and prices, and long-run economic growth. Presents alternative macroeconomic models. Also consists of applied case study analysis of the theoretical models presented in class.
• Prerequisite: (a) ECON 5105 or equivalent with a grade of C– and (b) knowledge of undergraduate microeconomic theory and (c) graduate standing.

ECON 5140 Applied Econometrics (4 SH)
Offers an intensive study of econometric techniques applied to cross-section, time-series, and panel data. Applies the fundamentals of econometrics to analyzing structural economic models, forecasting, and policy analysis. Computer applications and an empirical research project are an integral part of the course.
• Prerequisite: ECON 5105 and graduate standing.
ECON 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. May not be substituted for requirements leading to a BA or BS in economics.
- Prerequisite: Graduate standing.
- Repeatability: May be repeated without limit.

ECON 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Graduate standing.
- Repeatability: May be repeated without limit.

ECON 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- Repeatability: May be repeated without limit.

ECON 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
- Repeatability: May be repeated without limit.

ECON 7200 Topics in Applied Economics (4 SH)
Presents an application of microeconomic and macroeconomic theory, as well as quantitative methods, to a variety of social issues, both domestic and international.
- Repeatability: May be repeated without limit.

ECON 7210 Applied Microeconomic Policy Analysis (4 SH)
Examines the alternative microeconomic activities of the public sector and the role of a diverse array of microeconomic tools and techniques in public sector policymaking, planning, program administration, and evaluation. Topics include the economics of market failure; the economics of information, corruption, public goods, and services provision; production externalities; economics of deregulation and privatization; and policy and program evaluation techniques including outcome and impact evaluation, social and economic experiments, objective functions, cost-effectiveness analysis, and benefit-cost analysis.
- Prerequisite: ECON 5110 with a grade of C–; ECON 5140 is recommended.

ECON 7220 Applied Macroeconomic Policy Analysis (4 SH)
Examines the range of macroeconomic activities undertaken by national governments around the world, and identifies the role of a diverse array of macroeconomic policymaking and planning tools and techniques for use in formulating and evaluating macroeconomic policies. Topics include the macroeconomic functions of government, alternative macroeconomic policies and policy tools, the theory of economic policy, macroeconomic accounting and databases, econometric models of national economies, policy simulation models, forecasting and projection models, input-output models, general equilibrium models, and national economic growth models including the new growth models and empirical applications.
- Prerequisite: ECON 5120; ECON 5140 is recommended.

ECON 7230 History of Economic Thought (4 SH)
Discusses the development of economic thought since the sixteenth century and focuses on the analytical innovations in the discipline. Explores the persistence of certain topics like money, capital accumulation, macroeconomic stability, and price theory throughout the development of economics, and examines the historical policy issues that inspired different thinkers to address these topics in new ways.

ECON 7240 Workshop in Applied Econometrics (4 SH)
Offers an intensive, hands-on application of econometrics to research problems in economics, using current econometric software packages. Both cross-section and time-series techniques are used and applied to different areas of economics, such as global economics, labor economics, urban economics, public finance, policy evaluation, and so on. Students are expected to complete a written applied econometrics project and present the results to the class.
- Prerequisite: ECON 5140 with a grade of C–.

ECON 7250 International Economic Development (4 SH)
Examines the record of growth and development over the past five centuries, the history of global disparities in levels of development over the past two centuries, theories of growth and development, and development policies across lagging countries over the past fifty years. Each topic is examined from different theoretical perspectives including Marxist, neo-Marxist, neoclassical, and institutional.
- Prerequisite: Familiarity with microeconomics and trade theory is recommended.
ECON 7251 International Finance (4 SH)
Introduces students to international finance and equips them with tools and methods to study and analyze international economic issues and problems. Topics include the foreign exchange market, balance of payments, international investment and banking, monetary and fiscal policy in an open economy, economic integration and monetary unification, the international monetary system, and optimum currency areas. Each student is required to write a short paper on a current problem in international finance.

ECON 7252 International Trade (4 SH)
Examines theories of trade including Ricardian, Heckscher-Ohlin, and trade under increasing returns to scale; welfare implications of different trade policies including tariffs, quotas, voluntary export restraints, and customs union; the political economy of trade policies; and global trading arrangements including GATT and WTO.
• Prerequisite: Knowledge of microeconomic theory.

ECON 7253 International Integration (4 SH)
Examines the evolution of global markets for goods, services, capital, and labor over the past two centuries, the stylized facts regarding trends in integration, the factors affecting the trends in integration, the linkages between integration of different markets, and the impact of integration on the dynamics of global development and disparities. The analysis follows an eclectic approach to the questions addressed, drawing upon different intellectual traditions in economics.
• Prerequisite: Knowledge of intermediate microeconomic theory.

ECON 7254 Urban Economic Systems (4 SH)
Examines urban economic systems including systematic relationships among cities, as well as those within cities. The portion of the course devoted to intermetropolitan analysis covers central place theory, the location of economic activity, and intermetropolitan trade. Intrametropolitan analysis includes urban form and land use, land use controls, and local government systems.
• Prerequisite: ECON 5110 and ECON 5140.

ECON 7255 Urban Economic Development (4 SH)
Examines urban economic development processes. Topics include models and techniques for describing and evaluating urban economies; development strategies and tools; commercial, industrial, and housing development; and problems of poverty and housing.

ECON 7262 Regional Economic Theory (4 SH)
Analyzes the following topics: comparative costs and location analysis for industry, various indices of location measures, land use theories, interregional labor migration, interregional trade, regional development, regional indices of location measures, regional and interregional input-output analysis, and econometric models for regional analysis.
• Prerequisite: ECON 5110 with a grade of C–.

ECON 7263 Labor Economics (4 SH)
Offers a comprehensive microeconomic approach to neoclassical wage theory and the theory of labor markets focusing on labor supply, household production, marginal productivity, human capital, and search. Examines alternative labor market theories including the efficiency wage theory and the dual labor market theory. Emphasis is on understanding and estimating empirical models of labor markets.
• Prerequisite: ECON 5110 and ECON 5140.

ECON 7264 Economics of Human Capital (4 SH)
Studies human capital theory and its applications to a wide variety of economic and social behaviors including fertility, labor supply behavior, migration, employment and unemployment rates, wages, earnings, health, and economic growth and development. Topics include the evolution of human capital theory, concepts and measures, and the contributions of human capital to the economic growth of nations and regions. Applications cover the United States, other industrialized nations, and developing countries.
• Prerequisite: ECON 5110 and ECON 5140.

ECON 7265 Inequality and Poverty (4 SH)
Covers an array of topics on the economics of inequality and its application to the distribution of wages, earnings, incomes, and wealth and the economics of poverty. Topics include an analysis of the distribution of economic rewards in societies and alternative mechanisms for distributing incomes and goods/services; alternative concepts and measures of economic inequality; theories of distributive justice; empirical studies of wage, earnings, income, and wealth inequality; the measurement and analysis of poverty problems; and public policies to combat inequality and poverty. Presents empirical studies of inequality and poverty problems in the United States, other industrialized countries, and developing nations.
• Prerequisite: ECON 5110 and ECON 5140.

ECON 7266 Economics of Government (4 SH)
Presents an overview of the economics of government and the role of public policy. Develops guidelines to determine which economic activities are best performed by government and which are not. Topics include public choice, public goods, externalities, public enterprise, and efficiency and equity effects of alternative tax systems.
• Prerequisite: ECON 5110 with a grade of C–.
ECON 7270 Economics of Law and Regulation (4 SH)
Relies on models of welfare economics to analyze the impact of laws, regulation, and deregulation, in terms of both positive and normative aspects. Topics include economic analysis of market failures and government remedies; property, tort, and contract law; and economic and social regulation. Students are encouraged to develop critical skills in analyzing various types of economic policy.
• Prerequisite: Knowledge of microeconomics.
• Equivalent: ECON 7268.

ECON 7271 Industrial Organization (4 SH)
Analyzes the market structure of industries and strategic behavior by businesses, and the effect that these have on economic performance. Draws on economic theory, empirical evidence, and case studies. Also includes a brief discussion of governmental policies such as antitrust, regulation, and public ownership/privatization.
• Prerequisite: ECON 5110.

ECON 7710 Microeconomic Theory 2 (4 SH)
Continues ECON 5110, building on its theories. Topics include game theory, economics of information, incentive theory, welfare economics, general equilibrium, and social choice theory.
• Prerequisite: ECON 5110 or equivalent.

ECON 7720 Macroeconomic Theory 2 (4 SH)
Continues ECON 5120. Offers an advanced course in macroeconomic analysis where economic theory and econometric evidence are brought together to explain economic events and changes at the macro level including economic growth, changes in unemployment and inflation rates, and business cycles. Topics include the Solow growth model, overlapping-generations models, research and development models of growth, real-business-cycle theory, Keynesian theories of economic fluctuations, microfoundations, consumption, investment, unemployment, inflation and monetary theory, and budget deficits and fiscal policy.
• Prerequisite: ECON 5120 and ECON 5140, both with a grade of B–, or equivalent.

ECON 7740 Applied Econometrics 2 (4 SH)
Continues ECON 5140. Extends students’ understanding of econometrics beyond the topics covered in the earlier course. Students develop and complete an econometric research project using methods covered. Topics include models with multiple equations, nonlinear regression models, asymptotic theory, maximum likelihood, discrete choice models, limited dependent variables and duration models, panel data, regression models for time-series data, and unit roots and cointegration.
• Prerequisite: ECON 5140 with a grade of B–.

ECON 7763 Labor Market Analysis (4 SH)
Offers a theoretical and methodological survey of the field of neoclassical labor market analysis at the PhD level. Topics include the supply of labor from the perspective of the individual and the family, human capital, the demand for labor, market equilibrium, and the determination and distribution of wages and earnings. Other topics that may be included are unions, unemployment, labor mobility, alternative models of labor markets, labor productivity and growth, and income distribution and poverty.
• Prerequisite: ECON 7710 and ECON 7740 (the latter may be taken concurrently).

ECON 7764 Topics in Labor Economics (4 SH)
Covers the theoretical and empirical issues surrounding current topics in the area of labor economics. Topics may vary each time the course is offered and may include discrimination, efficiency wage theory, labor legislation, life cycle analysis, and the use of microdata (panel studies, search behavior, intergenerational earnings mobility, and employment and training policies).
• Prerequisite: ECON 7763.

ECON 7771 Framework of Industrial Organization (4 SH)
Sets out the analytical framework of industrial organization economics-the basis and method for evaluating the performance of markets and firms and for prescribing policies for improvement. Topics include size and structure of firms, market concentration, pricing in oligopoly and other markets, entry and entry deterrence strategies, and advertising and product strategies. Each of these topics is examined using a range of tools including microeconomic theory, game theory, and statistical analysis.
• Prerequisite: ECON 7710 and ECON 7740, both with a grade of B–.

ECON 7772 Public Policy Toward Business (4 SH)
Covers the three major facets of public policy toward business: antitrust, regulation, and privatization. Demonstrates how economic theory and evidence are brought to bear on practical questions of market failure and policies to remedy such failure. Topics include mergers, collusion and facilitating practices, predatory conduct, cost of service regulation, price caps and incentive regulation, deregulation, and public enterprise vs. privatization. Policies are analyzed for their rationale, techniques for implementation, and effects as measure in the context of actual experience in the United States and other countries.
• Prerequisite: ECON 7771.

ECON 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. May not be substituted for requirements leading to a BA or BS in economics.
• Repeatability: May be repeated without limit.
EDUC 1111 Education in the Community (4 SH)
Considers the unique contributions of community, family, and public schools to education in the United States today. Uses classroom and field-based activities to provide historical and social contexts of public education. Encourages students to reflect on their own prior education, to learn from persons active in the education community, and to consider their future roles as educators.
• Corequisite: EDUC 1112.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity, integrating knowledge and skills through experience.

EDUC 1112 Field Experience (0 SH)
Complements EDUC 1111 by providing a field placement in a community-based educational setting. Successful completion of the course is required before students apply to the School of Education.
• Corequisite: EDUC 1111.

EDUC 3521 Field Experience (0 SH)
Provides field placement and performance assessment that complements an intermediate or advanced course taken concurrently by students in the School of Education.
• Prerequisite: Admission to the School of Education.

EDUC 3568 Literacy Field (0 SH)
Provides field placement and performance assessment that complements EDUC 5121 taken concurrently by students in the School of Education.

EDUC 4000 Ethics and Education (4 SH)
Offers an interdisciplinary ethics and education course intended for students interested in considering how educators’ ethical dispositions, decisions, and behaviors affect and reflect a society’s values and ideals. Covers three primary areas of inquiry in this course. The first is the field of ethics itself—ethics of duty, idealism, utilitarianism, virtue, relativism, pragmatism, pluralism, critical ethics, ethics of care, and ethics of professionalism. The second is these ethical paradigms’ import for education, including issues relating to equality, diversity, cultural recognition, competition, dishonesty, privacy, discrimination, reward, and punishment. Third, the course considers particular theories of moral development and their relationship to moral education. Emphasizes the particular types of ethical issues presented in urban education contexts.
• Prerequisite: Junior or senior standing.
EDUC 4504 Learning and Accomplished Practice (4 SH)
Offers a practice-mediated survey of contemporary educational theory of human learning and accomplished teaching. Students develop a working understanding of teaching and learning as they occur in different types of schools and community settings. Investigates two kinds of theories: theories learning and cognition-how humans learn, acquire knowledge, and make sense of their experience; and theories of teaching or pedagogy-how best to teach for understanding and learning achievement. Students synthesize their developing understanding through their instructional activity with children in field placements. Includes a field placement and performance assessment to complete the course satisfactorily. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4511 Curriculum Design and Assessment (4 SH)
Explores the discourse about ‘curriculum’ as an evolution in our thinking about what’s worth learning and teaching. Links learning theory and teaching practice in three key areas: the impact of the community on the student as learner, the role of pedagogy in creating access to learning for all students, and the selection of curriculum content to create both inclusive and challenging learning environments. Students examine and develop several curricula as they explore the process of curriculum construction and the theoretical perspectives that affect what and how teachers teach, and how they assess student work. Presents an opportunity, prior to student teaching, for students to model both the concrete activities of the curriculum design process and their reflection on that process. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4521 Language, Culture, and Literacy in Middle and High Schools (4 SH)
Examines the interrelationships among language, culture, and identity, and explores the implications of those relationships for effective teaching in middle schools and high schools. Considers issues of linguistic diversity within their broad sociopolitical and philosophical contexts, emphasizing how language discrimination functions within the context of other forms of systematic oppression in our society. Explores the processes of identity development in the context of schooling and literacy performance. Also examines methods of helping linguistically diverse students to develop their oral and written language abilities within a learning environment that draws upon and celebrates their native language abilities and traditions. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4522 Teaching the Language Arts (4 SH)
Aims at developing competence and confidence in secondary teachers working with diverse students, many of whom appear to read and write only when required to do so. Considers the design and practices of traditional English curricula at the middle and high school level, and explores alternative syllabi and unit design as strategies for actively engaging students in the pursuit of meaning in reading and writing as they enhance their skills. Explores the role of research as well as interdisciplinary and collaborative approaches as they relate to curricula in English and the humanities. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4524 Teaching History and the Social Studies (4 SH)
Explores the intersecting disciplines of history and social studies including geography, sociology, economics, political science, and history. Emphasizes the interrelatedness of disciplines and the emerging role of middle and high school students as citizens in their school, community, nation, and the world. Examines the challenge of covering all the material deemed essential by state and district curriculum frameworks, while helping one’s students become problem-solvers and critical thinkers in their analysis of social problems. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4525 Teaching Science (4 SH)
Examines how the evolving nature of science-ideas, theories, concepts, and controversies-relates to diverse middle and high school students, and how teachers can use experience-based, problem-centered approaches that engage the range of student learners and help them meet local and state learning goals. Identifies research possibilities within school contexts, both inside and outside the laboratory. Explores curricular frameworks and culturally relevant content to enable teachers to create a learning environment that supports inquiry and problem solving. Analyzes examples of excellent curriculum products, programs, assessments, and technology tools. Students develop a curriculum unit including assessment philosophy and practices. Graduate students are required to demonstrate advanced levels of study and research.

EDUC 4526 Teaching Mathematics (4 SH)
Explores mathematics teaching methods that are research based, experienced based, and grounded in the contemporary theoretical frameworks influencing mathematics education. Emphasis is on issues related to teaching math in an urban school, problem solving, communication, connections, and integrating technology as well as issues of access and equity, assessment, and cross-content teaching strategies. Graduate students are required to demonstrate advanced levels of study and research.

• Prerequisite: EDUC 4504.
EDUC 4530 Race and Urban Education (4 SH)
Provides an intensive examination of racism in the United States and the implications of race on homophobia, sexism, and so on, with a focus on the context of urban education. Through the lenses of color, ethnicity, and class, explores questions and concepts that lie at the heart of our personal and professional interactions in the school, classroom, and the community. Students are expected to participate in class discussion and begin the personal exploration of their own feelings and experience with racism. Combines formal lectures with group and small-group discussions, fieldwork, and video presentation.

EDUC 4552 Inquiry in the Humanities and Social Sciences at the Elementary Level (4 SH)
Examines how teachers enhance children’s understanding of history and social studies as part of a coordinated approach to the humanities. The goal is for teachers to engage students actively in reading, writing, and speaking through approaches that develop critical skills and habits of mind in relation to issues of citizenship, community, social justice, and the pursuit of truth in an evolving world. Explores methodology and curriculum design, applicable within and beyond social studies/history and language arts/English. Graduate students are required to demonstrate advanced levels of study and research.
* Prerequisite: EDUC 4504.

EDUC 4553 Inquiry in Math and Science at the Elementary Level (4 SH)
Designed to help students enhance their understanding of how children develop math, science, and technology knowledge and skills, and how the three areas are interconnected. Examines research into current issues influencing elementary school math, science, and technology. Emphasis is on strategies for planning and implementing an integrated lesson; equity, gender, and access issues; problem solving; state and national curriculum and assessment issues related to math, science, and technology education; and standards-based curriculum materials. Graduate students are required to demonstrate advanced levels of study and research.
* Prerequisite: EDUC 4504.

EDUC 4567 Literacy Development and Instruction (4 SH)
Using an inquiry approach, explores the rich complexity of literacy development and instruction in the elementary grades. Considers reading and writing as ways of exploring and reacting to the world in a thoughtful, articulate manner. Considers how reading, writing, speaking, and listening are interrelated, critical processes for exploring and responding to the world. An integrated language model serves as a basis for instructional methodology. Explores a range of approaches to reading and writing instruction based on students’ own experiences and questions, in light of research on cognitive development and language acquisition, and informed by political and sociocultural perspectives. Graduate students are required to demonstrate advanced levels of study and research.
* Prerequisite: EDUC 4504.

EDUC 4570 Inclusion, Equity, and Diversity (4 SH)
Provides students with tools and understanding to address the range of learning needs of special education legislation, as well as the politics of who is identified and why. Examines students’ own attitudes about teaching children with learning disabilities, and develops skills and strategies for identifying and teaching. Graduate students are required to demonstrate advanced levels of study and research.
* Prerequisite: Junior or senior standing.

EDUC 4850 Teaching Practicum (8 SH)
Supervised 300-hour-minimum practicum situated within Boston Public School system that meets the requirements for Massachusetts State initial licensure. The teacher candidate is mentored by cooperating teachers and NU faculty to meet performance assessment of professional standards. Director of field placement approval required.
* Prerequisite: Appropriate fieldwork, completion of education licensure courses, and passing scores on the Massachusetts Tests for Educator Licensure (MTEL).
* Corequisite: EDUC 4851.
* NU Core: Experiential learning.

EDUC 4851 Teaching Seminar (4 SH)
Integrates theoretical knowledge and practical understanding through a cycle of action and reflection. In conjunction with a teaching practicum, enables the teacher candidate to meet the professional standards for Massachusetts State initial licensure.
* Prerequisite: Appropriate fieldwork and completion of education licensure courses.
* Corequisite: EDUC 4850.
* NU Core: Experiential learning.
EDUC 4936 Disciplines Field (0 SH)
Provides field placement and performance assessment that complements the following discipline courses: EDUC 5122, EDUC 5124, EDUC 5125, or EDUC 5126 taken concurrently by students in the School of Education.
• Prerequisite: Junior or senior standing.

EDUC 4947 Teaching Preparatory Lab 3 (0 SH)
Provides field placement and performance assessment that complements an intermediate or advanced course taken concurrently by students in the School of Education.
• Prerequisite: Admission to the School of Education.

EDUC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on an in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

EDUC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: EDUC 4970.
• Repeatability: May be repeated without limit.

EDUC 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

EDUC 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

EDUC 5503 Culture, Equity, Power, and Influence (4 SH)
Examines the broad construct of culture and explores how these characteristics impact personal identity, access to education, social mobility, power, and influence. Explores educational institutions as cultural systems and questions concepts at the heart of personal and professional interactions in teaching, learning, curriculum, and administration. Examines students’ own attitudes about teaching children with learning disabilities. Offers students an opportunity to develop skills and strategies for identifying and teaching learning-disabled children. Requires graduate students to demonstrate advanced levels of study and research.
• Prerequisite: EDUC 1111, EDUC 1112, and junior, senior, or graduate standing; restricted to students in the College of Arts, Media and Design, the College of Science, and the College of Social Sciences and Humanities.

EDUC 5504 Child and Adolescent Development, Learning, and Teaching (4 SH)
Surveys contemporary educational theory of human learning and accomplished teaching. Offers students an opportunity to develop a working understanding of teaching and learning as they occur in different types of schools and community settings. Investigates how children and adolescents learn, acquire knowledge, and make sense of their experience, as well as theories of teaching or pedagogy—how best to teach for understanding and learning achievement.
• Prerequisite: EDUC 1111, EDUC 1112, and junior, senior, or graduate standing; restricted to students in the College of Arts, Media and Design, the College of Science, and the College of Social Sciences and Humanities.

EDUC 5570 Inclusion, Equity, and Diversity (4 SH)
Addresses the range of learning needs of special education legislation, as well as the politics of who is identified and why. Examines students’ own attitudes about teaching children with learning disabilities. Offers students an opportunity to develop skills and strategies for identifying and teaching learning-disabled children. Requires graduate students to demonstrate advanced levels of study and research.
• Prerequisite: EDUC 1111, EDUC 1112, and junior, senior, or graduate standing; restricted to students in the College of Arts, Media and Design, the College of Science, and the College of Social Sciences and Humanities.

ELECTRICAL AND COMPUTER ENGINEERING (EECE)

EECE 2000 Introduction to Engineering Co-op Education (1 SH)
Provides students preparation for the first co-op experience. Focuses on skills that provide a basis for successful co-op engagement including expectations and requirements, an introduction to professional credentials, résumé construction, self-assessment and goal setting, interviewing, professional and co-op ethics, issues of diversity in the workplace community, academic planning and decision making, and an introduction to career portfolios.
• Prerequisite: GE 1000.
**EECE 2150 Circuits and Signals: Biomedical Applications (4 SH)**
Constitutes the lecture portion of an integrated lecture/lab. Covers circuit theory, signal processing, circuit building, and MATLAB programming. Introduces basic device and signal models and basic circuit laws used in the study of linear circuits. Analyzes resistive and complex impedance networks, including Thevenin equivalents. Uses the ideal operational amplifier model, focusing on differential amplifiers and active filter circuits. In the signal processing area, introduces the basic concepts of linearity and time-invariance for both continuous and discrete-time systems, as well as concepts associated with analog/digital conversion such as sampling and quantization. Demonstrates discrete-time linear filter design on acquired signals in the MATLAB environment.

- **Prerequisite:** GE 1111, MATH 2341, and PHYS 1155 (the latter two may be taken concurrently); electrical engineering, computer engineering, and related combined majors only.
- **Corequisite:** EECE 2151.
- **Equivalent:** EECE 2400 and EECE 2410.

**EECE 2151 Lab for EECE 2150 (1 SH)**
Constitutes the lab portion of an integrated lecture/lab. Offers students an opportunity to explore circuits and signals in the lab and to use their knowledge of circuits, analog signals, digital signals, and biological signals to build a working analog/digital EKG system.

- **Prerequisite:** GE 1111, MATH 2341, and PHYS 1155 (the latter two may be taken concurrently); engineering students only.
- **Corequisite:** EECE 2150.
- **NUpath:** Analyzing and using data.
- **Equivalent:** EECE 2401 and EECE 2411.

**EECE 2160 Embedded Design Enabling Robotics (3 SH)**
Constitutes the lecture portion of an integrated lecture/lab. Presents the basics of the Unix operating system, high-level programming concepts, introductory digital design, wireless networking, and Simulink design.

- **Prerequisite:** GE 1111 or CS 2500; electrical engineering, computer engineering, computer science, and related combined majors only.
- **Corequisite:** EECE 2161.

**EECE 2161 Lab for EECE 2160 (1 SH)**
Constitutes the lab portion of an integrated lecture/lab. Offers students a hands-on experience developing a remote-controlled robotic arm using an embedded systems platform.

- **Prerequisite:** GE 1111 or CS 2500; restricted to students in the College of Engineering and in the College of Computer and Information Science.
- **Corequisite:** EECE 2160.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.

**EECE 2210 Electrical Engineering (4 SH)**
Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff’s laws. Discusses selected topics that illustrate a variety of applications of electrical engineering, such as AC circuits and electric power, the basics of semiconductor devices with applications to transistor amplifier models, transients in circuits with energy storage, mechanical controls and mechatronics, digital signals, logic circuits, and some basic concepts of computer operations, specifically, number coding, arithmetic operations, and memory circuits.

- **Prerequisite:** MATH 1342; mechanical engineering and related combined majors only.
- **Corequisite:** EECE 2211.

**EECE 2211 Lab for EECE 2210 (1 SH)**
Accompanies EECE 2210. Covers fundamental DC and AC electrical concepts as well as analog and digital electronics.

- **Corequisite:** EECE 2210.

Covers the design and evaluation of control and data structures for digital systems. Uses hardware description languages to describe and design both behavioral and register-transfer-level architectures and control units. Topics covered include number systems, data representation, a review of combinational and sequential digital logic, finite state machines, arithmetic-logic unit (ALU) design, basic computer architecture, the concepts of memory and memory addressing, digital interfacing, timing, and synchronization. Assignments include designing and simulating digital hardware models using Verilog as well as some assembly language to expose the interface between hardware and software.

- **Prerequisite:** EECE 2160; engineering students only.
- **Corequisite:** EECE 2323.

**EECE 2323 Lab for EECE 2322 (1 SH)**
Offers students an opportunity to design and implement a simple computer system on field-programmable logic using a hardware description language. Covers simulation and testing of designs.

- **Prerequisite:** EECE 2160; engineering students only.
- **Corequisite:** EECE 2322.
EECE 2412 Fundamentals of Electronics (4 SH)
Reviews basic circuit analysis techniques. Briefly introduces operation of the principal semiconductor devices: diodes, field-effect transistors, and bipolar junction transistors. Covers diode circuits in detail; the coverage of transistor circuits focuses mainly on large-signal analysis, DC biasing of amplifiers, and switching behavior. Uses PSpice software to simulate circuits and large-signal models and transient simulations to characterize the behavior of transistors in amplifiers and switching circuits. Digital electronics topics include CMOS logic gates, dynamic power dissipation, gate delay, and fan-out. Amplifier circuits are introduced with the evaluation of voltage transfer characteristics and the fundamentals of small-signal analysis.
• Prerequisite: EECE 2150; engineering students only.
• Corequisite: EECE 2413.
• Equivalent: EECE 2402.

EECE 2413 Lab for EECE 2412 (1 SH)
Covers experiments reinforcing basic electronics topics such as diodes, bipolar junction transistors (BJT) as a switch, BJT amplifiers, and MOSFET circuits for switching and amplification. Practical measurements include use of voltmeters, ammeters, ohm meters, and impedance meters, as well as oscilloscope measurements of frequency, gain, distortion, and upper- and lower-cutoff frequencies of amplifiers.
• Prerequisite: (a) EECE 2150 or EECE 2410 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; engineering students only.
• Corequisite: EECE 2412.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: EECE 2403.

EECE 2520 Fundamentals of Linear Systems (4 SH)
Develops the basic theory of continuous and discrete systems, emphasizing linear time-invariant systems. Discusses the representation of signals and systems in both the time and frequency domain. Topics include linearity, time invariance, causality, stability, convolution, system interconnection, and sinusoidal response. Develops the Fourier and Laplace transforms for the discussion of frequency-domain applications. Analyzes sampling and quantization of continuous waveforms (A/D and D/A conversion), leading to the discussion of discrete-time FIR and IIR systems, recursive analysis, and realization. The Z-transform and the discrete-time Fourier transform are developed and applied to the analysis of discrete-time signals and systems.
• Prerequisite: (a) EECE 2150 or EECE 2410 and (b) MATH 2341; engineering students only.
• Equivalent: EECE 3464.

EECE 2530 Fundamentals of Electromagnetics (4 SH)
Introduces electromagnetics and high-frequency applications. Topics include transmission lines: transmission line model with distributed circuit elements, transmission line equations and solutions, one-dimensional traveling and standing waves, and applications; electromagnetic field theory: Lorentz force equations, Maxwell’s equations, Poynting theorem, and application to the transmission line’s TEM waves. Also studies uniform plane wave propagation along a coordinate axis and along an arbitrary direction; equivalent transmission lines for TEM, TE, and TM waves; reflection and refraction of uniform plane waves by conducting and dielectric surfaces. Discusses applications to wave guides, resonators, optical fibers, and radiation and elementary antennas. Introduces modern techniques (computational methods) and applications (optics, bioelectromagnetics, and electromagnetic effects in high-speed digital circuits).
• Prerequisite: (a) EECE 2150 or EECE 2410 and (b) MATH 2321 and (c) PHYS 1155; engineering students only.
• Corequisite: EECE 2531.
• Equivalent: EECE 3440.

EECE 2531 Lab for EECE 2530 (1 SH)
Accompanies EECE 2530. Supports class material related to transmission lines, wave-guiding structures, plane wave reflection and refraction, and antenna radiation. Includes experiments with microwave transmission line measurements and the determination of the properties of dielectric materials, network analyzer analysis of microwave properties of circuit elements and transmission line electrical length, analysis of effective dielectric constant and loss from microstrip line resonator transmission, optical measurement of refraction and reflection leading to determination of Brewster angle and optical constants for transparent and absorbing materials, and measurement of radiation patterns from dipole antennas.
• Prerequisite: (a) EECE 2150 or EECE 2410 and (b) MATH 2321 and (c) PHYS 1155; engineering students only.
• Corequisite: EECE 2530.
• Equivalent: EECE 3441.

EECE 2540 Fundamentals of Networks (4 SH)
Presents an overview of modern communication networks. The concept of a layered network architecture is used as a framework for understanding the principal functions and services required to achieve reliable end-to-end communications. Topics include service interfaces and peer-to-peer protocols, a comparison of the OSI (open system interconnection) reference model to the TCP/IP (Internet) and IEEE LAN (local area network) architectures, network-layer and transport-layer issues, and important emerging technologies such as Bluetooth and ZigBee.
• Prerequisite: Sophomore standing or above; electrical engineering, computer engineering, and related combined majors only.
• Equivalent: EECE 4628.
EECE 2560 Fundamentals of Engineering Algorithms (4 SH)
Covers the design and implementation of algorithms to solve engineering problems using a high-level programming language. Reviews elementary data structures, such as arrays, stacks, queues, and lists, and introduces more advanced structures, such as trees and graphs and the use of recursion. Covers both the algorithms to manipulate these data structures as well as their use in problem solving. Introduces algorithm complexity analysis and its application to developing efficient algorithms. Emphasizes the importance of software engineering principles.
• Prerequisite: EECE 2160 or CS 1500; engineering students only.
• Equivalent: EECE 3326.

EECE 2750 Enabling Engineering (4 SH)
Offers students an opportunity to develop a proposal for a design project that uses engineering technologies to improve the lives of individuals with cognitive or physical disabilities. Offers student project groups an opportunity to work with end users and caregivers at local nursing homes and special education schools to assess a specific need, research potential solutions, and develop a detailed proposal for a project. Project groups are matched with product design mentors who guide groups through the design process. Lectures cover relevant topics, including surveys of specific physical and cognitive disabilities and applicable engineering technologies. The same project may not be used to satisfy both this course and EECE 4790.
• Repeatability: May be repeated up to 2 times.

EECE 3000 Professional Issues in Engineering (1 SH)
Provides students with an opportunity to reflect on both academic and co-op experiences in the context of planning for the senior year and beyond. Issues include professional and ethical issues, resolving ethical conflicts, awareness of engineers as professionals in a diverse world, strengthening decision-making skills, career portfolios, and lifelong learning needs, goals, and strategies. Students reflect upon issues of diversity from their experience in the University and in their cooperative education placements. Explores the role of different work and learning styles and diverse personal characteristics on the workplace and the classroom. Professional issues impact of the cultural context, both in the United States and around the world, on the client, government relations, and the workplace.
• Prerequisite: EECE 2000 and junior or senior standing.
• NU Core: Comparative study of cultures.

EECE 3154 Hyperspectral Imaging in an International Context (4 SH)
Covers hyperspectral imaging, including instrumentation, data acquisition, and signal processing, taught in an international context. Specific topics include concepts of optics in optical measurement systems (lens equation, diffraction, spectroscopy, radiometry), effects of optical properties of atmosphere and target on images, and selection of appropriate wavelengths for different applications. Offers students an opportunity to learn about Beer’s law, reflection, scattering, and other basic concepts to apply to computational techniques. Introduces different analytical techniques to solve inverse problems. Taught in an international context with a partner faculty member with complementary expertise in the field to gain an understanding of different equipment and analytical approaches for a global perspective on this discipline.
• NU Core: Mathematical/analytical thinking level 2.

EECE 3230 Computer Architecture for Computer Scientists (4 SH)
Introduces the organization and architecture of computer systems. Uses the MIPS assembly language introduced in the prerequisite course, CS 2600, to illustrate the instruction set architecture. Introduces the basics of digital and logic circuits, followed by a description of the structure and function of the data path and control hardware. Illustrates the implementation of the instruction set by single-cycle, multiple-cycle, and a basic pipeline. Covers the architecture of modern high-performance processors inclusive of performance evaluation, arithmetics, hardware and software organization trade offs, and memory management (caching and virtual memory).
• Prerequisite: CS 2600.

EECE 3324 Computer Architecture and Organization (4 SH)
Presents a range of topics that include assembly language programming, number systems, data representations, ALU design, arithmetic, the instruction set architecture, and the hardware/software interface. Offers students an opportunity to program using assembly language and to simulate execution. Covers the architecture of modern processors, including datapath/control design, caching, memory management, pipelining, and superscalar. Discusses metrics and benchmarking techniques used for evaluating performance.
• Prerequisite: (a) CS 1500 or EECE 2160 and (b) EECE 2322; engineering students only.
EECE 3392 Electronic Materials (4 SH)
Provides a basic treatment of electronic materials from atomic, molecular, and application viewpoints. Topics include atomic structure and bonding in materials, structure of materials, and crystal defects. These topics lay a foundation for the introduction of thermal and electronic conduction, which is the underlying physics of electronic devices. Finally, the electronic properties of semiconductors, dielectric, magnetic, superconducting, and optical materials are examined. The latter half deals with an introduction to the state of the art in electronic materials, including semiconductor nano-electronics, magnetic semiconductors and spintronics, molecular electronics, carbon nanotubes, conducting polymers, diamond-like carbon, and other topics representing recent technological breakthroughs in the area of electronic materials.

EECE 3410 Electronics 2 (4 SH)
Covers transistors and op-amp circuits. Emphasizes real devices and their performance, analog IC design concepts, and building blocks. Reviews the Laplace transform and introduces its applications to analysis of electronic circuits governed by linear differential equations. Presents and employs equivalent models of passive and active elements in s-domain analysis including response speed, pole/zero plots, and magnitude/phase frequency behavior of important network functions. Introduces feedback and stability, oscillators, A/D and D/A converters and mixed-signal circuits, active filters, sensors and signal-conditioning circuits, and other design topics at the discretion of the instructor. Uses SPICE simulation to support design work. Includes laboratory hardware projects.

• Prerequisite: EECE 2412; College of Computer and Information Science, College of Engineering, and College of Science students only.

EECE 3468 Noise and Stochastic Processes (4 SH)
Discusses probability, random variables, random processes, and their application to noise in electrical systems. Begins with the basic theory of discrete and continuous probabilities, then develops the concepts of random variables, random vectors, random sequences, and random processes. Continues with a discussion on the physical origins of noise and models of where it is encountered in electronic devices, signal processing, and communications. Defines the concepts of correlation, covariance, and power density spectra and uses them to analyze linear system operations in continuous time.

• Prerequisite: (a) MATH 2341 and (b) EECE 2520 or EECE 3464.

EECE 4512 Biomedical Electronics (4 SH)
Provides the fundamental background required to interface biological systems with circuits and sensors. Includes signal conditioning electronics, electrodes, and other sensors used to extract information from the organism and safety considerations for medical applications. Combines lectures and labs.

• Prerequisite: EECE 2210 or EECE 2412.

EECE 4520 Software Engineering 1 (4 SH)
Provides an overview of main concepts in software engineering, the software process, methods, techniques, and tools. Topics include requirements analysis and specification; software design, coding, testing, and maintenance; and verification, validation, and documentation. Covers structured analysis and object-oriented design methodologies. Presents overviews of user interface design, prototyping, CASE tools, software metrics, and software development environments. Includes a small software development project.

• Prerequisite: CS 1500 or EECE 2560.

EECE 4524 VLSI Design (4 SH)
Covers a structured digital CMOS design focusing on designing, verifying, and fabricating CMOS VLSI-integrated circuits and modules. Emphasizes several topics essential to the practice of VLSI design as a system design discipline including systematic design methodology, good understanding of CMOS transistor, physical implementation of combinational and sequential logic network, and physical routing and placement issues. Begins design exercises and tutorials with basic inverters and proceeds to the design, verification, and performance of large, complex digital logic networks. Also covers IC design methodologies and performance, scaling of MOS circuits, design and layout of subsystems such as PLA and memory, and system timing. Requires lab session that includes computer exercises using CAD tools to design VLSI layouts and switch-level plus circuit-level simulations to design and analyze the project.

• Prerequisite: EECE 2322 and EECE 2412.

• Corequisite: EECE 4525.

EECE 4525 Lab for EECE 4524 (1 SH)
Accompanies EECE 4524. Covers topics from the course through various experiments.

• Corequisite: EECE 4524.
EECE 4528 CAD for Design and Test (4 SH)
Addresses the principles of the algorithms and approaches for VLSI design and test automation. Briefly covers basic data structures and graph algorithms typically used for computer-aided design (CAD) as well as general-purpose methods for combinatorial optimization, such as backtracking, branch-and-bound, simulated annealing, and genetic algorithms. Design automation topics include physical design automation (partitioning, floor planning, placement, global and detailed routing, cell generation, and layout compaction), and high-level synthesis (scheduling, resource allocation). Testing topics include an overview of fault modeling, automatic test pattern generation, design for testability, and built-in self test (BIST). Course involves some programming assignments (implementation of some of the algorithms covered in class) as well as using state-of-the-art CAD tools in the design flow.
- Prerequisite: (a) EECE 2322 and (b) EECE 2560 or EECE 3326.

EECE 4530 Hardware Description Languages and Synthesis (4 SH)
Focuses on modeling of digital systems in a hardware description language. Topics include textual vs. graphical modeling of digital systems, syntax and semantics of the VHDL language, modeling for simulation, and modeling for synthesis. Students use a commercially available CAD tool to simulate and synthesize digital system descriptions.
- Prerequisite: EECE 2322.

EECE 4532 Embedded System Design (4 SH)
Concentrates on design methodology, design of components, utilization of packages, use of design tools, and programming of embedded systems. Begins with presentation of register-transfer level design and ends with an implementation of a microcontroller as part of an embedded system. Teaches the Verilog Hardware Description Language and its related tools and uses them as a means of describing hardware at various levels of abstraction for simulation and synthesis. Also uses Field Programmable Gate Arrays and related design tools for simulation and synthesis.
- Prerequisite: EECE 2322.

EECE 4534 Microprocessor-Based Design (4 SH)
Focuses on the hardware and software design for devices that interface with embedded processors. Topics include assembly language; addressing modes; embedded processor organization; bus design; electrical characteristics and buffering; address decoding; asynchronous and synchronous bus protocols; troubleshooting embedded systems; I/O port design and interfacing; parallel and serial ports; communication protocols and synchronization to external devices; hardware and software handshake for serial communication protocols; timers; and exception processing and interrupt handlers such as interrupt generation, interfacing, and auto vectoring.
- Prerequisite: EECE 3324.
- Corequisite: EECE 4535.

EECE 4535 Lab for EECE 4534 (1 SH)
Accompanies EECE 4534. Consists of a comprehensive laboratory performed by a team of students. These laboratory exercises require students to design, construct, and debug hardware and software that runs on an embedded platform. Exercises are centered around a common embedded platform. The final exercise is a project that lets each group integrate hardware and software to realize a complete embedded design.
- Corequisite: EECE 4534.

EECE 4542 Advanced Engineering Algorithms (4 SH)
Covers classical and modern algorithms that efficiently solve hard electrical and computer engineering optimization problems. These problems arise in a wide range of disciplines—including computer-aided design, parallel computing, computer architecture, and compiler design—and are usually NP-complete, making it unlikely that optimal solutions can be found in a reasonable amount of time. Covers the fundamentals of algorithm analysis and complexity theory and then surveys a wide range of combinatorial optimization techniques, including exhaustive algorithms, greedy algorithms, integer and linear programming, branch and bound, simulated annealing, and genetic algorithms. Considers the efficient generation of optimal solutions, the development and evaluation of heuristics, and the computation of tight upper and lower bounds.
- Prerequisite: EECE 2560 or EECE 3326.

EECE 4572 Communications Systems (4 SH)
Introduces basic concepts of digital communication over additive white Gaussian noise (AWGN) channels. Reviews frequency domain signal analysis through treatment of noiseless analog communication. Reviews foundations of stochastic processes including stationarity, ergodicity, autocorrelation, power spectrum, and filtering. Provides an introduction to lossless and lossy source coding and introduces Huffman and Lempel-Ziv algorithms. Introduces optimal quantization and PCM and DPCM systems. Examines geometric representation of signals and signal space concepts, principles of optimum receiver design for AWGN channels, correlation and matched filter receivers, and probability of error analysis for binary and M-ary signaling through AWGN channels, and performance of ASK, PSK, FSK, and QAM signaling schemes. If time permits, also covers digital PAM transmission through band-limited AWGN channels, zero ISI condition, system design in the presence of channel distortion, and equalization techniques.
- Prerequisite: EECE 3468.
EECE 4574 Wireless Communication Circuits (4 SH)
Covers the electronics of radio receivers and transmitters. Employs a commercial radio transceiver (NorCal 40A) as a learning tool. Presents basic topics (radio spectrum utilization, antennae, and information processing by modulation and demodulation). Studies building block realizations for modulators and demodulators for analog (AM, FM) and digital (ASK, PSK, FSK) radio. Covers common radio receiver architectures. Presents circuit-level designs of radio building blocks (resonators; L-C RF filters; crystals and IF filters; tuned transformers and impedance matching; amplifiers and power amplifiers; RF oscillators; mixers and up/down frequency conversion; signal detectors; and automatic gain control circuits). Includes receiver noise and sensitivity; transmitter range; spurious emissions and IM distortion; antennae and propagation in the atmosphere; wireless standards; multiple-access techniques; and software-defined radio, if time permits.
* Prerequisite: EECE 2412.

EECE 4604 Integrated Circuit Devices (4 SH)
Designed to provide electronic device knowledge to students who may pursue IC design; semiconductor process engineering; or research and development of electronic devices, microelectromechanical systems (MEMS), or optoelectronics. Offers a comprehensive introduction to the electronic properties of semiconductors and to the technology, theory, and applications of the most important electronic devices, particularly considering their impacts on the performance of integrated circuits. Topics include semiconductor electronic properties, Si fabrication technologies, pn junctions, MOS capacitors, MOSFETs, metal-semiconductor contacts, and bipolar transistors. Emphasizes MOS devices, which are by far the dominant device in integrated circuits. Introduces recent research trends in novel device concepts.
* Prerequisite: EECE 2210 or EECE 2412.

EECE 4622 Parallel and Distributed Processing (4 SH)
Covers parallel and distributed processing concepts including concurrency and its management, models of parallel computation, and synchronous and asynchronous parallelism. Topics include simple parallel algorithm formulation, parallelization techniques, interconnection networks, arrays, trees, hypercubes, message routing mechanisms, shared address space and message-passing multiprocessor systems, communication cost and latency-hiding techniques, scalability of parallel systems, and parallel programming concepts and application case studies.
* Prerequisite: CS 1500 or EECE 2560.

EECE 4626 Image Processing and Pattern Recognition (4 SH)
Provides an introduction to processing and analysis of digital images with the goal of recognition of simple pictorial patterns. Topics include discrete signals and systems in 2-D, digital images and their properties, image digitization, image enhancement, image restoration, image segmentation, feature extraction, object recognition, and pattern classification principles (Bayes rules, class boundaries) and pattern recognition methods.
* Prerequisite: (a) EECE 3464 and (b) EECE 3468 or MATH 3081.

EECE 4630 Robotics (4 SH)
Introduces robotics analysis covering basic theory of kinematics, dynamics, and control of robots. Develops students’ design capabilities of microprocessor-based control systems with input from sensory devices and output actuators by having teams of students design and implement a small mobile robot system to complete a specific task, culminating in a competition at the end of the course. Covers actuators, sensors, system modeling, analysis, and motion control of robots.
* Prerequisite: EECE 2322 and EECE 2412.

EECE 4638 Special Topics in Computer Engineering (4 SH)
Focuses on advanced topics related to computer engineering technology to be selected by instructor.
* Repeatability: May be repeated without limit.

EECE 4642 Antennas (4 SH)
Introduces the fundamental physical principles for the electromagnetic radiation from antennas and presents the most important mathematical techniques for the analysis of the radiation. Applies these principles and techniques to practical antenna systems. Starts with the fundamental parameters of the antennas. Introduces the vector potentials and the theorems that are needed for the derivation of the radiation integrals from Maxwell’s equations. Covers the application of these theories to practical antennas and antenna systems, including linear wire antennas, loop antennas, linear and two-dimensional planar phased arrays, patch antennas, frequency-independent antennas, and aperture and reflector antennas. Presents impedance matching techniques.
* Prerequisite: EECE 2530 or EECE 3440.

EECE 4644 Microwave Circuits and Networks (4 SH)
Addresses novel applications of analytical and engineering techniques for RF/microwave circuits and networks. Presents fundamental concepts, essential mathematical formulas and theorems, and engineering applications. Emphasizes transmission lines and smith charts, microstrip lines, S-parameters and network theory, impedance matching and tuning, and novel RF devices such as resonators, power dividers, and filters. Introduces active networks. Provides ample examples to ensure that the participants fully appreciate the power of the materials described in the class.
* Prerequisite: EECE 2530 or EECE 3440.
EECE 4646 Optics for Engineers (4 SH)
 Presents the basic optical concepts necessary for an understanding of current and future optical communication, remote sensing, and industrial and biomedical systems. Topics include geometrical optics, polarized light, diffraction, and interference. Studies lasers and other light sources, optical fibers, detectors, CCD cameras, modulators, and other components of optical systems. Presents applications to specific systems such as fiber-optic communication, medical imaging systems, fiber-optic sensors, and laser radar.
 • Prerequisite: EECE 2530 or EECE 3440.

EECE 4648 Biomedical Optics in an International Context (4 SH)
 Covers biomedical optics and discusses the theory and practice of biological and medical applications of lasers. Topics covered include fundamentals of light propagation in biological tissues and light-matter interactions such as elastic and inelastic scattering; computational modeling techniques; fluorescence and phosphorescence; diagnostic imaging techniques such as confocal fluorescence microscopy, diffuse optical tomography, and optical coherence tomography novel imaging techniques such as phase conjugation and ultrasound modulated optical tomography; and therapeutic interventional techniques, including photodynamic therapy, laser thermal therapies, and fluorescence-guided surgeries. Taught abroad in collaboration with a world expert on computational modeling.
 • Prerequisite: PHYS 1155, MATH 2321, and junior or senior standing.
 • NU Core: Mathematical/analytical thinking level 2.
 • Repeatability: May be repeated without limit.

EECE 4660 Introduction to Microelectromechanical Systems (4 SH)
 Introduces the design and manufacture of microelectromechanical systems (MEMS), including principles of MEMS sensing and actuation, microfabrication, and packaging. Covers electrical, thermal, and mechanical behavior of microsystems, the design of electromechanical and thermal sensors and actuators, MEMS microfabrication, and MEMS packaging techniques. Studies a variety of microscale sensors and actuators (e.g., electrical switches, pressure sensors, inertial sensors, and optical MEMS). Devotes the last third of the course largely to design projects, involving design of MEMS devices to specifications in a realistic fabrication process.
 • Prerequisite: Junior or senior standing; engineering students only or permission of instructor.
 • Cross-list: ME 4660.
 • Equivalent: ME 4660.

EECE 4692 Subsurface Sensing and Imaging (4 SH)
 Introduces the emerging field of subsurface sensing and imaging (SSI). Topics include the interrelatedness of the three technological levels of sensing, modeling and signal processing, and computational technology, the similarity of SSI across diverse problem domains and size scales, and the variety of information extraction strategies such as localized imaging and the use of multiple views in space, wavelength, and so on. Provides hands-on experience with a particular SSI modality that includes experimental measurement and subsequent processing and visualization of the measured data.
 • Prerequisite: (a) EECE 2410 or EECE 2150 and (b) EECE 3468 or MATH 3081.

EECE 4694 Numerical Methods and Computer Applications (4 SH)
 Presents numerical techniques used in solving scientific and engineering problems with the aid of digital computers. Topics include theory of interpolation; the theory of numerical integration and differentiation, numerical solutions of linear as well as nonlinear systems of equations, the theory of least squares; and numerical solution of ordinary and partial differential equations using a programming environment such as MATLAB.
 • Prerequisite: MATH 2341 and GE 1111.

EECE 4698 Special Topics in Electrical Engineering (4 SH)
 Covers various topics from term to term, depending on the interests of the department and the students.
 • Repeatability: May be repeated without limit.

EECE 4790 Electrical and Computer Engineering Capstone 1 (4 SH)
 Requires students to select a project requiring design and implementation of an electrical, electronic, and/or software system, form a team to carry out the project, and submit and present a detailed proposal for the work. Students must specify the materials needed for their project, provide cost analysis, and make arrangements with their capstone adviser to purchase and/or secure donation of equipment. Requires student to perform a feasibility study by extensive simulation or prototype design of subsystems to facilitate the second phase of the capstone design.
 • Prerequisite: (a) EECE 2322, EECE 2520, or EECE 3464 and (b) junior or senior standing.
 • NU Core: Capstone, experiential learning, writing intensive in the major.
 • NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.
EECE 4792 Electrical and Computer Engineering Capstone 2 (4 SH)
Continues EECE 4790. Requires students to design and implement the project proposed in that earlier course. Expects students to evaluate progress with interim milestone reports and to present the final design project with written and oral reports.
- **Prerequisite:** EECE 4790 and junior or senior standing.
- **NU Core:** Capstone, experiential learning, writing intensive in the major.
- **NUpath:** Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.

EECE 4949 Research Laboratory Project (4 SH)
Offers an opportunity to conduct research in a laboratory setting under faculty supervision.
- **Prerequisite:** Junior or senior standing; engineering students only.
- **Repeatability:** May be repeated once.

EECE 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
- **Repeatability:** May be repeated without limit.

EECE 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- **Prerequisite:** EECE 4970.
- **Repeatability:** May be repeated without limit.

EECE 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- **NUpath:** Integrating knowledge and skills through experience.

EECE 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability:** May be repeated without limit.

EECE 4993 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
- **Repeatability:** May be repeated without limit.

EECE 4994 Internship (4 SH)
Offers students an opportunity for internship work.
- **NUpath:** Integrating knowledge and skills through experience.
- **Repeatability:** May be repeated without limit.

EECE 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
- **NU Core:** Experiential learning.
- **NUpath:** Integrating knowledge and skills through experience.
- **Repeatability:** May be repeated without limit.

EECE 5576 Wireless Communication Systems (4 SH)
Examines fundamental principles of wireless system design, focusing on modern techniques used in cellular systems and wireless local area networks. Covers various levels of system design, from modulation/detection to traffic analysis. Introduces basics of radio propagation and studies their effect on communication signals. Special topics include spatial frequency reuse; call blocking and cellular system capacity; power control and hand-off strategies; channel access and sharing; orthogonal frequency division multiplexing (OFDM—a modulation technique used in WLAN and the fourth-generation [4G] cellular systems) and spread spectrum modulation (third-generation WCDMA systems); diversity techniques and multi-input multi-output (MIMO) signal processing.
- **Prerequisite:** (a) EECE 4572 and junior or senior standing or (b) graduate standing and an undergraduate course in communications systems; engineering students only.

EECE 5580 Classical Control Systems (4 SH)
Introduces the analysis and design of classical control systems. Examines control system objectives, modeling and mathematical description, transfer function and state-variable representations, feedback control system characteristics, system responses, and stability of feedback systems. Also addresses compensator design based on root-locus and frequency response, and modern control system design using state-variable feedback.
- **Prerequisite:** (a) EECE 3464 and junior or senior standing or (b) graduate standing.

EECE 5581 Lab for EECE 5580 (1 SH)
Accompanies EECE 5580. Covers the practical aspects of control systems design through lab experiments. Topics vary and include computer simulation, digital computer control, and use of CAD packages such as MATLAB for analysis and design of control systems. Examples emphasize concepts introduced in EECE 5580, such as system response to stimuli, stability, and robustness.
- **Prerequisite:** Junior or senior standing.
EECE 5606 Micro- and Nanofabrication (4 SH)
Provides an overview of integrated circuit fabrication from the viewpoint of a process engineer. Offers students an opportunity to fabricate micro- and nanoscale devices in integrated lab sessions. Focuses on the physics, chemistry, and technology of integrated circuit fabrication in the lecture portion of the course, while students fabricate and test novel devices (an electrohydrodynamic micropump and three-dimensional carbon nanotube interconnects) in integrated lab sessions. Concentrates on silicon IC technology but also includes examples from other materials and device systems including microelectromechanical (MEMS) technologies that are used to build devices such as accelerometers, pressure sensors, and switches for telecommunications and other current examples provided from nanofabrication and nanotechnology. Lab hours are arranged.
• Prerequisite: EECE 2412 or graduate standing.
• Equivalent: EECE 4606.

EECE 5610 Digital Control Systems (4 SH)
Covers sampling and analysis tools for linear discrete-time dynamic systems, including the design of digital control systems using transform techniques by discrete equivalent and direct design methods; root locus, Bode and Nyquist diagrams, and Nichols charts; controller implementation issues, such as digital filter realizations, nonlinear effects due to quantization, round off, dead band, and limit cycles; and selection of the sampling rate.
• Prerequisite: EECE 5580 and junior standing or above; engineering students only.

EECE 5626 Image Processing and Pattern Recognition (4 SH)
Introduces processing and analysis of digital images with the goal of recognition of simple pictorial patterns. Topics include discrete signals and systems in 2D, digital images and their properties, image digitization, image enhancement, image restoration, image segmentation, feature extraction, object recognition, and pattern classification principles (Bayes rules, class boundaries) and pattern recognition methods.
• Prerequisite: (a) EECE 3464, either EECE 3468 or MATH 3081, and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5627 Arithmetic and Circuit Design for Inexact Computing with Nanoscaled CMOS (4 SH)
Studies the principles of inexact (approximate) computing through arithmetic and circuit design. By reducing circuit complexity, critical path delay, and power dissipation at the expense of introducing processing errors in computation, inexact computing is one of the leading emerging paradigms in nanoscale computing. Topics include basic computer arithmetic, approximation criteria, error analysis, nanoscale CMOS principles (PTMs), case studies, and experimental assessment.
• Prerequisite: (a) EECE 2412, EECE 3324, and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5639 Computer Vision (4 SH)
Introduces topics such as image formation, segmentation, feature extraction, matching, shape recovery, dynamic scene analysis, and object recognition. Computer vision brings together imaging devices, computers, and sophisticated algorithms to solve problems in industrial inspection, autonomous navigation, human-computer interfaces, medicine, image retrieval from databases, realistic computer graphics rendering, document analysis, and remote sensing. The goal of computer vision is to make useful decisions about real physical objects and scenes based on sensed images. Computer vision is an exciting but disorganized field that builds on very diverse disciplines such as image processing, statistics, pattern recognition, control theory, system identification, physics, geometry, computer graphics, and learning theory.
• Prerequisite: Good programming experience in Matlab or C++; and junior, senior, or graduate standing; engineering students only.

EECE 5640 High-Performance Computing (4 SH)
Covers accelerating scientific and other applications on computer clusters, many-core processors, and graphical processing units (GPUs). Modern computers take advantage of multiple threads and multiple cores to accelerate scientific and engineering applications. Topics covered include parallel computer architecture, parallel programming models, and theories of computation, as well as models for many-core processing. Highlights implementation of computer arithmetic and how it varies on different computer architectures. Includes an individual project where each student is expected to implement an application, port that application to several different styles of parallelism, and compare the results. Programming is done in variants of the C programming language.
• Prerequisite: (a) EECE 3324 and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5642 Data Visualization (4 SH)
Introduces relevant topics and concepts in visualization, including computer graphics, visual data representation, physical and human vision models, numerical representation of knowledge and concept, animation techniques, pattern analysis, and computational methods. Topics include tools and techniques for practical visualization and elements of related fields, including computer graphics, human perception, computer vision, imaging science, multimedia, human-computer interaction, computational science, and information theory. Covers examples from a variety of scientific, medical, interactive multimedia, and artistic applications. Includes hands-on exercises and projects. Emphasizes modern engineering applications of computer vision, graphics, and pattern classification methodologies for data visualization.
• Prerequisite: Junior, senior, or graduate standing; engineering students only.
EECE 5643 Simulation and Performance Evaluation (4 SH)
Studies simulation and performance evaluation in computer systems. Primarily covers both classic and timely techniques in the area of performance evaluation, including capacity planning to predict system performance, scheduling, and resource allocation in computer systems. Introduces basic computational and mathematical techniques for modeling, simulating, and analyzing the performance by using simulation, including models, random-number generation, statistics, and discrete event-driven simulation.
• Prerequisite: (a) Either EECE 2560 or EECE 3326 and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5644 Introduction to Machine Learning and Pattern Recognition (4 SH)
Studies machine learning, the study and design of algorithms that enable computers/machines to learn from experience/data. Covers a range of algorithms, focusing on the underlying models between each approach. Emphasizes the foundations to prepare students for research in machine learning. Topics include Bayes decision theory, maximum likelihood parameter estimation, model selection, mixture density estimation, support vector machines, neural networks, probabilistic graphics models, and ensemble methods (boosting and bagging). Offers students an opportunity to learn where and how to apply machine learning algorithms and why they work.
• Prerequisite: (a) Either EECE 3468 or MATH 3081 and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5647 Nanophotonics (4 SH)
Introduces basic concepts and recent developments in nanophotonic materials and devices. Nanophotonics is one very important research area in nanotechnology. Discusses the fundamentals of electromagnetics (Maxwell’s equations, polarization, wave propagations, etc.); quantum mechanics; and typical nanofabrication and characterization techniques. Focuses on specific topics in nanophotonics, including silicon photonics; photonic crystals; plasmonics and optical metamaterials, with their diverse applications in optical circuits; imaging; optical trapping; biomedical sensing; and energy harvesting. Offers students an opportunity to obtain a fundamental understanding of the property and manipulation of light at the nanoscale.
• Prerequisite: (a) Either EECE 2530 or EECE 3440 and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5648 Biomedical Optics (4 SH)
Covers biomedical optics and discusses the theory and practice of biological and medical applications of lasers. Topics covered include fundamentals of light propagation in biological tissues, light-matter interactions such as elastic and inelastic scattering; fluorescence and phosphorescence; diagnostic imaging techniques such as confocal fluorescence microscopy, diffuse optical tomography, and optical coherence tomography; and therapeutic interventional techniques, including photodynamic therapy, laser thermal therapies, and fluorescence-guided surgeries.
• Prerequisite: (a) EECE 3440 and junior or senior standing or (b) graduate standing; engineering majors only.

EECE 5649 Design of Analog Integrated Circuits with Complementary Metal-Oxide-Semiconductor Technology (4 SH)
Covers theoretical analysis, practical design, and simulation of analog integrated circuits implemented in complementary metal-oxide-semiconductor (CMOS) fabrication process technologies. Introduces cadence tools for circuit simulations, physical layout, and layout verification. Begins with basic concepts such as CMOS device models, DC and small-signal analysis techniques for single- and multistage amplifiers, biasing configurations, and reference generation circuits. Explores differential signal processing, operational amplifiers, operational transconductance amplifiers, and common-mode feedback circuits. Analysis methods include the evaluation of linearity, noise, stability, and device mismatches from process variations. Addresses some advanced design techniques, such as linearity improvement methods, frequency compensation, and digitally assisted performance tuning.
• Prerequisite: (a) EECE 3410 and junior or senior standing or (b) graduate standing; engineering students only.

EECE 5664 Biomedical Signal Processing (4 SH)
Introduces biomedical signal processing and biomedical imaging and image processing. Specific topics covered depend on instructor and/or student's areas of interest and are drawn from a variety of application areas. They include the nature and processing of intrinsic signals such as cardiac and neurological bioelectric signals, natural processing of external signals such as auditory and visual processing, and topics related to a variety of medical and biological imaging modalities.
• Prerequisite: EECE 3468 or graduate standing.
• Equivalent: EECE 4664.
EECE 5666 Digital Signal Processing (4 SH)
Presents the theory and practice of modern signal processing techniques. Topics include the characteristics of discrete signals and systems, sampling, and A/D conversion; the Z-transform, the Fourier transform, and the discrete Fourier transform; fast Fourier transform algorithms; design techniques for IIR and FIR digital filters; multirate digital filters; and quantization effects in digital signal processing.
• Prerequisite: (a) EECE 3464 and junior or senior standing or (b) graduate standing; graduate students may register for this course only if they did not complete an undergraduate course in digital signal processing; such graduate registration requires approval of instructor and an internal departmental petition.

EECE 5667 Lab for EECE 5666 (1 SH)
Accompanies EECE 5666. Focuses on practical aspects of DSP by programming a digital signal processing chip in a high-level language using an integrated development and debugging environment. Topics include input/output operations via A/D and D/A converters, digital frequency synthesis, computation of discrete-time convolution, and design and implementation of both FIR and IIR filters.
• Prerequisite: Junior or senior standing.

EECE 5680 Electric Drives (4 SH)
Examines all subsystems that comprise an electric drive including electric machines, power electronic converters, mechanical system requirements, feedback controller design, and interactions with utility systems. Based on an integrative approach that requires minimal prerequisites: a junior-level course in signals and systems and some knowledge of electromagnetic field theory (possibly from physics classes), and does not require separate courses in electric machines, controls, or power electronics.
• Prerequisite: (a) EECE 3440, EECE 3464, and junior or senior standing or (b) graduate standing.

EECE 5682 Power Systems Analysis 1 (4 SH)
Covers fundamentals including phasors, single-phase and balanced three-phase circuits, complex power, and network equations; symmetrical components and sequence networks; power transformers, their equivalent circuits, per unit notation, and the sequence models; transmission line parameters including resistance, inductance, and capacitance for various configurations; steady-state operation of transmission lines including line loadability and reactive compensation techniques; power flow studies including Gauss-Speidel and Newton Raphson interactive schemes; symmetrical faults including formation of the bus impedance matrix; and unsymmetrical faults including line-to-ground, line-to-line, and double line-to-ground faults.
• Prerequisite: (a) EECE 3440 and junior or senior standing or (b) graduate standing.

EECE 5683 Power Systems Lab (1 SH)
Accompanies EECE 5682. Addresses topics such as transmission line constants, load flow and short-circuit studies, and transient stability. Includes upgrading the design of a small power system.
• Prerequisite: Junior, senior, or graduate standing.

EECE 5684 Power Electronics (4 SH)
Provide tools and techniques needed to analyze and design power conversion circuits that contain switches. The first part of the course emphasizes understanding and modeling of such circuits, and provides a background for engineering evaluation of power converters. The second part covers dynamics and control of this class of systems, enabling students to design controllers for a variety of power converters and motion control systems. Addresses a set of analytical and practical problems, with emphasis on a rigorous theoretical treatment of relevant questions. Designed for students with primary interests in power conditioning, control applications, and electronic circuits, but it could prove useful for designers of high-performance computers, robots, and other electronic and electromechanical (mechatronic) systems in which the dynamical properties of power supplies become important.
• Prerequisite: (a) EECE 2412, EECE 3464, and junior or senior standing or (b) graduate standing.

EECE 5686 Electrical Machines (4 SH)
Reviews phasor diagrams and three-phase circuits; the magnetic aspects including magnetic circuits and permanent magnets; transformers, their equivalent circuits, and performance; principles of electromechanical energy conversion; elementary concepts of rotating machines including rotating magnetic fields; and steady-state theory and performance of induction machines, synchronous machines, and direct current machines.
• Prerequisite: (a) EECE 3440 and junior or senior standing or (b) graduate standing.

EECE 5688 Analysis of Unbalanced Power Grids (4 SH)
Examines common types of power system faults. Starts with a detailed description of three-phase modeling of basic power system elements such as transmission lines, transformers, and generators. Then presents fundamentals of three-phase circuit analysis in the steady state, both for balanced and unbalanced operating conditions. Uses symmetrical component transformation and positive, negative, and zero sequence networks to analyze unbalanced systems. Presents methods to calculate fault currents and postfault bus voltages. Reviews basic protective relaying and relay settings using typical distribution system examples.
• Prerequisite: (a) EECE 2410 and junior or senior standing or (b) graduate standing; engineering students only.
**EECE 5694 Electromagnetic Photonic Devices (4 SH)**
Introduces basic principles of photonic devices. Topics include crystal optics, dielectric optical waveguides, waveguide couplers, electro-optic devices, magneto-optic devices, acousto-optic devices, nonlinear effects, and optical switching. Discusses both theory and concept. This is a multidisciplinary course, and novel emerging areas in nanoscale optics and metamaterials are described.

- **Prerequisite:** (a) Either EECE 2530 or EECE 3440 and junior or senior standing or (b) graduate standing; engineering students only.

**EECE 5695 Radio-Frequency and Optical Antennas (4 SH)**
Introduces the fundamental physical principles for electromagnetic radiation from antennas. Presents the most important mathematical techniques for radiation analysis. Applies these principles and techniques to practical antenna systems. Starts with the fundamental parameters of the antennas. Introduces the vector potentials and the theorems that are needed for the derivation of the radiation integrals from Maxwell’s equations. Covers the application of these theories to practical antennas in radio frequency and optical communication systems and in new emerging areas. Some examples are wire antennas, loop antennas, linear and two-dimensional planer phased arrays, patch antennas, frequency-independent antennas, and aperture and reflector antennas. Also discusses metamaterial nanoscale optical antennas.

- **Prerequisite:** (a) Either EECE 2530 or EECE 3440 and junior or senior standing or (b) graduate standing; engineering students only.

**EECE 5696 Energy Harvesting Systems (4 SH)**
Covers different aspects of energy harvesting systems, such as energy harvesting devices, power conditioning, energy storage, etc. Explores different energy harvesting technologies, including solar energy, wind energy, vibration energy, thermoelectric energy, etc. Examines different kinds of functional materials used for different energy harvesting technologies, including piezoelectric materials, magnetic materials, solar cell materials, thermoelectric materials, etc. Emphasizes vibration energy harvesting technologies and functional materials for vibration energy harvesting.

- **Prerequisite:** Junior, senior, or graduate standing; engineering students only.

**EECE 5697 Acoustics and Sensing (4 SH)**
Introduces the fundamental concepts of acoustics and sensing with waves. Offers a unified theoretical approach to the physics of image formation through scattering and wave propagation in sensing. Topics include the linear and nonlinear acoustic wave equation; sources of sound; reflection, refraction, transmission, and absorption; bearing and range estimation by sensor array processing, beam forming, matched filtering, and focusing; diffraction, bandwidth, ambient noise, and reverberation limitations; scattering from objects, surfaces, and volumes by Green’s theorem; forward scatter, shadows, Babinet’s principle, extinction, and attenuation; ray tracing and waveguides in remote sensing; and applications to acoustic, radar, seismic, thermal, and optical sensing and exploration.

- **Prerequisite:** (a) Either EECE 2520 or EECE 3464 and junior or senior standing or (b) graduate standing; engineering students only.

**EECE 5698 Special Topics in Electrical and Computer Engineering (4 SH)**
Covers special topics in electrical and computer engineering. Topics are selected by the instructor and vary from semester to semester.

- **Prerequisite:** Junior, senior, or graduate standing; engineering students only.

- **Repeatability:** May be repeated up to 4 times.

**EECE 6000 Introduction to Cooperative Education (1 SH)**
Designed to introduce graduate engineering students to the cooperative education program and focuses on skills that provide a basis for successful co-op engagement. Affords students the opportunity to develop job-search, job-survival, and career-management skills. Seeks to help students understand the co-op program, policies, and expectations; understand how to use the Northeastern Web site to access online information used in the job-search process; identify and describe their skills and work values and how they relate to their career choices; learn how to write and critique a resume; learn and practice proper interviewing skills and techniques; and communicate their interests, skills, needs, and future plans to their co-op coordinator and future employers.

- **Prerequisite:** Engineering students only.

**EECE 6960 Exam Preparation—Master’s (0 SH)**
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

**EECE 6964 Co-op Work Experience (0 SH)**
Provides eligible students with an opportunity for work experience.

- **Prerequisite:** EECE 6000; electrical and computer engineering students only.

- **Repeatability:** May be repeated without limit.
EECE 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
  • Prerequisite: EECE 6000; electrical and computer engineering students only.
  • Repeatability: May be repeated without limit.

EECE 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
  • Repeatability: May be repeated without limit.

EECE 7105 Optics for Engineers (4 SH)
Provides an introductory graduate course in optics, presenting the engineering concepts necessary to understand and evaluate electro-optical systems. Begins with a brief but rigorous treatment of geometric optics, including matrix methods, aberrations, and pupils and windows, with practical examples of optical instruments and electro-optical systems. Topics include polarization, interference, diffraction, and optical properties of crystals, thin films, optical resonators, guided waves, modulators, and detectors. Presents concepts with examples from modern optical systems such as LIDAR, fiber-optical sensors, range finders, infrared systems, and optical communication systems.
  • Prerequisite: Bachelor of science in engineering or physics; engineering students only.
  • Equivalent: EECE 5646.

EECE 7200 Linear Systems Analysis (4 SH)
Covers fundamental algebraic concepts and algebraic structures. Topics include linear operators and their representations; matrices, algebraic equations, equivalence, and similarity transformations; introduction to the state-variable theory of continuous and discrete linear systems; standard canonical representations, the concept of state, and the representation of interconnected systems, linear spaces, the state equations, and their solution; stability; and introduction to the general control problem in terms of controllability and observability.
  • Prerequisite: Engineering students only.

EECE 7201 Solid State Devices (4 SH)
Covers the fundamental elements of solid-state device physics and the application of these principles. Seeks to provide students with the opportunity to develop an understanding of pn junctions, bipolar junction transistors, and MOSFETs.
  • Prerequisite: Electrical engineering and computer engineering students only.

EECE 7202 Electromagnetic Theory 1 (4 SH)
Examines the fundamental equations, their physical meaning, principal mathematical techniques, and important engineering applications. Topics include sources of the electromagnetic field, Lorentz force equation, integral form of Maxwell’s equations and point relations (differential equations and boundary conditions), electromagnetic energy and power, propagation of uniform and nonuniform plane waves in homogeneous media, reflection and refraction, scalar and vector potentials, solutions in the absence of boundaries for static and dynamic problems, solutions to boundary value problems, duality, uniqueness, images, physical theory of diffraction, and general theory of metal and dielectric wave-guides and resonators for Cartesian and cylindrical systems.
  • Prerequisite: Engineering students only.

EECE 7203 Complex Variable Theory and Differential Equations (4 SH)
  • Prerequisite: Engineering students only with knowledge of undergraduate advanced calculus.
EECE 7204 Applied Probability and Stochastic Processes (4 SH)
Covers fundamentals of probability and stochastic processes with applications to estimation and queuing theory. Includes basic laws of probability, conditioning, and Bayes rule. Topics include random variables and their functions; PDF, PMF, and CDF notions; statistical averages; moments and characteristic functions; multiple random variables; joint and conditional PDF and PMF; multiple functions of random variables; correlation and covariance; mean squared estimation of random variables; Markov, Chebychev, and Chernov inequalities; various notions of convergence of random variable sequences; laws of large numbers; central limit theorem; and large deviation theory. As time permits, discusses basic notions of estimation and properties of estimators, unbiased and minimum variance estimation, CRLB, sufficient statistics, consistency of estimators, basic notions of discrete and continuous-time random processes, mean and autocorrelation function, WSS and cyclo-stationary processes, ergodicity of random processes, and other topics.
* Prerequisite: Engineering students only with strong understanding of linear systems, transform techniques, and linear algebra.

EECE 7205 Fundamentals of Computer Engineering (4 SH)
Introduces fundamental techniques in computer engineering used throughout the graduate curriculum. Covers basic programming and analysis methods and the formulation and solution of a wide range of computer engineering problems. Also discusses the applications of algorithm analysis and complexity theory to analyzing and solving problems. Emphasizes those fundamental computational problems and related algorithms whose solution can be obtained in polynomial time. For basic computational problems such as sorting, searching, elementary graph algorithms, shortest-paths problems, as well as flow problems in networks, many different algorithms and data structures are described and analyzed, implemented, and compared both from a theoretical and from an experimental point of view.
* Prerequisite: Engineering students only.

EECE 7211 Nonlinear Control (4 SH)
Discusses phase plane analysis for nonlinear systems. Topics include fundamentals of Lyapunov theory; absolute stability, passivity, averaging, singular perturbation, input-output stability, and other advanced stability topics; describing functions; nonlinear control methods based on linearization, feedback linearization, sliding control, Lyapunov, and passivity and center manifold theory and bifurcations.
* Prerequisite: EECE 7200.

EECE 7212 Multivariable Control Systems (4 SH)
Discusses mathematical preliminaries, polynomial, and polynomial matrices; representations of linear multivariable system; matrix fraction description (MFD) and polynomial matrix description (PMD); responses of linear multivariable systems; controllability, observability, and canonical forms; poles and zeros of multivariable systems; stability; realization problem; interaction control; state feedback and observer design; compensator design, stability, and robustness; noninteraction control; and frequency domain design techniques.
* Prerequisite: EECE 5580 and EECE 7200.

EECE 7213 System Identification and Adaptive Control (4 SH)
Discusses fundamental issues of adaptive identification and control, such as stability of adaptive systems, convergence, persistent excitation, and robustness. Identification is the process of mathematically modeling a system based on measurement data that may be limited or uncertain. Adaptive control, then, is the means by which a system that is poorly modeled is controlled adequately. Enhances the underlying basic ideas that are essential for adaptive control. Emphasizes recursive approaches, such as recursive least squares algorithm, where parameter estimates are updated in real time. Covers simple adaptive systems, adaptive observers, and adaptive control. Discusses in detail two major adaptive schemes, model reference adaptive control (MRAC) and self-tuning regulators (STR).
* Prerequisite: EECE 7200.

EECE 7214 Optimal and Robust Control (4 SH)
Explores state-space, time-domain techniques for analyzing and designing optimal and robust linear control systems. Introduces basic concepts of dynamic optimization and applies them to problems of short-term and long-term optimal control, path planning and stabilization, state estimation, and filtering. Emphasizes linear quadratic optimization, H2 control, H-infinity control, and mu-synthesis. Reviews pertinent linear systems concepts and discusses connections with a geometric intuition relating quadratic optimization to projections.
* Prerequisite: EECE 7200.

EECE 7220 Power System Analysis 2 (4 SH)
Continues EECE 5682. Reviews power flow studies, power system protection, power system controls, transient operation of transmission lines, transient stability, and HVDC transmission.
* Prerequisite: EECE 5682.
EECE 7221 Power System Operation and Control (4 SH)
Provides tools and techniques needed to analyze and quantify phenomena that arise in operation and control of modern power systems. Considers problems that have a wide-ranging importance in power systems and includes analysis of steady-state and control of power systems dynamics. These problem areas share a common mathematical framework. The first part of the course covers a classical study of steady states in power systems and the solution of voltage stability problems associated with them. The goal is to present problems (and solutions) of load flow with several modifications, namely, frequency deviations and voltage-sensitive loads. The second part covers modeling, analysis, and controller design for electromechanical transients in power systems (load variations, frequency, and power transmission dynamics). Connections are established with modern robust control theory.
• Prerequisite: Knowledge of controls.

EECE 7224 Power Systems State Estimation (4 SH)
Offers an up-to-date account of the strategies utilized in state estimation of electric power systems. Provides a broad overview of power system operation and the role of state estimation in overall energy management. Presents an abundance of examples, models, tables, and guidelines to clearly examine new aspects of state estimation, the testing of network observability, and methods to assure computational efficiency.
• Prerequisite: Engineering students only.

EECE 7226 Modeling and Simulation of Power System Transients (4 SH)
Presents computer modeling of linear and nonlinear power system components to be used in transient studies. Covers methods of digital simulation of power systems operating in the steady-state and transient conditions. Discusses use of transient simulation programs for design and analysis of power systems. Students are asked to carry out a term project and deliver a presentation about its outcome.
• Prerequisite: Engineering students only.

EECE 7236 Special Topics in Control (4 SH)
Covers aspects of controls not studied in other courses. Topics may vary from year to year.
• Repeatability: May be repeated without limit.

EECE 7237 Special Topics in Power Electronics (4 SH)
Covers aspects of power electronics not studied in other courses. Topics may vary from year to year.
• Repeatability: May be repeated without limit.

EECE 7238 Special Topics in Electric Drives (4 SH)
Covers aspects of electric drives not studied in other courses. Topics may vary from year to year.
• Repeatability: May be repeated without limit.

EECE 7239 Special Topics in Power Systems (4 SH)
Covers aspects of power systems not studied in other courses. Topics may vary from year to year.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

EECE 7240 Analog Integrated Circuit Design (4 SH)
Treats the analysis and design of analog ICs, their functional performance, and applications. Focuses on the various building blocks of analog circuits, their operation, and the underlying principles and techniques, with analysis supplemented by CAD simulation. Topics include modeling and layout of CMOS, bipolar, BiCMOS devices, and passive components; DC building blocks, including precision current and voltage references; performance analysis of signal gain, impedances, and frequency response and speed of basic/compound amplifier structures; architectures of operational amplifiers, including low-voltage, OTAs, and three-stage designs; feedback and performance merits, topologies, instability, and frequency compensation of feedback amplifiers; nonlinear and analog computation IC functions; noise in ICs, physical origins and device modeling, noise circuit analysis, SNR and NF, and techniques for the enhancement of system noise performance.

EECE 7241 Advanced Solid State Devices (4 SH)
Covers state-of-the-art topics in solid-state devices including advanced MOSFET concepts like deep-submicron scaling, HBTs, HEMTs, MESFETs, and other high-frequency/high-speed semiconductor devices.
• Prerequisite: EECE 7201.

EECE 7242 Integrated Circuits for Communications and Mixed-Signal Processing (4 SH)
Covers analysis and design of ICs for high-speed communications and mixed-signal processing. Focuses on performance of CMOS and BiCMOS implementations of building blocks for these systems. Covers passive R, L, C, and active devices for ICs; broadband amplifiers, TIAs, limiters, buffers/drivers, muxes, and demuxes; circuit noise modeling and analysis and methods for optimization of SNR and BER, with applications to optical communication; baseband and HF filters; design methods of L-C, OTA-C, MOSFET-C, and switched-C filters; data conversion and D-A and A-D characteristics, popular DAC architectures, serial and parallel ADCs, and high-resolution techniques; clock generators and oscillators, L-C resonator-based designs, VCOs, PLLs and frequency synthesis, and CDR circuits. Requires a verification review of a selected publication relevant to the course.
• Prerequisite: EECE 7240 or permission of instructor.
EECE 7243 Integrated Circuit Fabrication (4 SH)
Discusses the fundamental aspects of integrated circuit fabrication beginning with the scientific foundations for diffusion, oxidation, ion implantation, chemical and physical vapor deposition, etching, and lithography. Then covers state-of-the-art integrated circuit fabrication technologies in a seminar format.

EECE 7244 Introduction to Microelectromechanical Systems (MEMS) (4 SH)
Introduces microelectromechanical systems, including principles of sensing and actuation, microfabrication technology for MEMS, noise concepts, and packaging techniques. Covers a wide range of disciplines, from electronics to mechanics, material properties, microfabrication technology, electromagnetics, and optics. Studies several classes of devices including inertial measurement devices, pressure sensors, rf components, and optical MEMS. Devotes the last third of the semester largely to projects involving design of MEMS devices to specifications in a realistic fabrication process.

• Prerequisite: Electrical engineering and computer engineering students only.
• Equivalent: ME 6260.

EECE 7245 Microwave Circuit Design for Wireless Communication (4 SH)
Covers planar microwave circuits and integrated circuits (MMICs) for wireless communication systems. Employs microwave CAD tools in design projects as well as in-class case-study examples. Reviews communication system basics, modulation and demodulation, architectures of receivers and transmitters, and system performance. Covers planar transmission lines and coupled lines and their application to important devices and microwave circuit functions and multiport networks using S-parameters, flow graphs, and Smith charts. Studies microwave filters, narrowband and broadband amplifiers, their gain and stability, impedance matching, and noise performance, as well as mixers and frequency-conversion techniques. Finishes with design and performance of microwave oscillators. Covers wireless standards, multiple-access techniques, and recent advances if time permits.

• Prerequisite: Restricted to specific master’s and doctoral programs in the Department of Electrical and Computer Engineering.

EECE 7246 Design and Analysis of Digital Integrated Circuits (4 SH)
Explores the analysis and design of basic digital-integrated-circuit logic families. Focuses on CMOS and BICMOS circuits and covers emitter-coupled logic (ECL). Covers design considerations including propagation delay, switching speed, fan-out, and the effect of parasitics. Discusses noise, cross talk, and interconnect issues as well as bistable circuits and clocks. Correlates design techniques with computer simulations.

EECE 7247 Radio Frequency Integrated Circuit Design (4 SH)
Introduces radio frequency (RF) integrated circuit analysis, design, and simulation methods with an emphasis on CMOS implementations. Covers basic RF design concepts including linearity, noise figure, sensitivity, impedance matching, and imperfections of integrated passive components (parasitics, quality factors). Discusses front-end circuit design considerations for low-noise amplifiers, mixers, oscillators, and power amplifiers.

• Prerequisite: EECE 7240; engineering students only.

EECE 7249 Special Topics in Electronics, Semiconductor Devices, and Microfabrication (4 SH)
Covers aspects of electronics, semiconductor devices, and microfabrication not studied in other courses. Topics may vary from year to year.

• Repeatability: May be repeated without limit.

EECE 7270 Electromagnetic Theory 2 (4 SH)
Continues EECE 7202. Examines important electrodynamic applications by the use of advanced mathematical techniques. Topics include general theory of wave-guides and resonators with application to the cylindrical geometry; dielectric rod wave-guide; optical fibers; radiation; linear antennas; loop antenna; linear arrays; ray optics; scattering and diffraction of waves for planar, cylindrical, and spherical geometries; and effects of random media.

• Prerequisite: EECE 7202.

EECE 7271 Computational Methods in Electromagnetics (4 SH)
Presents solutions to problems in electromagnetics using a wide variety of numerical and computational methods. Discusses in detail the finite difference approximations of partial differential equations and the finite difference time-domain method of simulating electromagnetic wave propagation and scattering. Uses moment methods to solve the integral equations related to currents and charges on wire structures. Uses finite element and higher-order finite difference methods to solve problems in electrostatics and wave propagation. Discusses efficient matrix methods, relaxation methods, the conjugate gradient technique, and multidimensional Newton’s method in the context of electromagnetic field simulation.

• Prerequisite: EECE 7202.

EECE 7272 Radar System (4 SH)
Provides emphasis on the system’s aspects of radar engineering. Topics include basic theory of radar detection, measurement of range, angle, and Doppler shift; classes of radar systems; types of radar noise; components of a radar system; matched filters and correlation receivers as applied to radar systems; and fundamental ideas of radar system analysis. Also explores search radar theory, maximum likelihood estimation approach to measurement of radar target parameters, resolution and ambiguity functions applied to radar, and radar parameter uncertainty principles.

• Prerequisite: EECE 7204.
EECE 7273 Remote Sensing (4 SH)
Introduces the theory, instruments, and techniques for remote sensing of the earth. Topics include fundamental properties of electromagnetic radiation; matter-energy interaction in the optical and microwave regions; optical imaging systems; synthetic aperture radar and side-looking airborne radar imaging systems; radar polarimetry; microwave scatterometry and radiometry; system considerations, such as temporal and spatial resolution, operating frequency and bandwidth, calibration, measurement precision, and accuracy; data acquisition and storage, such as models and techniques for retrieving geophysical parameters from remotely sensed data; and survey of current and planned airborne and spaceborne remote sensing systems and application of these sensors to measuring geophysical phenomena and monitoring global change.
• Prerequisite: EECE 7202 and EECE 7204.

EECE 7274 Propagation in Artificial Structures (4 SH)
Covers effective dielectric and permeability constants in composite materials at high frequencies, electromagnetic wave propagation in electrical and magnetic anisotropic media, magneto-static and magneto-elastic wave propagation in single layer, and electromagnetic wave propagation in multilayers.
• Prerequisite: Knowledge of electromagnetic field theory.

EECE 7275 Antennas and Radiation (4 SH)
Presents the fundamental theory and properties of antennas. Topics include equivalence, reciprocity, uniqueness, Huygen’s principle, antenna impedance, and diffraction; linear, loop, array, and aperture antennas including horns, reflectors, lenses, and microstrip; transmitting and receiving antennas and transmission formulas; and numerical antenna analysis methods.
• Prerequisite: EECE 7202 and EECE 7270.

EECE 7276 Microwave Properties of Materials (4 SH)
Discusses general dielectric and magnetic properties of materials, tensor properties of dielectric and magnetic materials, special microwave properties of thin-film materials, and experimental techniques developed in the characterization of microwave materials.
• Prerequisite: Knowledge of electromagnetics and materials science.

EECE 7277 Microwave Electron Devices (1 to 4 SH)
Presents the fundamental principles and operation of the principal types of conventional (linear-beam and crossed-field) and novel (maser effect) devices. Topics include interactions of nonrelativistic and relativistic electron beams with electromagnetic fields, linear-beam tubes (klystron, traveling wave tube, backward-wave amplifier, and oscillator), crossed-field tubes (magnetron, forward-and-backward cross-field amplifier, and high-gain CFA), and maser-effect devices (cyclotron maser and gyrotron).
• Prerequisite: EECE 7202.
• Repeatability: May be repeated without limit.

EECE 7280 Fourier and Binary Optics (4 SH)
Examines the fundamentals of Fourier and binary optics from a theoretical and a practical viewpoint. Topics include radiation as a wave, polarization of radiation, reflection and refraction at surfaces, optical diffraction, scalar wave equation, Helmholtz and Kirchoff integral theorems, Fresnel and Fraunhoffer diffraction, Green’s theorem, interferometry, division of amplitude, division of wave front, diffraction gratings, multilayer filters, interferometric instrumentation, and holography. Also discusses imaging properties of lenses and optical systems, coherent and incoherent imaging, modulation transfer function, spatial filtering, diffraction-limited optical systems, surface design of binary optical elements, miniature and micro-optics, fabrication of diffraction-limited optics, and applications of diffraction-limited optics.
• Prerequisite: EECE 5646.

EECE 7281 Fourier Optics (4 SH)
Covers current topics of interest in Fourier optics and optical instrumentation. Discusses application of coherence phenomena to optical instrumentation including microdensitometers, microscopes, viewers, cameras, spectrophotometric, and interferometric instruments. Also considers applications of holography, optical data processing and computing, holographic memories, optical modulation, noise and its effects on data collection, synthetic aperture optics, and medical application of laser optics.
• Prerequisite: EECE 7280.

EECE 7282 Lasers (4 SH)
Introduces basic principles of lasers. Topics include models for the interaction of electromagnetic radiation and matter, laser threshold and rate equations, resonator theory, transverse and longitudinal modes, Rigrod analysis, homogeneous and inhomogeneous broadening, Q switching, cavity dumping, and mode locking. Discusses specific laser types including gas, liquid, and solid, and the applications of lasers and laser systems.
• Prerequisite: Engineering students only.
EECE 7284 Optical Properties of Matter (4 SH)

Presents the formal mathematical treatment of classical crystal optics including dispersion, polarization, birefringence, metal optics, and the optics of thin films. Emphasis is on the interaction of electromagnetic waves and the crystal lattice. Classical crystal optics are extended to nonlinear effects observed with very intense electric and magnetic fields. Presents applications of nonlinear optics, such as second- and third-harmonic generation, optical mixing, optical parametric oscillation, multiple photon interaction, and linear and nonlinear scattering. Various topics in linear and nonlinear optics are applied in such areas as birefringent filters, second-harmonic generators, optical parametric oscillators, and acousto-optical beam deflectors.

Prerequisite: Engineering students only.

EECE 7285 Opto-electronics and Fiber Optics (4 SH)

Covers the fundamentals of the opto-electronic elements that interconnect to create a fiber-optic system for communication and sensing. Discusses the structure of single and multimode fibers, step and graded index fibers, modal theory of fiber propagation, ray theory of multimode fibers, fiber parameters, numerical aperture, Etendue, modal cutoff, couple mode theory, semiconductor physics, diode lasers and LED sources, photovoltaic and photoconductive detectors, coupling sources and detectors to optical fibers, noise in fiber-optic systems, active and passive components, modulators and couplers, fiber interferometry, and applications in communication and sensing.

Prerequisite: EECE 5646.

EECE 7286 IR Imaging (4 SH)

Covers the basic concepts necessary for understanding, designing, and evaluating electro-optical systems including modern infrared technology. Emphasis is on considering the system as a whole including radiation sources, the optical collection system, and the detection process. Performance characteristics and system limitations are derived for a variety of imaging and nonimaging systems, as well as for laser devices. Systems to be analyzed may include standard commercial television, night vision devices, laser rangers, thermal imagers, satellite imagers (LANDSAT, SPOT), optical communications, and guidance systems.

Prerequisite: Engineering students only.

EECE 7287 Optical Detection (4 SH)

Covers the detector as a component of an optical system. Topics include the laws governing radiation and radiometry, properties of real radiation sources, detailed descriptions of detection devices, noise, contrast, and MTF, imaging and ranging devices, and electro-optical detector systems analysis. Also includes practical consideration in real detectors, resolution and recognition of signals, heterodyne detection, sub-nanosecond pulse detection, and calibration of electro-optical detectors.

Prerequisite: Engineering students only.

EECE 7288 Light and Information (4 SH)

Covers the fundamentals of classical and quantum optical signal processing and information theory. Topics include a review of basic wave theory for signal and information processing, classical wave entropy and information, number of degrees of freedom and information capacity of classical imaging systems, information-theoretic wave imaging algorithms, number of degrees of freedom and information capacity of general wave radiation, propagation and scattering systems, basic quantum physics for electrical and computer engineers, quantum bits (qubits), quantum circuits, quantum entanglement, the basics of quantum wave entropy and information, and the basics of quantum information theory. Applications covered include information-theoretic characterization of wireless and antenna systems, fundamental limits in sensors and vision, optical imaging, optical communications, and cryptography.

Prerequisite: EECE 7202 and EECE 7204.

EECE 7290 Plasma Engineering (4 SH)

Overviews the basic principles and applications of plasma and gaseous discharges. Topics include gas kinetics, interaction of electrons and ions with static and rf fields, and wave propagation in plasmas. Discusses applications in material processing, space exploration, and microwave devices.

Prerequisite: EECE 7202.

EECE 7291 Plasma Theory (4 SH)

Introduces the basic theory of gaseous discharges. Discusses fluid and kinetic description of collisionless and collisional plasmas with and without magnetic field effects. Emphasis is on linear stability analysis, although also discusses nonlinear effects.

Prerequisite: EECE 7202.

EECE 7292 Plasma Processing Seminar (4 SH)

Covers the fundamental physics of plasmas in a lecture format. Students then investigate state-of-the-art plasma processing techniques used in integrated circuit fabrication, MEMS, and other materials processing applications in a seminar format.

Prerequisite: Electrical engineering and computer engineering students only.
EECE 7293 Modern Imaging (4 SH)
Covers basic and advanced topics in imaging engineering. Starts with the formulation of typical forward problems in electromagnetic and acoustic wave field propagation and scattering, emphasizing biomedical and nondestructive testing applications, and continues with a survey of imaging methodologies including the so-called qualitative imaging methods. Topics covered are: obstacle scattering, inhomogeneous medium scattering, uniqueness and stability in inverse scattering, imaging with finite data, point-source method and its applications, singular sources and shape reconstruction, linear sampling methods, signal-subspace-based methods, noniterative approaches for the inverse medium problem, intensity-only imaging, estimation theory in imaging and the question of superresolution, and selected topics in compressive sensing and quantum imaging.
• Prerequisite: EECE 7202; engineering students only.

EECE 7295 Applied Magnetism (4 SH)
Covers the fundamentals of magnetism and magnetic materials, their applications in different industries, and the frontiers of research activities on magnetism and magnetic materials. Includes magnetic units, magnetic classification, origin of ferromagnetism and ferrimagnetism, magnetic anisotropies, magnetostriction, magnetic domain theory, ferromagnetic/ferrimagnetic resonance, soft magnetic materials, hard magnetic materials, applications of magnetic materials, and information storage.
• Prerequisite: Engineering students only.

EECE 7296 Electronic Materials (4 SH)
Offers a basic treatment of electronic materials from atomic, molecular, and application viewpoints. Topics include atomic structure and bonding in materials, structure of materials, and crystal defects. These topics lay a foundation for thermal and electronic conduction, which is the underlying physics of electronic devices. Examines the electronic properties of semiconductors, dielectric, magnetic, superconducting, and optical materials. The latter half of the course deals with an introduction to state-of-the-art electronic materials, including semiconductor nanoelectronics, magnetic semiconductors and Spintronics, molecular electronics, carbon nanotubes, conducting polymers, graphene and graphite, and other topics representing recent technological breakthroughs in the area of electronic materials.
• Prerequisite: Engineering students only.

EECE 7297 Advanced Magnetic Materials—Magnetic Devices (4 SH)
Covers magnetism and magnetic materials, their applications in different industries, magnetic devices, and the frontiers of research activities on magnetism and magnetic materials. Topics include magnetic units, magnetic materials classification, origin of ferromagnetism and ferrimagnetism, magnetic anisotropies, magnetostriction, magnetic domain theory, ferromagnetic/ferrimagnetic resonance, soft magnetic materials, hard magnetic materials, applications of magnetic materials, information storage, and leading-edge research. Includes lectures on different magnetic sensors—including AMR, GMR, TMR, fluxgate, magnetolectric sensors, etc.—and on microwave magnetic devices—including tunable filters, phase shifters, isolators, circulators, etc.
• Prerequisite: Electrical and computer engineering students only.

EECE 7298 Magnetic Materials—Fundamentals and Measurements (4 SH)
Covers the fundamentals of magnetism and magnetic materials, their applications in different industries, and the frontiers of research activities on magnetism and magnetic materials. Includes magnetic units, magnetic materials classification, origin of ferromagnetism and ferrimagnetism, magnetic anisotropies, magnetostriction, magnetic domain theory, and information storage. Also covers different magnetic material characterization methods, including B-H looper, VSM, MOKE, field-sweep FMR, frequency-sweep FMR, permeameters, etc.
• Prerequisite: Engineering students only.

EECE 7309 Special Topics in Electromagnetics, Plasma, and Optics (4 SH)
Covers aspects of electromagnetics, plasma, and optics not studied in other courses. Topics may vary from year to year.
• Repeatability: May be repeated without limit.

EECE 7310 Modern Signal Processing (4 SH)
Covers theory and practice of modern signal processing techniques with emphasis on optimal filtering and multirate signal processing. Includes the principle of orthogonality, Wiener and Kalman filters, linear prediction, spectral factorization, the Yule-Walker equations, decimation and interpolation, Noble identities and polyphase representation, and maximally decimated filter banks.
• Prerequisite: EECE 7204.
EECE 7311 Two Dimensional Signal and Image Processing (4 SH)
Examines the fundamentals of two-dimensional signal processing, with emphasis on image processing. Topics include signals, systems, and transforms in two dimensions; design and analysis of FIR and IIR filters; DFT and FFT algorithms; generation of digital image from the source; image digitizers and display devices; image transforms; techniques for point-wise, local, and global image enhancement; statistical image restoration techniques including recursive estimation; image coding techniques in spatial and transform domain including coding for facsimile transmission; and feature analysis.
• Prerequisite: Good understanding of linear systems, transform techniques, linear algebra, and random processes.

EECE 7312 Statistical and Adaptive Signal Processing (4 SH)
Uses linear mean square estimation concepts to explore some important areas of statistical and adaptive signal processing. Offers students an opportunity to gain a thorough understanding and working knowledge of FIR Wiener filtering, linear prediction, and autoregressive model matching; autocorrelation estimation and the deterministic least squares method; LMS and RLS adaptive filters; order recursive (triangular and lattice) architectures; and beamforming in antenna arrays. Emphasizes performance analysis of adaptive filters under nonstationary conditions; triangular covariance factorization; geometric derivation of RLS adaptive algorithms; a factual knowledge of some basic concepts concerning fundamentals of regularized least squares and the Kalman filter interpretation of the RLS algorithm; IIR (Laguerre-based) lattice configuration; and nonlinear adaptive filtering.
• Prerequisite: EECE 7204 and EECE 7310.

EECE 7313 Pattern Recognition (4 SH)
• Prerequisite: EECE 7204.

EECE 7314 Auditory Signal Processing (4 SH)
Offers particular relevance to engineers interested in the processing and production of audio signals including speech, music, and audible noise. Discusses how sounds are processed and perceived in the auditory system by exploring physiological and psychological acoustics. Emphasis is on mathematical models of the auditory system. Topics include properties of acoustical stimuli; anatomy and physiology of the auditory system; electrical recordings from the auditory system; acoustic emissions from the ear; nonlinear, positive feedback model of cochlear mechanics; methods of psychophysical measurements; absolute thresholds; temporal integration; masking and auditory frequency analysis; signal detection theory applied to the auditory system; experiments on and models of auditory discrimination; temporal processing in the auditory system including gap detection thresholds and models of temporal processing; loudness; Zwicker’s loudness summation model; pitch of simple and complex tones; and binaural hearing. Explores practical applications of psychoacoustics.

EECE 7315 Digital Image Processing (4 SH)
Focuses on generation of digital image from the source; image digitizers and display devices; image transforms; enhancement techniques, such as histogram, equalization, and edge sharpening; restoration by Wiener and Kalman filters; image coding using run-length coding; DPCM; transform coding; and feature analysis.
• Prerequisite: Undergraduate course in digital signal processing highly recommended but not required.

EECE 7316 Modern Spectral Analysis and Array Processing (4 SH)
Describes the problem of estimating spectra from finite records of noisy data and reviews applications including communications (especially wireless), biomedicine, geophysics, speech, nondestructive testing, and sonar and radar. Explores common power spectrum estimation algorithms. Emphasizes the advantages and limitations of conventional, Capon’s, multiple window, maximum entropy, parametric (AR, MA, and ARMA), and harmonic decomposition (Prony, Pisarenko, and SVD) methods, in terms of accuracy (bias), reliability (variance), applicability, and other criteria. Introduces higher-order and nonstationary spectrum estimation including conventional and parametric higher-order methods and sliding window (short-time Fourier transform and model-based), adaptive, time-frequency, and wavelet techniques for the nonstationary problem. Examines extensions to multichannel and multidimensional data, discusses the array processing problem from a spectrum estimation perspective, and introduces the wave-field perspective. Discusses nonparametric and parametric array processing techniques and applications.
• Prerequisite: EECE 5666, EECE 7204, and EECE 7312.
EECE 7317 Digital Filter Banks and Wavelets (4 SH)
Develops the theory and applications of perfect reconstruction digital filter banks (PR filter banks) and continuous-time wavelet and wave-packet representations. The mathematical structure of the two disciplines are shown to be intimately related and the theory of both is developed from a signal processing and an abstract mathematical viewpoint. Examines applications that include signal processing and digital communications. Emphasis is on the multiresolution analysis (MRA) of discrete and continuous-time signals and to applications that make use of this paradigm.

• Prerequisite: Engineering students only with strong understanding of digital signal processing, modern signal processing, and linear systems/vector spaces.

EECE 7323 Numerical Optimization Methods (4 SH)
Introduces fundamental theoretical and algorithmic concepts behind numerical optimization theory for objective functions with finite numbers of parameters. Optimization problems arise ubiquitously in all areas of engineering and science. Presents established numerical methods for iterative unconstrained and constrained optimization. Topics covered include line-search and trust-region strategies, gradient descent and Newton methods and their variations, linear and quadratic programming, penalty-augmented Lagrangian methods, sequential quadratic programming, and interior point methods. The course relies on the use of Matlab in projects.

• Prerequisite: Basic knowledge of calculus and linear algebra; engineering students only.

EECE 7327 Special Topics in Signal Processing 1 (4 SH)
Covers aspects of signal processing not studied in other courses. Topics may vary from year to year. Topics may include physics-based image restoration methods for subsurface sensing problems, fundamentals of linear and nonlinear inverse problems, wave-field signal processing, and tomographic imaging.

• Prerequisite: EECE 5666.
• Repeatability: May be repeated without limit.

EECE 7328 Special Topics in Signal Processing 2 (4 SH)
Covers aspects of signal processing not studied in other courses. Topics may vary from year to year. Topics may include physics-based image restoration methods for subsurface sensing problems, fundamentals of linear and nonlinear inverse problems, wave-field signal processing, and tomographic imaging.

• Prerequisite: EECE 5666.
• Repeatability: May be repeated without limit.

EECE 7329 Special Topics in Signal Processing 3 (4 SH)
Covers aspects of signal processing not studied in other courses. Topics may vary from year to year. Topics may include physics-based image restoration methods for subsurface sensing problems, fundamentals of linear and nonlinear inverse problems, wave-field signal processing, and tomographic imaging.

• Prerequisite: EECE 5666.
• Repeatability: May be repeated without limit.

EECE 7330 Multi-User Detection (4 SH)
Focuses on the fundamentals of joint data detection for cochannel users. Applications include magnetic recording channels and 3G base station design. Topics include the multiaccess channel, long sequences, random sequences, carrier modulation, nonantipodal modulation, matched-filter outputs, single-user matched filter, optimal receiver for the single-user channel, probability of error for asynchronous users, asymptotic multiuser efficiency and related measures, coherent single-user matched filter in Rayleigh fading, optimum coherent multiuser detection, minimum error probability in the asynchronous channel, optimum asymptotic efficiency, near-far resistance, performance analysis in Rayleigh fading, optimum noncoherent multiuser detection, decorrelating detector, truncated-window decorrelating detector, coherent decorrelator in the presence of fading, differentially coherent decorrelation, decorrelation for nonlinear modulation, nondecorrelating linear multiuser detection, mmse linear multiuser detection, linear multiuser detection, adaptive mmse linear multiuser detection, blind mmse multiuser detection, decision-driven multiuser detectors, successive cancellation, performance analysis of successive cancellation, and multistage detection.

• Prerequisite: EECE 7336.
EECE 7331 Network Communications and Performance Engineering (4 SH)

Presents principles for the design and analysis of modern communications networks. Emphasis is on theoretical and practical concepts. Uses the concept of a layered network architecture as a framework for understanding the functions and services of reliable end-to-end communications. Analyzes different switching and multiplexing techniques within the context of network session requirements and network traffic characterization. Introduces performance modeling with intermediate-level problems in queuing theory including M/G1 queues, simple queuing networks, the IPP, and the MMPP. Discusses models for transmission, encoding, and fundamental limitations of physical channels as motivation for the development of data-link-layer services. Presents correctness and performance analysis with respect to framing, error detection, and ARQ schemes. Discusses host-to-host communications as a problem of routing and addressing. Discusses routing, emphasizing correctness, stability, and performance of fundamental algorithms. Students gain insight into the problems of adapting traditional routing strategies to high-speed and wireless environments. Considers flow and congestion control strategies within the context of end-to-end session requirements and global network performance.

* Prerequisite: EECE 7204 and working knowledge of C programming; understanding of statistics, discrete-event simulation, and networking recommended.

EECE 7332 Error Correcting Codes (4 SH)

Covers algebra and Galois field theory in detail, as well as linear block codes, Hamming codes, cyclic codes, their encoding and decoding algorithms, BCH and Reed-Solomon codes, the Berlekamp-Massey decoding algorithm, Fourier transform over finite fields, codes in the frequency domain, and frequency domain decoding techniques. Studies bounds on code performance and burst error correcting codes, convolutional codes, their properties, Viterbi algorithm, performance of the ML decoding, sequential decoding of convolutional codes, the Zigangirov-Jelinek algorithm, concatenated codes, array codes, BCJR and SOVA algorithms, turbo codes, iterative decoding schemes, Trellis coded modulation, low-density parity check codes, and coding for fading channels.

* Prerequisite: Knowledge of probability and digital communications.

EECE 7333 Spread Spectrum Communication Systems (4 SH)

Introduces the fundamental concepts of spread spectrum communication systems. Studies the basic theory of direct sequence (PN) and frequency hopping (FH) spread spectrum techniques. Topics include direct sequence code generation, acquisition, and tracking; and phase and Doppler tracking. Emphasis is on the performance of uncoded and coded spread spectrum communications in the presence of interference, jamming, and fading environments. Considers the low probability of interception/detection (LPI/LPD) characteristics of spread spectrum techniques in multiuser communication systems. Presents various practical applications of spread spectrum including IEEE 802.11b, HomeRF, and Bluetooth.

* Prerequisite: EECE 7336.

EECE 7334 Wireless Communications (4 SH)

Treats a diverse range of topics in wireless communications for applications such as cellular mobile radio, personal communication services, and wireless local area networks. Offers a working knowledge of both narrowband and wideband radio propagation models, including multipath fading and shadowing. Explores the system-level design of cellular networks, including the concepts of frequency reuse, channelization, handoff, power control, cell splitting, sectorization, and Erlang capacity. Covers modern multiple-access methods, including code-, space-, time-, and frequency-division multiple access. Compares coherent, differentially coherent, and noncoherent signaling techniques from the perspectives of spectral efficiency, bit error rate, and transceiver complexity. Explores both optimal and practical receiver designs and covers topics such as digital equalization and diversity techniques.

* Prerequisite: EECE 7336.

EECE 7335 Detection and Estimation Theory (4 SH)

Reviews vector space and stochastic concepts, sufficiency, unbiased estimation, Cramer-Rao bound, Rao-Blackwell theorem, Pitman efficiency, maximum likelihood estimation, Bayesian estimation, minimum mean squared error estimation, least squares estimation, and Gauss-Markov theorem. Topics include simple and composite hypotheses, Neyman-Pearson tests, uniformly most powerful tests, invariant tests, CFAR detection, Gaussian detection, minimax detection, nonparametric testing, sequential testing, and quickest detection.

* Prerequisite: EECE 7204; engineering students only.
EECE 7336 Digital Communications (4 SH)
Covers fundamentals of digital communications and coding and the basic structure of a communication system. Topics include modeling of information sources; entropy; rate distortion function; lossless and lossy source coding theorems; Huffman coding; Lempel-Ziv algorithm; scalar and vector quantization; digital modulation schemes and their spectral characterization including PAM, MPSK, QAM, OQPSK, MSK, π/4-QPSK, CPFSK, CPM, and GMSK; and orthogonal, biorthogonal, and simplex signaling. Explores optimal receiver design and probability of error derivation for various systems. Covers noncoherent detection and DPSK systems and their performance. Discusses synchronization systems, analysis of PLL in the presence of noise, methods of timing recovery, channel capacity, and Shannon’s noisy channel coding theorem. Studies cutoff rate and its communication system design. Other topics include coding systems, linear block codes, soft and hard decision decoding, performance of linear block codes, cyclic codes, convolutional codes, Viterbi decoding, error probability bounds, concatenated codes, MAP decoding, Trellis code modulation, communication over band-limited channels, ISI, Nyquist conditions, raised cosine signaling, partial response signaling, equalization techniques, linear adaptive equalization, decision feedback equalizers, maximum likelihood sequence detection, and communication over fading channels.

• Prerequisite: EECE 7204: engineering students only.

EECE 7337 Information Theory (4 SH)
 Discusses basic properties of entropy and mutual information, Shannon’s fundamental theorems on data compression and data transmission in the single-user case, binning, and covering lemmas. Topics include rate distortion theory, feedback in one-way channels, Slepian-Wolf coding of correlated information sources, source coding with side information at the receiver, multiple access channel and its capacity region, and the capacity region of the Gaussian multiple access channel. Also covers broadcast channels, superposition coding, and the capacity region of the degraded broadcast channel; performance and comparison of TDMA, FDMA, and CDMA systems from a theoretical point of view; capacity issues for time-varying channels and channels with memory; relation between information theory and statistics; Stein’s lemma; and large deviation theory.

• Prerequisite: EECE 7204.

EECE 7338 Local Area Networks and Interworking (4 SH)
Presents fundamental principles on the design and analysis of local area networks (LANs) and internetworking strategies. The traditional definition of a LAN is that it provides high-speed transmission within a limited geographic scope, and ownership is associated with the organization that uses and manages it. An alternative definition is that a LAN provides the physical and link-layer access point to an internetwork. LAN technology provides electrical, physical, and signaling specifications, as well as the rules for transmission on various shared or dedicated media. Today LANs can operate at speeds in the gigabits per second and may span great distances. Internetworking imposes a higher logical-layer abstraction that provides the protocols, algorithms, and devices for interconnecting a mesh of heterogeneous LANs and intermediate networks into an Internet. Guides students through the evolution of LAN technology, from the challenges addressed by engineers designing first- and second-generation LANs to present and future advances. Emphasizes basic algorithms and protocols used for media access control and performance evaluation. Discusses internetworking concepts related to the protocols used in the present-day Internet. 

• Prerequisite: EECE 7331 and EECE 7336.

EECE 7339 Testing and Design for Testability (4 SH)
Encompasses the theoretical and practical aspects of digital systems testing and the design of easily testable circuits. Topics include defect and fault models, test generation for combinational and sequential circuits, testing measures and costs, functional and parametric test methods, design for testability, built-in self-test, and concurrent testing. Provides the foundations for developing test methods for digital systems and provides the techniques necessary to practice design for testability.

EECE 7340 Broadband Communications Networks (4 SH)
Covers the basic principles and fundamental design issues relevant to broadband communication networks and exposes students to current research problems. Broadband networks are designed to support a variety of services and applications. Topics range from SONET and ATM switching to high-speed network control. Other topics include characterization of network traffic and its implications on network design; traffic management, flow control, and congestion control including call admissions control, scheduling, and policing; quality of service-based routing; and multicast routing. Networking technologies reflect current research areas and implementations. Focuses on high-speed wide-area-networking (WAN) technologies including frame relay (FR), asynchronous transfer mode (ATM), and next-generation Internet architecture. Includes lectures, readings from relevant literature, and student presentations.
EECE 7347 Special Topics in Communications 1 (4 SH)
Covers state-of-the-art advanced topics in communications. Topics are selected from the areas of interest and research of the instructor. The prerequisites are determined by the instructor.
- Repeatability: May be repeated without limit.

EECE 7348 Special Topics in Communications 2 (4 SH)
Covers state-of-the-art advanced topics in communications. Topics are selected from the areas of interest and research of the instructor. The prerequisites are determined by the instructor.
- Repeatability: May be repeated without limit.

EECE 7349 Special Topics in Communications 3 (4 SH)
Covers state-of-the-art advanced topics in communications. Topics are selected from the areas of interest and research of the instructor. The prerequisites are determined by the instructor.
- Repeatability: May be repeated without limit.

EECE 7350 Software Engineering 1 (4 SH)
Presents traditional methods in software engineering. Includes the various development models, requirements, specification, design, prototyping, implementation, test, and maintenance. Discusses object-oriented design principles, such as encapsulation, inheritance, and polymorphism. A software project is assigned that contrasts the differences between function-oriented and object-oriented design.
- Prerequisite: Working knowledge of C programming language.

EECE 7351 Software Engineering 2 (4 SH)
Continues EECE 7350. Focuses on a very specific issue, modular design of software. Explores issues of stepwise-refinement and top-down design in depth and considers organizational/data-flow issues.
- Prerequisite: EECE 7350.

EECE 7352 Computer Architecture (4 SH)
Presents many of the issues involved in the design and analysis of new and evolving computer architectures. Topics include all aspects of the system including the microprocessor, memory, I/O, and networking. Emphasizes the connection between architecture and the underlying software that drives it. Topics include pipelining, superscalar, out-of-order execution and completion, data flow, caching, prefetching, virtual memory, RAID, and ATM switching. Performance analysis is another fundamental theme of this course. A project is assigned that involves the creation of a trace-driven simulation model to study the performance of various hardware or software architectural features. Also provides a survey of the current state of the art in processor architectures and provides additional readings from recent research in the field.
- Prerequisite: Engineering students only with working knowledge of C programming language.

EECE 7353 VLSI Design (4 SH)
Covers all aspects of VLSI design and engineering including VLSI design methodology; MOS transistors and circuits; CAD tools to create, extract, simulate, and evaluate physical layouts; CMOS fabrication process; evaluation and optimization of circuit area, power consumption, and propagation delay; CAD tools to design CMOS systems with standard cells; system clocking design and evaluation; the characteristics and limitations of CAD tools, such as simulation, placement, and routing; VLSI testing, fault models, test vector generation, and design for testability; design projects going through a complete VLSI design cycle; and a research project targeting a specific area of VLSI engineering.
- Prerequisite: Knowledge of electronics and digital systems design.

EECE 7354 VLSI Architecture (4 SH)
Augments the physical-level VLSI design knowledge built in EECE 7353 by studying how to take advantage of VLSI technologies. Provides students with the opportunity to go through the design process of VLSI architectures with two architectural-level design projects. Prior project examples include the design and evaluation of FPGAs, application specific processors, and microprocessors. Emphasizes performance and cost tradeoffs and decision making in these projects. Lectures provide theories and discussions to support these design projects that include a brief review of VLSI design methodology, pipelining and parallel processing in VLSI processors, interconnection between VLSI processing units, VLSI-oriented algorithms and applications, VLSI architecture synthesis, such special VLSI architectures as synchronous and asynchronous processor arrays and massively parallel fine-grained processor arrays, and reconfigurable VLSI architectures.
- Prerequisite: EECE 7353.

EECE 7355 Digital Systems Design with Hardware Description Languages (4 SH)
Covers design, simulation, modeling, synthesis, verification, and implementation of complex digital systems using high-level computer hardware description languages (HDL), beginning with a description of digital system design hierarchy and abstraction. Provides a brief overview of available design tools and simulation programs. Continues with a complete presentation of the standard VHDL hardware description language and how to use this language for design and verification of digital systems at different levels of abstraction. Includes the following topics: CPU design; synthesis of a large design; FPGA implementation of a complete design; and, for materializing this complete design, coding for synthesis, use of verification libraries, and how to program FPGAs and CPLDs. Uses advanced simulation, synthesis, and FPGA programming tools.
- Prerequisite: EECE 7352; electrical engineering and computer engineering students only.
EECE 7356 Digital Systems Design and Interfacing with Verilog (4 SH)
Covers automated design and synthesis of digital systems with the standard Verilog hardware description language, with an emphasis on CPU structures and interfacing. Demonstrates how Verilog can be used for simulation, synthesis, and test of digital systems. Discusses hardware description using predefined parts, using the bussing structure of a system, or using a mapping of inputs to outputs. After a complete presentation of the Verilog language, presents synthesizability concepts and templates for logic unit, memory unit, and state machine synthesis. Continues by using Verilog in a complete design and description of a CPU, its peripheral devices, and generation of a complete CPU board.
• Prerequisite: Engineering students only.

EECE 7357 Fault-Tolerant Computers (4 SH)
Overviews fault-tolerant computing and the design and evaluation of dependable systems, and provides a base for research in fault-tolerant systems. Quantitative evaluation and modeling provide the foundation for study of fault avoidance, fault detection, and fault removal from the component level to the system level. Analyzes contemporary and historical architectures. Software evaluation tools are available for the class to explore fault-tolerant design spaces.
• Prerequisite: Engineering students only.

EECE 7358 Parallel Architecture for High-Performance Computing (4 SH)
Introduces models of parallel computation, network architectures used for parallel processing (ring, mesh, and hypercube, etc.), message routing mechanisms, point-to-point and collective communication primitives (one-to-all, all-to-all, scatter, gather, etc.), parallel and distributed systems performance, and scalability evaluation methods. Discusses how a sequential algorithm can be transformed systematically into a parallel computational strategy so that it can be realized either in hardware (using an application-specific architecture) or in software (using a network of distributed general-purpose computers). Uses numerical algorithms to highlight the key issues involved in this mapping. Includes case studies of high-performance scalable parallelization strategies for computationally intensive operations, such as dense and sparse linear system solvers, multidimensional data transforms, etc., which are often encountered in scientific and multimedia applications. Introduces students to parallel programming using intermediate-level C/MPI.
• Prerequisite: EECE 7202.

EECE 7359 Multiprocessor Architectures (4 SH)
Presents the issues related to designing and programming tightly coupled shared-memory multiprocessor systems. Covers memory structure, snoopy and directory-based caching, memory consistency protocols, cache coherency protocols, processor interconnect strategies, and multiprocessor scalability. Covers issues related to program execution of real applications on a multiprocessor system including synchronization primitives, task scheduling, and memory allocation.
• Prerequisite: Familiarity with computer architecture.

EECE 7360 Combinatorial Optimization (4 SH)
Introduces combinatorial optimization, an emerging field that combines techniques from applied mathematics, operations research, and computer science to solve optimization problems over discrete structures. Emphasizes problems that arise in the areas of electrical and computer engineering including VLSI, computer-aided design, parallel computing, computer architecture, and high-performance compiling. Covers the foundations of algorithm analysis including asymptotic notation and complexity theory, and a range of optimization techniques including divide and conquer, local optimization, dynamic programming, branch and bound, simulated annealing, genetic algorithms, approximation algorithms, integer and linear programming, matroid theory, and greedy algorithms. Considers the efficient generation of optimal solutions, the development and evaluation of heuristics, and the computation of tight upper and lower bounds.
• Prerequisite: Engineering students only.

EECE 7361 Digital Hardware Synthesis (4 SH)
Introduces techniques and tools for the automatic synthesis of digital systems. Focuses on algorithms for translating a high-level specification into an implementation. Covers a brief introduction to hardware description languages (HDL), automatic translation of the HDL to an intermediate format, architectural synthesis of the register transfer-level implementation, automatic state machine synthesis, and logic synthesis. Requires a completed research project in the Automatic synthesis of digital designs.
• Prerequisite: EECE 7205.
EECE 7362 Network Computing (4 SH)
Studies the theory and practice of analysis and design of network-based computing systems in which programs can be executed adaptively in a changeable computing environment, such as clusters of workstations or PCs. Includes distributed shared memory; cache coherence; snooping; locking; atomic exchange; deadlock; message passing interface (MPI-1 and MPI-2); point-to-point communication; collective communications; and groups, contexts, and communicators. Studies process topologies (virtual topologies), network of workstations (NOW), protocols and programming, scalable coherent interface (SCI) using point-to-point connection of distributed shared memory (DSM) machine, SCIs, cache coherence protocol, clusters of workstations based on SCI, scalable networks for data processing topologies, wormhole routing, deadlock avoidance, scalability, message format, fault tolerance, arbitration policies, and performance evaluation of network-based computing systems. Includes ServerNet, myrinet, SCI, scalable networks for data processing topologies, wormhole routing, deadlock avoidance, scalability, message format, fault tolerance, arbitration policies, and performance evaluation of network-based computing systems. Includes ServerNet, myrinet, and clusters of advanced workstations case studies.
• Prerequisite: EECE 7352 and EECE 7363.

EECE 7363 Interconnection Network for Multicomputers (4 SH)
Covers static interconnection networks, topological properties of static interconnection networks, dynamic networks, routing in multicomputer networks, path setup, path selection (deterministic and adaptive), network flow control (store and forward, virtual cut-through, and wormhole), deadlocks in routine (virtual networks), multicasting and broadcasting in static networks (one-to-all, all-to-all broadcasting, and spanning graphs), fault tolerance and reliability of interconnection networks, and performance metrics for different topologies (through-put, message latency, max delivery time, saturation point, hot spots, stable state, average link usage, and dynamic hot spots identification). Also studies modules for a realization of interconnection networks, Node’s architecture and organization, based on 32- and 64-bits CPU. Case studies include different topologies and routine strategies.
• Prerequisite: EECE 7352.

EECE 7364 Mobile and Wireless Networking (4 SH)
Introduces the fundamental techniques and protocols in first- and second-generation, and emerging third-generation, wireless systems. Examines how mobility affects networks, systems, and applications. Mobility of devices and end-users has behavioral implications at all layers of the Internet protocol stack, from the MAC layer up through the application layer. Handling mobility efficiently requires more information sharing between network layers than is typically considered. Topics include cellular system, medium access control protocols for wireless systems, mobility management and signaling within mobile networks, common air interfaces (AMPS, IS-136, IS-95, or GSM), wireless data networking (CDPD), ad hoc networks, Bluetooth, Mobile IP, and PCS systems. Also introduces students to the problems and current research in the provision of quality of service (QoS) in wireless networks. Methodology includes lectures, textbooks, and emphasis on readings from relevant literature.

EECE 7365 Distributed Systems (4 SH)
Covers fundamentals of distributed systems, distributed computing models, client-server computing, remote procedure calls, distributed file and directory services, distributed systems design and implementation issues, reliability and availability, security, overview of computer networks, and case studies in distributed systems.
• Prerequisite: Knowledge of operating systems.

EECE 7366 Special Topics in Computer Engineering 1 (4 SH)
Covers topics in computer engineering not studied in other courses. Subject matter may change from year to year. Topics may include computer architecture, design automation, parallel computing, VLSI, networks, compilers, algorithm design, fault tolerance, and testing.
• Repeatability: May be repeated without limit.

EECE 7367 Robotics and Automation Systems (4 SH)
Explores methods of operation of general-purpose and industrial manipulator systems, kinematic and dynamic models of mechanical arms, joint solutions and motion characteristics, trajectory planning, arm control through coordinate transformations, classical feedback methods and modern closed-loop control techniques, and real-time control of robotic systems.
• Prerequisite: EECE 7200.

EECE 7368 High-Level Design of Hardware-Software Systems (4 SH)
Presents state-of-the-art methods, tools, and techniques for system-level design and modeling of complete multiprocessor systems from specification down to implementation across hardware-software boundaries. Recognizes that system complexities are growing exponentially, driven by ever-increasing application demands and technological advances that allow one to put complete multiprocessor systems on a chip (MPSoCs). System-level design that jointly covers hardware and software is one approach to address the associated complexities in the design process and the market pressures. Using system-level design languages (e.g., SpecC, SystemC), offers students an opportunity to specify, simulate, analyze, model, and design hardware-software systems based on examples of typical embedded applications.
• Prerequisite: EECE 7205 and working knowledge of C/C++, algorithms, and data structures; engineering students only.
EECE 7370 Advanced Computer Vision (4 SH)
Offers students an opportunity to obtain practical knowledge in computer vision and to develop skills for being a successful researcher in this field. The goal of the field of computer vision is to make useful decisions about real physical objects and scenes based on sensed images. Achieving this goal requires obtaining and using descriptions (models) of the sensors and the world. Computer vision is an exciting field that builds on very diverse disciplines such as image processing, statistics, pattern recognition, control theory and system identification, physics, geometry, computer graphics, and machine learning. Course material includes state-of-the-art in the field, current research trends, and algorithms and their applications, with an emphasis on the mathematical methods used.

• Prerequisite: Engineering students only.

EECE 7374 Fundamentals of Computer Networks (4 SH)
Focuses on fundamental concepts of computer networks with a particular focus on the Internet. Covers the language and practices of computer networking at all levels of various network protocol stacks. Basic concepts include general definitions and network organization. Delves into the protocol stack following a top-down approach, covering the application layer (with Internet applications); the transport layer, with its functions and services (e.g., the TCP protocol); the network layer, with a discussion on forwarding and routing and the IP protocol; and the data link layer, with an emphasis on multiaccess. Concludes with current topics including networks analysis/modeling, physical layer/cross-layer design, emerging technologies, and mobility.

• Prerequisite: EECE 7367.

EECE 7376 Operating Systems: Interface and Implementation (4 SH)
Covers fundamentals of operating systems (OS) design, including theoretical, OS-generic design considerations as well as the practical, implementation-specific challenges in the development of a real OS.

• Prerequisite: EECE 7352; solid knowledge of digital system design, integrated circuits synthesis flow, and embedded systems recommended; engineering students only.

EECE 7377 Special Topics in Computer Networks (4 SH)
Covers current aspects of computer communications networks not covered in previous courses. Subject matter may change from year to year. Topics may include wireless ad hoc networks, quality of service in wireless networks, network and Internet security, modeling and analysis of network traffic and mobility, and advanced queuing.

• Repeatability: May be repeated without limit.

EECE 7388 Special Topics in Computer Engineering 2 (4 SH)
Covers topics in computer engineering not studied in other courses. Subject matter may change from year to year. Topics may include computer architecture, design automation, parallel computing, VLSI, networks, compilers, algorithm design, fault tolerance, and testing.

• Prerequisite: Engineering students only.

• Repeatability: May be repeated without limit.

EECE 7389 Robot Vision and Sensors (4 SH)
Examines methods of acquisition, representation, and processing of real-world information for robot control. Focuses on the different aspects of robot vision. Topics include projection, lens distortion, image noise reduction, texture, edge-based systems, region-based systems, Hough space, matched filtering, object modeling, stereo vision, motion, and optical flow. Robot sensors covers a variety of sensor types including force/torque, proximity, and tactile sensors.

• Prerequisite: EECE 7367.

EECE 7390 Computer Hardware Security (4 SH)
Presents the foundations for understanding the new and evolving area of hardware security and trust, which have become major concerns for national security over the past decade. Coverage includes security and trust issues in all types of electronic devices and systems, such as ASICs, COTS, FPGAs, microprocessors/DSPs, and embedded systems. Topics encompass the state-of-the-art research fronts such as hardware support for system security, hardware implementations of security primitives, physical attacks and tamper resistance, analysis and practices of side-channel attacks and countermeasures, security for RFID tags, physically unclonable functions, design for hardware trust, hardware Trojan detection and localization, etc.

• Prerequisite: EECE 7352; solid knowledge of digital system design, integrated circuits synthesis flow, and embedded systems recommended; engineering students only.

EECE 7393 Analysis and Design of Data Networks (4 SH)
Introduces fundamental concepts and approaches for the analysis and design of data networks. Covers delay models, multi-access communication, scheduling, routing, congestion control, and network coding. Presents analytical techniques such as basic queuing theory, queuing networks, optimization, stochastic control, and distributed algorithms.

• Prerequisite: Knowledge of basic probability; engineering students only.
EECE 7394 Networks and Systems Security (4 SH)
Focuses on network and systems security, providing a broad overview of a diverse range of topics across these two domains. Builds from foundational security models and principles to examine attacks and defenses in systems code, the Web, and mobile platforms. Emphasizes practical techniques in support of the high-level goal to impart the “attacker’s mind-set.”
• Prerequisite: Comfort with UNIX/Linux systems; networking (TCP/IP); C and/or C++; and Python, Ruby, or another scripting language; restricted to engineering students.

EECE 7397 Advanced Machine Learning (4 SH)
Covers topics in advanced machine learning. Presents materials in the current machine learning literature. Focuses on graphical models, latent variable models, Bayesian inference, and nonparametric Bayesian methods. Seeks to prepare students to do research in machine learning. Expects students to read conference and journal articles, present these articles, and write an individual research paper.
• Prerequisite: CS 6140, EECE 7204, or EECE 7313; restricted to students in the College of Computer and Information Science and in the College of Engineering.
• Cross-list: CS 7140.
• Equivalent: CS 7140.

EECE 7398 Special Topics (4 SH)
Covers topics of interest to the faculty member conducting this class for advanced study.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

EECE 7399 Preparing High-Stakes Written and Oral Materials (4 SH)
Focuses on how to think through and develop critical materials that have high-stakes impact. These could include writing a compelling technical paper or a winning proposal for external funding, making a compelling oral presentation for a job interview or thesis defense, or presenting arguments to a CEO about strategic directions for a complex project. Includes hands-on exercises and class exercises around challenges defined by the instructor or by guest lecturers.
• Prerequisite: Engineering students only.

EECE 7400 Special Problems in Electrical Engineering (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

EECE 7674 Master’s Project (4 SH)
Offers analytical and/or experimental work leading to a written report and a final short presentation by the end of the semester.
• Prerequisite: Engineering students only.

EECE 7990 Thesis (4 to 8 SH)
Offers analytical and/or experimental work conducted under the auspices of the department.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated once.

EECE 7996 Thesis Continuation (0 SH)
Offers analytical and/or experimental work conducted under the auspices of the department.
• Prerequisite: Engineering students only.

EECE 8400 Advanced Seminar (4 SH)
Offers treatment of advanced topics of research to include theoretical as well as experimental aspects. Requires reports and discussion of selected technical articles in professional journals and symposia.
• Prerequisite: Engineering students only.

EECE 8960 Exam Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Permission of advisor; electrical engineering and computer engineering students only; intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
• Repeatability: May be repeated once.

EECE 8984 Master’s Research (1 to 8 SH)
Offers investigation of master’s research topic under supervision of individual faculty member.
• Prerequisite: Electrical and computer engineering students only.
• Repeatability: May be repeated without limit.

EECE 8986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

EECE 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of program requirements for PhD candidacy.

EECE 9803 PhD Seminar (0 SH)
Requires the student to present a seminar to the Department of Electrical Engineering on a subject related to his/her PhD thesis. The thesis supervisor coordinates the seminar.
• Prerequisite: Passing of PhD qualifying exam; electrical engineering students only.
EECE 9984 Doctoral Research (1 to 8 SH)
Investigates doctoral research topic under supervision of individual faculty member.
• Prerequisite: Electrical and computer engineering students only.
• Repeatability: May be repeated without limit.

EECE 9986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

EECE 9989 Dissertation (0 SH)
Requires theoretical and/or experimental work conducted under the auspices of the department. Required to be taken in two consecutive semesters. Includes attendance at Distinguished Lecture Series (DLS).
• Prerequisite: PhD candidacy in electrical or computer engineering.
• Repeatability: May be repeated once.

EECE 9996 Dissertation Continuation (0 SH)
Offers continued dissertation work conducted under the supervision of a departmental faculty member. Includes attendance at Distinguished Lecture Series (DLS).
• Prerequisite: EECE 9990 completed twice; electrical and computer engineering students only.
• Repeatability: May be repeated without limit.

ENERGY SYSTEMS (ENSY)

ENSY 5000 Fundamentals of Energy System Integration (4 SH)
Focuses on the integration of energy systems. Introduces combined heat and power systems, strategies of incorporating renewable energy sources, thermoeconomics, and carbon capture techniques. Includes energy, exergy, and thermoeconomic cost factors in the presented case studies. Explores the effects of public policy, regulations, and financial operations on selecting energy technology. Students are given case studies to illustrate the complexity of implementing energy systems and are expected to complete a major project involving proposing an energy system. Emphasizes that successful implementation of energy systems requires both a technical and an economic solution.
• Prerequisite: Calculus-based physics and chemistry and senior or graduate standing; engineering and technological entrepreneurship students only.

ENSY 5585 Wind Energy Systems (4 SH)
Introduces wind energy and its applications. Integrates aerodynamics of wind turbine design with the structures needed to support them. Covers types of wind turbines, their components, and related analyses; airfoil aerodynamics; concepts of lift, drag, pitching moment, circulation, angle of attack, and stall; laminar and turbulent boundary layers and separation concepts; fundamental conservation equations; Bernoulli’s, Euler’s, and Navier-Stokes equations and their applications; Betz limit; computational fluid dynamics and its application for flow over typical airfoils; compressibility and elements of one-dimensional gas dynamics; wind resource; wind climatology and meteorological data; turbine tower and structural engineering aspects of turbines; vibration problems; aeroelastic phenomena in turbines; small wind turbines and vertical axis wind turbines; and introduces environmental and societal impacts and economic aspects.
• Prerequisite: Engineering students only.

ENSY 5964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

ENSY 5965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

ENSY 7374 Special Topics in Energy Systems (4 SH)
Offers topics of interest to the staff member conducting the course for advanced study.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

ENSY 7978 Independent Study (1 to 4 SH)
Offers an individual effort in an area selected by student and advisor and approved by the Department Discipline Committee, resulting in a definitive report.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.
**ENGINEERING COOPERATIVE EDUCATION (ENCP)**

**ENCP 6000 Career Management for Engineers (1 SH)**
Designed to introduce graduate engineering students to the cooperative education program and maximize their learning by seeking to help them be more intentional about learning in co-op and in the transfer of that knowledge and experience to and from their academic program and throughout their entire careers. Offers students an opportunity to develop career goals and be able to identify and justify what they need to learn through their co-op experience and entire careers. Offers students an opportunity to engage in readings, exercises, and discussions to acquire the tools to be able to continually assess what they already know, what they think they know, what they need to know, and what they would like to know in relation to achieving their career goals.

- **Prerequisite:** Restricted to MS engineering students in computer systems engineering, energy systems, engineering management, information systems, sustainable building systems, and telecommunications systems management.

**ENCP 6100 Introduction to Cooperative Education (1 SH)**
Introduces graduate students to the Cooperative Education Program and offers them an opportunity to develop job-search and career-management skills. Students perform discipline-specific assessments of their workplace skills, interests, and values and discuss how they impact personal career choices. Covers how to develop field/industry-specific materials, including a professional-style résumé and cover letter, and introduces students to career portfolios. Additional topics include ethics, professional behaviors, workplace culture, and proper interviewing techniques. Familiarizes students with workplace issues relative to their field of study while outlining co-op policies, procedures, and expectations of the Cooperative Education Program and employers.

- **Prerequisite:** Restricted to College of Engineering graduate students in bioengineering, chemical engineering, civil engineering, electrical and computer engineering, industrial engineering, mechanical engineering, and operations research.

**ENCP 6964 Co-op Work Experience (0 SH)**
Provides eligible students with an opportunity for work experience.

- **Prerequisite:** Engineering students only.
- **Repeatability:** May be repeated without limit.

**ENGINEERING INTERDISCIPLINARY (ENGR)**

**ENGR 0600 Preparation for Professional and Academic Engineering Success in the United States (0 SH)**
Designed for international engineering graduate students who are learning about living, working, and studying in the United States. The goal is to create experiences that assist the student toward biculturalism. Offers students an opportunity to obtain an in-depth understanding of the American people, the university culture, and the professional engineering environments they experience both during their program at Northeastern and after graduation. Examines the importance of critical thinking skills, creativity, and individualism as core values of the American spirit. At the same time, introduces language skills necessary for successful communication at the university, in engineering settings, and in the wider culture.

- **Prerequisite:** Engineering graduate students only.

**ENGR 5050 Advanced Engineering Calculus with Applications (4 SH)**
Introduces methods of vector analysis. Expect students to master over thirty predefined types of problems. Topics include analytic geometry in three dimensions, geometric vectors and vector algebra, curves in three-space, linear approximations, the gradient, the chain rule, the Lagrange multiplier, iterated integrals, integrals in curvilinear coordinates, change of variables, vector fields, line integrals, conservative fields, surfaces and surface integrals, the flux and the circulation of a vector field, Green’s theorem, the divergence theorem, and Stokes’ theorem. Illustrates the material by real-world science and engineering applications using the above techniques.

- **Prerequisite:** Familiarity with single-variable calculus.

**ENGR 5670 Sustainable Energy: Materials, Conversion, Storage, and Usage (4 SH)**
Examines, in this interdisciplinary course, modern energy usage, consequences, and options to support sustainable energy development from a variety of fundamental and applied perspectives. Emphasizes both (1) physical and chemical processes in materials for the conversion of energy and (2) how to design a system with renewable energy for applications such as electricity generation and transmission. Takes a systems analysis point of view. Topics may include energy conservation; fossil fuels; and energy conversion methods for solar, geothermal, wind, hydro, bioenergy, electrochemical, and similar methods.

- **Prerequisite:** Junior, senior, or graduate standing; engineering students only.
ENGR 6150 Nanotechnology in Engineering (4 SH)
Explores a wide range of new technologies based on, or influenced by, breakthroughs in nanoscience. Nanotechnology, the refinement of functional properties of materials, devices, or systems at least one dimension smaller than 100 nm with a general goal of engineering new or enhanced macroscopic properties from nanostructure or nanoscale materials and components, has revolutionized science and its impact on society. Nanotechnologies include, but are not limited to, spintronics, quantum computing, carbon nanotube electronics, nanoparticle cancer remediation strategies, biomolecular electronics, and nanomachines. Through review of the scientific literature, classroom lecture, seminars by international leaders of nanotechnology, and student team and individual projects, the student has an opportunity to develop an in-depth understanding of one area of interest in this field.
- Equivalent: CHME 5155 and EECE 5150.

ENGR 6600 Early-Stage Technology—Commercialization Opportunity Assessment (4 SH)
Focuses on real-world product development and commercialization in engineering. Organized with several interdisciplinary teams consisting of business students and engineering students, supported by technical and commercial mentors from industry and academia. Through their engagement with industry, offers students an opportunity to work on confidential intellectual property and early concept/product-idea generation.
- Prerequisite: Restricted to students in the College of Engineering and in the D’Amore-McKim School of Business.

ENGR 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated without limit.

ENGR 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated without limit.

ENGR 7996 Thesis Continuation (0 SH)
Offers continuing master’s thesis supervision under individual faculty supervision.
- Prerequisite: Engineering students only.

ENGR 8986 Research Fieldwork (0 SH)
Offers students an opportunity to conduct research under faculty supervision.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated up to 21 times.

ENGR 9701 Engineering Teaching Practicum (0 SH)
Offers intermediate or terminal-level doctoral candidates a teaching assignment under the guidance of a faculty member. Typical activities include preparing and teaching recitations; preparing and teaching laboratory sessions; holding office hours; preparing and grading quizzes, problem sets, and other assignments; and assisting the instructor with other activities associated with teaching a course. All nonnative English speakers should conform to the university language requirements for teaching assistants.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated up to 5 times.

ENGR 8986 Research Fieldwork (0 SH)
Offers students an opportunity to conduct research under faculty supervision.
- Prerequisite: Engineering students only.
- Repeatability: May be repeated up to 21 times.

ENLR 5121 Engineering Leadership 1 (2 SH)
Covers elements of engineering practices such as product engineering (system design and engineering, integration, and documentation); engineering leadership (team building, communication, leadership styles, ethical behavior, and conflict resolution); market assessment (engineering economics, business plans, intellectual property, risk assessment, and mitigation); and engineering excellence (quality, reliability, serviceability, manufacturability, procurement, and problem solving). Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
- Prerequisite: Junior, senior, or graduate standing; engineering leadership students only.

ENLR 5122 Engineering Leadership 2 (2 SH)
Continues the examination of engineering practices begun in ENLR 5121. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
- Prerequisite: ENLR 5121 and junior, senior, or graduate standing; engineering leadership students only.
ENLR 5131 Scientific Foundations of Engineering 1 (2 SH)

Presents the fundamental science underlying engineering disciplines. Develops a conceptual framework to understand interdisciplinary engineering practice and to make informed, back-of-the-envelope, quantitative estimates. Covers topics such as principles of mechanics and mechanics of materials, wave physics, quantum physics, statistical and thermal physics, fluid physics, Maxwell’s equations and constitutive relations, and topics in chemistry and biology.

• Prerequisite: Junior, senior, or graduate standing; engineering leadership students only.

ENLR 5132 Scientific Foundations of Engineering 2 (2 SH)

Continues the examination of fundamental science begun in ENLR 5131.

• Prerequisite: ENLR 5131 and junior, senior, or graduate standing; engineering leadership students only.

ENLR 7440 Engineering Leadership Challenge Project 1 (4 SH)

Offers students an opportunity to develop and present a plan for the demonstration of a marketable technology product or prototype. This course is the first half of a thesis-scale project in technology commercialization. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.

• Prerequisite: Engineering leadership students only.

ENLR 7442 Engineering Leadership Challenge Project 2 (4 SH)

Continues ENLR 7440, a thesis-scale project in technology commercialization. Offers students an opportunity to demonstrate their development of a marketable technology product or prototype and produce a written documentary report on the project to the satisfaction of an advising committee. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.

• Prerequisite: ENLR 7440; engineering leadership students only.

ENLR 7444 Engineering Leadership Challenge Project Continuation (0 SH)

Continues ENLR 7442, a thesis-scale project in technology commercialization. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.

• Prerequisite: Engineering leadership students only.

ENGINEERING MANAGEMENT (EMGT)

EMGT 5220 Engineering Project Management (4 SH)

Examines the theory and practice of managing projects. Explores human, mathematical, entrepreneurial, managerial, and engineering aspects of project management. The systems development life cycle is the framework for the course. Addresses needs analysis, requirements definition, design, and implementation in the context of project management. Introduces mathematical and software tools for planning, monitoring, and controlling projects.

• Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Engineering and in the College of Science.

EMGT 5300 Engineering/Organizational Psychology (4 SH)

Offers an analysis of the purpose and functioning of organizations as the basic networks for achieving goals through coordination of effort, communication, and responsibility. Studies the role and function of engineering organizations based on modern behavioral science concepts as well as the application of psychology to industry relative to human relations, group dynamics, tests and measurements, personnel practices, training, and motivation. Examines the evolution of the learning organization and its role in the management of R&D and technology, the influence of the rapid changes in technology, and the globalization of the marketplace through group-oriented case studies.

EMGT 5374 Special Topics in Engineering Management (4 SH)

Offers topics of current interest in engineering management.

• Prerequisite: Junior, senior, or graduate standing; engineering students only.

• Repeatability: May be repeated up to 4 times.

EMGT 6225 Economic Decision Making (4 SH)

Explores economic modeling and analysis techniques for selecting alternatives from potential solutions to an engineering problem. Considers measures of merit, such as present worth, annual worth, rate of return, and benefit/cost techniques. Examines recent techniques of economic analysis, especially the tools of decision making. Explores decisions under uncertainty. Studies the causes of risk and uncertainty, and examines ways to change and influence the degree of risk and uncertainty through sensitivity analysis, expectation-variance criterion, decision tree analysis, statistical decision techniques, and multiple attribute decision making through group case studies.

• Prerequisite: Restricted to students in the College of Engineering and in the College of Science.
EMGT 6305 Financial Management for Engineers (4 SH)
Examines the issues and processes of short-term financing on industrial firms, financial analysis of cases, supplemented by readings to develop familiarity with sources and uses of working capital as well as the goals and problems involved in its management. Also covers the analysis necessary for such long-term financial decisions as issuance of stock or bonds; contracting of leases or loans, and financing of a new enterprise; mergers, capital budgeting, the cost of capital, and the valuation of a business. Examines financial statement ratio analysis along with the use of the capital asset pricing model as it relates to risk and return. Explores leverage and capital structure and international managerial finance in the examination of the overall financial policy decision-making process.
• Prerequisite: Engineering students only.

EMGT 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

EMGT 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

EMGT 7374 Special Topics in Engineering Management (4 SH)
Offers topics of interest to the staff member conducting this class for advanced study.
• Repeatability: May be repeated without limit.

EMGT 7945 Master’s Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.

EMGT 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

EMGT 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
• Repeatability: May be repeated without limit.

EMGT 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

EMGT 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.

ENGLISH (ENGL)

ENGL 1000 English at Northeastern (1 SH)
Intended for freshmen in the College of Social Sciences and Humanities. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

ENGL 1120 Trouble in Utopia (4 SH)
Offers a first-year seminar exploring utopian/dystopian thought from Plato to contemporary popular culture, as a site for literary, political, social, and personal experimentation. Offers students opportunities to identify, critique, and theorize utopian ideas in critical and creative writing exercises. Culminates in a collective exhibit for which students produce and analyze their own utopian "artifacts" in the medium of their choice.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently) and (b) freshman or sophomore standing.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major.

ENGL 1130 Animals, Objects, Humans (4 SH)
Offers a first-year seminar examining the emotional, aesthetic, and ethical relationships that humans make with animals and objects. Offers students opportunities to engage critically and creatively with the variety of ways that we live those relationships and represent them in literature, art, film, and photography across cultures and through history.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently) and (b) freshman or sophomore standing.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major.
ENGL 1160 Introduction to Rhetoric (4 SH)
Introduces students to major concepts, traditions, and issues in rhetorical studies. Explores the range of ways that people persuade others to change their minds or take action; the relationship among language, truth, and knowledge; and the role of language in shaping identity and culture. Focuses on recognized thinkers from the Western tradition as well as writers that challenge the rhetorical canon. Emphasizes contemporary and interdisciplinary approaches to rhetoric interested in the entire range of rhetorical artifacts, with primary attention given to methods of critically investigating texts and their effects.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.

ENGL 1400 Introduction to Literary Studies (4 SH)
Offers a foundational course designed for English majors. Introduces the methods and topics of English literary and textual studies, including allied media (e.g., film, graphic narrative). Explores strategies for reading, interpreting, and theorizing about texts; for conducting research; for developing skills in thinking analytically and writing clearly about complex ideas; and for entering into written dialogue with scholarship in the diverse fields that comprise literary studies.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently): English majors and combined majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ENGL 1410 Introduction to Writing Studies (4 SH)
Introduces the basic theories, history, methodologies, and debates surrounding the study of how people learn to write and how writing is used in home, school, work, and civic contexts. Considers writing itself as both a practice and an object of study. Explores historical, rhetorical, linguistic, cognitive, social, and critical approaches to the teaching, study, and practice of writing, both in the U.S. tradition and in international contexts (e.g., UK, France, China). Emphasizes research on the development of critical reading and writing practices and students’ understanding of their own experiences and practices of other groups.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102 (any of which may be taken concurrently): English majors and combined majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ENGL 1450 Reading and Writing in the Digital Age (4 SH)
Grapples with the long and sometimes tumultuous relationship between literature—including fiction, poetry, film, and video games—and new media technologies. Offers students opportunities to historicize and engage the social and literary upheavals of our own technological moment through reading, discussion, writing projects, and practicums that seek to develop skills for analyzing the data and metadata of texts through both qualitative and quantitative methods.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, analyzing and using data, writing intensive in the major.

ENGL 1500 British Literature to 1800 (4 SH)
Surveys the major British writers and major literary works from the Middle Ages to the end of the eighteenth century. Includes works by such writers as Julian of Norwich, Chaucer, Spenser, Shakespeare, Milton, Behn, Pope, and Swift.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: ENGL 2220.

ENGL 1501 British Literature 1800 to Present (4 SH)
Surveys the major British and British postcolonial writers and major literary movements from the Romantic period through the Victorian and modern periods to the present. Includes works by such writers as Wordsworth, Hemens, Browning, Tennyson, Yeats, Lawrence, Lessing, Beckett, and Achebe.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: ENGL 2221.

ENGL 1502 American Literature to 1865 (4 SH)
Surveys the major American writers and major literary forms from the colonial period to the Civil War. Includes works by such writers as Bradstreet, Taylor, Wheatley, Cooper, Poe, Hawthorne, Douglass, Stowe, Melville, and Emerson.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: ENGL 2223.
ENGL 1503 American Literature 1865 to Present (4 SH)
Surveys the major American writers and major literary works from
the Civil War through the present. Includes works by such writers
as Whitman, Dickinson, Twain, James, Hemingway, Moore,
Faulkner, Ellison, and Morrison.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• Equivalent: ENGL 2224.

ENGL 1600 Introduction to Shakespeare (4 SH)
Introduces students to a selection of Shakespeare’s major plays in
each of the principle genres of comedy, tragedy, history, and
romance.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and
institutions.
• Equivalent: ENGL 2300.

ENGL 1700 Global Literature to 1500 (4 SH)
Introduces students to the ancient and classical literatures of
Greece, Rome, and the eastern Mediterranean, as well as other
premodern literatures in translation.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ENGL 2310.

ENGL 1701 Global Literature to 1500 (4 SH)
Focuses on the literatures (in English or in translation) of the
world from the early modern period to the present.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102 (any of which may be taken concurrently).
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ENGL 2311.

ENGL 1995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Repeatability: May be repeated without limit.

ENGL 2200 The Bible (4 SH)
Studies books of both the Old Testament and the New Testament
as literature and as history.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 3680.

ENGL 2210 Medieval British Literature (4 SH)
Surveys the major works of medieval English literature. Includes
such works as Sir Gawain, Piers Plowman, and Pearl.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 4605.

ENGL 2215 Shakespeare’s Comedies (4 SH)
Explores such central themes as marriage, sexuality, and festive
inversions of power in Shakespeare’s comedies and romances.
Gives attention to historical, cultural, and theoretical frameworks
for the study of comedy.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 3612.

ENGL 2216 Shakespeare’s Tragedies (4 SH)
Studies the nature of the tragic hero, the questioning of social
norms, and the landscape of chaos in plays ranging from Julius
Caesar to Coriolanus.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 3613.

ENGL 2230 Sixteenth-Century British Literature (4 SH)
Focuses on the literature and culture of the English Renaissance,
including such genres as sonnet sequence, romance, drama,
broadside ballads, and ghost stories. Authors may include Wyatt,
Sidney, Spenser, Elizabeth I, Shakespeare, and Marlowe, as well
as lesser known and anonymous authors.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 4610.

ENGL 2240 Seventeenth-Century British Literature (4 SH)
Examines the literature and culture of the period from the death of
Elizabeth I to the end of the century. Considers such figures as
Bacon, Jonson, Donne, Herbert, Milton, Marvell, Cavendish, and
Behn.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 4617.

ENGL 2250 Eighteenth-Century British Literature (4 SH)
Surveys the long eighteenth century with particular attention to the
Augustan age. Includes such major writers as Behn, Pope, Swift,
Goldsmith, and Johnson.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or
ENGL 1102.
• Equivalent: ENGL 4619.
ENGL 2260 Romantic Poetry (4 SH)
Surveys the development of English Romantic poetry, in both its lyric and longer forms, in Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats, as well as Dorothy Wordsworth, Mary Shelley, and Felicia Hemans. Emphasizes problems of belief and the relationship of the individual to the surrounding world of natural, social, and historical process.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4621.

ENGL 2270 Victorian Literature (4 SH)
Surveys the major writers, genres, and issues of Victorian England, considering such authors as Tennyson, Browning, Dickens, the Brontës, Hopkins, and Wilde.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4624.

ENGL 2280 Nineteenth-Century British Fiction (4 SH)
Studies theme and form in the major English novels of the nineteenth century, considering such authors as the Brontës, Charles Dickens, George Eliot, and Thomas Hardy.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4626.

ENGL 2290 Twentieth-Century British Literature (4 SH)
Surveys the work of twentieth-century English authors in both poetry and prose, including such writers as William Butler Yeats, D. H. Lawrence, W. H. Auden, Doris Lessing, and Iris Murdoch.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4631.

ENGL 2291 Major Twentieth-Century British Novelists (4 SH)
Introduces students to British fiction from Joseph Conrad to John Fowles, including such writers as D. H. Lawrence and Virginia Woolf. Attention given to novelistic form and historical context.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4630.

ENGL 2295 Revolution and Revolt in Early American Literature (4 SH)
Examines American literature in the context of the colonial Atlantic world and the early Republic, including such writers as Bradford, Bradstreet, Taylor, Edwards, Franklin, Wheatley, Irving, and Bryant.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4661.

ENGL 2296 Early African-American Literature (4 SH)
Surveys the development and range of black American writers and writers of the black Atlantic, focusing on poetry and prose from the Middle Passage to the Civil War.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: AFAM 4663 and ENGL 4663.

ENGL 2330 The American Renaissance (4 SH)
Studies the nineteenth-century development of an American national literary tradition in the context of democratic and romantic attitudes toward experience, nation formation, and national crisis. Includes such writers as Emerson, Thoreau, Hawthorne, Fuller, and Melville.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4665.

ENGL 2340 American Realism (4 SH)
Examines the realist tradition in American literature, including local color and native humor, from the end of the Civil War to the beginning of the twentieth century. Includes such writers as Twain, James, Harding Davis, Howells, Crane, Chesnutt, and Norris.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4667.

ENGL 2355 Modern American Literature (4 SH)
Studies major developments in American poetry and fiction from 1900 to 1945. Considers such poets as Frost, Eliot, Stevens, Williams, and Moore and such novelists as Hemingway, Faulkner, Fitzgerald, and Cather.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4668.

ENGL 2360 Modern African-American Literature (4 SH)
Surveys the development and range of black American writers in poetry and prose from the post-Civil War period to the present.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures.
• Equivalent: AFAM 4670 and ENGL 4670.

ENGL 2370 The Modern Short Story (4 SH)
Studies the short story from Henry to the present, including such writers as Joyce, Kafka, Munro, and O’Connor.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 4671.
ENGL 2380 The Modern Novel (4 SH)
Studies the major British and American novelists of the twentieth century. Considers theme and form in such authors as Lawrence, Woolf, Fitzgerald, Ellison, and Hurston.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 4672.

ENGL 2400 Modern Poetry (4 SH)
Studies the modernist tradition in American and British poetry. Considers such writers as Moore, Yeats, Hardy, Frost, Eliot, Stevens, Williams, and Cummings.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 4674.

ENGL 2410 Contemporary American Literature (4 SH)
Studies major movements in American poetry and fiction since 1945. Considers such poets as Plath, Ashbery, and Dove and such novelists as Morrison, Pynchon, and DeLillo.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 4676.

ENGL 2420 Contemporary Poetry (4 SH)
Studies developments in British and (especially) American poetry since 1945. Includes such writers as Bishop, Lowell, Ginsberg, Ashbery, Walcott, Heaney, Kunitz, Jorie Graham, Frank Bidart, Rita Dove, and Kevin Young.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 4678.

ENGL 2430 Contemporary Fiction (4 SH)
Examines British and American writers from 1945 to the present, including such figures as Lessing, Burgess, Pynchon, Morrison, Kingston, and Erdrich.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 4679.

ENGL 2440 The Modern Bestseller (4 SH)
Explores the relationship between commercially successful fiction and the popular imagination.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Equivalent: ENGL 3408.

ENGL 2450 Postcolonial Literature (4 SH)
Examines the literature and cultures of postcolonial nations in the Caribbean, Africa, and Asia. Designed to familiarize students with the cultural paradigms and transnational experiences of colonialism. Focuses on the variety of artistic strategies employed by writers to communicate contemporary postcolonial themes such as neocolonialism, nationalism, Third-World feminism, and diaspora.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: ENGL 4683.

ENGL 2455 American Women Writers (4 SH)
Effective Spring 2017
Surveys the diversity of American women’s writing to ask what it means to describe writers as disparate as Phillis Wheatley, Edith Wharton, Toni Morrison, and Alison Bechdel as part of the same “tradition.” With attention to all genres of American women’s writing, introduces issues of genre and gender; literary identification; canons; the politics of recuperation; silence and masquerade; gender and sexuality; intersectionality; sexual and literary politics, compulsory heterosexuality, and more.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Cross-list: WMNS 2455.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: WMNS 2455.

ENGL 2460 Multiethnic Literatures of the U.S. (4 SH)
Explores contemporary American literature by writers from distinctive ethnic groups (for example, Native, Asian, African, Latino/a, Jewish, Italian, Irish, Arab). Features a variety of works that reflect an evolving recognition of the artistically and culturally diverse nature of American literature.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: ENGL 3671.

ENGL 2470 Asian-American Literature (4 SH)
Introduces students to American writers of Chinese, Japanese, Korean, Filipino, South Asian, and Southeast Asian descent. Focuses on works published since the 1960s. Pays close attention to prevalent themes, sociohistorical contexts, and literary form.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: ENGL 3672.
ENGL 2480 U.S. Latino/a Literature (4 SH)
Introduces students to American authors from various Spanish-speaking origins (for example, Mexican, Cuban, Dominican, and Puerto Rican). Explores the use of both traditional and experimental forms and themes such as gender roles, bilingualism, and cultural identity. Examines works written in English and published since the 1960s.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ENGL 3673.

ENGL 2490 Native American Literature (4 SH)
Introduces students to Native American authors and critics. Emphasizes works published since the Native American renaissance of the late 1960s. Addresses ongoing critical debates such as the connection between Native traditions and contemporary Native American literature.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ENGL 3674.

ENGL 2510 Horror Fiction (4 SH)
Explores English and American horror fiction. Focuses on short stories, novels, and movies. Examines the evolution of horror fiction and the various themes, techniques, and uses of the macabre.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 1200 and ENGL 3405.

ENGL 2520 Science Fiction (4 SH)
Traces the development of various science fiction themes, conventions, and approaches from early human-vs.-machine tales to tales of alien encounters. Examines how science fiction explores the relationship between humans and technology as well as humans and nature.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 3406.

ENGL 2600 Irish Literary Culture Abroad (4 SH)
Explores Irish writers from the nineteenth century through the present. Emphasizes their relationships to contemporary Irish society. Explores the formal traditions of Irish writing as well as the historical, political, and cultural discourses that Irish writing has both helped to shape and within which the writing circulates. As the course takes place in Dublin during the summer term, offers students an opportunity to meet living Irish writers who talk about their relationship to the literary tradition and their own craft. Covers writers such as Oscar Wilde, James Joyce, Kate O’Brien, Colm Tóibín, Anne Enright, Paul Murray, Kevin Barry, and Maeve Binchy.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Interpreting culture, integrating knowledge and skills through experience.

ENGL 2610 Contemporary Israeli Literature and Art Abroad (4 SH)
Explores contemporary Israeli culture through literature and art. Focuses on the tensions, pains, and pleasures of existence from various Israeli points of view. Takes place in Israel during the summer term, offering students an opportunity to meet with contemporary Israeli writers, visit sites of the literary settings, and explore art galleries and museums. Readings include short stories and poetry by major Israeli and Palestinian writers from 1948 through the present.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: JWSS 2610.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: JWSS 2610.

ENGL 2620 What Is Nature? (Abroad) (4 SH)
Focuses on a variety of texts (imaginative literature, memoir, scientific writing, creative nonfiction, and popular journalism) that take nature, ecology, and the environment as their subject. Examines paintings, photography, and other visual representations (such as computer simulations) of the natural world. Takes place in Boston and in the United Kingdom.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Interpreting culture, integrating knowledge and skills through experience.

ENGL 2700 Creative Writing (4 SH)
Gives the developing writer an opportunity to practice writing various forms of both poetry and prose. Features in-class discussion of student work.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Exploring creative expression and innovation.
• Equivalent: ENGL 3372.
ENGL 2710 Style and Editing (4 SH)
Explores the relationship between style and substance through close attention to choices made at the level of the paragraph, sentence, and word. Introduces editorial processes and practices and gives students practice in editing for themselves and others.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.
• Equivalent: ENGL 3383.

ENGL 2730 Digital Writing (4 SH)
Effective Spring 2017
Explores the ways in which composing processes and meaning are impacted when writing moves from material media (e.g., print, images, voice, and performance) to digital media (e.g., hypertexts, digital stories, and videos). Readings cover aspects of digital writing as semiotic (e.g., domains of meaning, mode, materiality, delivery, ensembles of meaning) and draw on theories of multimodality to explore digital remediations of writing. Culminates in an electronic portfolio and collective exhibit.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

ENGL 2740 Writing and Community Engagement (4 SH)
Offers students an opportunity to study and practice writing in community contexts through advocacy writing, service-learning, community research, and/or community publishing.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major, integrating knowledge and skills through experience.

ENGL 2760 Writing in Global Contexts (4 SH)
Explores the various ways that linguistic diversity shapes our everyday, academic, and professional lives. Offers students an opportunity to learn about language policy, the changing place of World English in globalization, and what contemporary theories of linguistic diversity, such as translingualism, mean for writing. Invites students to explore their own multilingual communities or histories through empirical or archival research.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major.

ENGL 2770 Writing to Heal (4 SH)
Explores how creative writing can be used as a healing tool. Offers students opportunities to analyze, theorize, and create healing narratives through readings, in-class writing activities, writing workshops, and process journals. Culminates in the creation and revision of written personal narratives as well as a digital storytelling project.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

ENGL 2780 Visual Writing: Writing Visuals (4 SH)
Effective Spring 2017
Explores how visual elements, such as fonts, graphics, charts, and video, work within different types of documents to reach various audiences across cultures. Readings cover several aspects of visual writing (e.g., thinking, learning, and expressing) and draw on theories of visual rhetoric to explore the interaction among content, visual elements, audiences, and contexts. Culminates in an electronic portfolio and collective exhibit.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major.

ENGL 2830 Literary Theory (4 SH)
Introduces students to major twentieth-century theoretical approaches to literature in conjunction with the close reading of literary works in several genres.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: ENGL 3337.

ENGL 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

ENGL 2995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.
ENGL 3151 Topics in Early Literatures Abroad (4 SH)
Focuses on a particular aspect of medieval or Renaissance British literature, such as medieval romance or Renaissance representations of gender and sexuality. Designated for students engaged in study abroad through the Dialogue of Civilizations program.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

ENGL 3190 Topics in Nineteenth-Century American Literature (4 SH)
Focuses on a group of authors (e.g., the Fireside Poets, Transcendentalists, regional/local color writers); specific theme (e.g., Manifest Destiny, American romanticism, regionalism, sentimentalism, slavery, democracy, public vs. private); or genre (e.g., the slave narrative, the novel, lyric poetry) in nineteenth-century American literature.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Repeatability: May be repeated without limit.
- Equivalent: ENGL 4666.

ENGL 3210 Topics in Twentieth- and Twenty-First-Century American Literatures (4 SH)
Focuses on a specific theme (e.g., speculative fiction, the Harlem Renaissance, modern and postmodern feminism, immigration and migration) or genre (e.g., memoir, travel writing, neo-slave narratives, urban literature) in twentieth- and twenty-first-century American literature.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Repeatability: May be repeated without limit.
- Equivalent: ENGL 4669.

ENGL 3325 Rhetoric of Law (4 SH)
Introduces students to the persuasive work of legal texts, procedures, and institutions. Investigates the range of critical approaches to the study of law and rhetoric, as well as the implications of understanding law as rhetorical. Draws on texts produced by lawyers and judges, classical rhetoricians, contemporary rhetorical critics, and legal scholars.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NUpath: Interpreting culture.

ENGL 3340 Technologies of Text (4 SH)
Examines innovations that have reshaped how humans share information, e.g., the alphabet, the book, the printing press, the postal system, the computer. Focuses on debates over privacy, memory, intellectual property, and textual authority that have historically accompanied the rise of new media forms and genres. Offers students an opportunity to gain skills for working with texts using the rapidly changing tools of the present, e.g., geographic information systems, data mining, textual analysis.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Mathematical/analytical thinking level 2.
- NUpath: Exploring creative expression and innovation, analyzing and using data.

ENGL 3370 Writing Cultures (4 SH)
Effective Spring 2017
Offers students the opportunity to conduct qualitative empirical research (using methods such as interviewing and observation) into rhetorical practices, such as reading, writing, listening, speaking, and body language. Explores the role of rhetoric and writing in the representation of people, cultures, and research in online and physical spaces.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Experiential learning, writing intensive in the major.
- NUpath: Interpreting culture, writing intensive in the major, integrating knowledge and skills through experience.

ENGL 3375 Writing Boston (4 SH)
Explores how writing shapes the life of, and life in, the city. Considers how Boston is constructed in a range of discourses and disciplines. Offers students an opportunity to research and write about the city and participate in a community-based writing project.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Experiential learning, writing intensive in the major.
- NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major, integrating knowledge and skills through experience.
ENGL 3376 Creative Nonfiction (4 SH)
Explores how writers apply narrative strategies and techniques to factual material. Offers students an opportunity to read and write a variety of nonfiction forms (e.g., narrative essays and narrative journalism, travel and science writing, memoir, editorials, protest and political essays), as well as cross-genre and hybrid forms (e.g., nonfiction prose mixed with poetry, audio and graphic nonfiction). The topics for narrative nonfiction writing apply to a wide array of disciplines, including the humanities, the sciences, and journalism.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

ENGL 3377 Poetry Workshop (4 SH)
Offers an advanced workshop in writing and reading original poetry. Students experiment in established poetic forms. Features in-class discussion of student work.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Exploring creative expression and innovation.

ENGL 3378 Fiction Workshop (4 SH)
Offers an advanced workshop in writing and reading original fiction. Features in-class discussion of student work.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NUpath: Exploring creative expression and innovation.

ENGL 3379 Nonfiction Workshop (4 SH)
Offers an advanced workshop in writing and reading original nonfiction. Features in-class discussion of student work.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3380 Topics in Writing (4 SH)
Allows writers to hone their skills as readers and writers and to develop their interests in a particular form, such as travel writing, autobiography, and science writing.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.
• Repeatability: May be repeated without limit.

ENGL 3381 The Practice and Theory of Teaching Writing (4 SH)
Offers training in the teaching of writing. Includes readings in the professional literature of writing theory and instruction. Offers students an opportunity to engage in a teaching practicum by tutoring in the Northeastern Writing Center and/or community writing centers or by shadowing experienced teachers.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience.

ENGL 3382 Publication Arts (4 SH)
Explores the process of authorship in various fields (e.g., fiction, drama, poetry, education, the sciences) and in any format (books, journals, or newspapers). Examines such topics as print and electronic publishing, the process of writing and submitting work, and ways to increase acceptance as a writer and/or publication professional. Students engage in out-of-classroom publication experiences, such as shadowing editors at local publishing houses. Fulfills the experiential education requirement for English majors.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major.

ENGL 3427 The Literature of Science (4 SH)
Examines historical instances of the discovery methods and models of literature and science, exploring one or more of the following areas: the relationship of the methods and models of literature and science; the treatment of scientific methods and models in literary texts; and the use of assumed cultural contexts, and literary devices, techniques, and traditions in scientific texts. Readings are drawn from the areas of social history of science, science, and literature.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3487 Film and Text Abroad (4 SH)
Studies the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as a means of cultural expression in a specific country outside the United States.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
ENGL 3488 Film and Text (4 SH)
Studies either the similarities and differences between literary texts and film versions of those texts or the interrelations between film and literature as means of cultural expression during a specific historical period. For example, students might compare Doctorow’s *Book of Daniel* to the film version, *Daniel*, or they might study books and movies of a period like the sixties that reflect the spirit of the era (*Catch-22*, *The Graduate*).
- Equivalent: CINE 3488.

ENGL 3572 Fantasy (4 SH)
Explores the social, psychological, and social contexts of fantasy in the work of writers such as Carroll, Poe, Kafka, Le Guin, and Tolkien.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3582 Children’s Literature (4 SH)
Studies children’s literature with attention to such matters as genre, theme, and social dynamics.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3605 Medieval Romance and Modern Readers (4 SH)
Focuses on a variety of medieval romances in their original historical and cultural contexts. Includes the study of adaptations and retellings of medieval romances in modern literature, film, and art.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3607 Chaucer (4 SH)
Surveys the work of Chaucer, with emphasis on the *Canterbury Tales*.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3618 Milton (4 SH)
Concentrates on Milton’s *Paradise Lost*, with supplementary readings in his minor poetry and prose.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3619 Emerson and Thoreau (4 SH)
Focuses on Ralph Waldo Emerson and Henry David Thoreau, two major American Romantic writers whose ideas about the individual, spirituality, nature, and politics have had a wide-ranging impact on American culture. Readings include essays, poetry, and journals by these two Massachusetts-based authors.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

ENGL 3633 The African-American Novel (4 SH)
Studies the African-American novelist’s place in the history of American fiction. Focuses on Chesnutt, Toomer, Wright, Ellison, and contemporary novelists and on their different perceptions of the African-American experience in America.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
- Equivalent: AFAM 3663.

ENGL 3678 Bedrooms and Battlefields: Hebrew Bible and the Origins of Sex, Gender, and Ethnicity (4 SH)
Considers stories from Hebrew Scripture in English translation, beginning with the Garden of Eden through the Book of Ruth, asking how these foundational narratives establish the categories that have come to define our humanity. Analyzes how the Bible’s patterns of representation construct sexual and ethnic identities and naturalize ideas about such social institutions as “the family.”
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
- Cross-list: JWSS 3678.
- Equivalent: JWSS 3678.

ENGL 3685 From Kafka to Kushner: Modern and Contemporary Jewish Literature (4 SH)
Surveys Jewish literature from the late modern (1880–1948) and contemporary (1948–present) periods. Considers themes of immigration and cross-cultural influences and issues of religious, ethnic, and gender identity. Emphasizes American and European literatures to begin to define an international Jewish literary canon, including Yiddish poets and playwrights, Russian Jewish writers, and modern writers.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Cross-list: JWSS 3685.
- NU Core: Interpreting culture, engaging difference and diversity.
- Equivalent: JWSS 3685.

ENGL 3720 Nineteenth-Century Major Figure (4 SH)
Examines in detail the work and critical reception of a major writer of the nineteenth century.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- Repeatability: May be repeated up to 4 times.
- Equivalent: ENGL 4686.

ENGL 3730 Twentieth- and Twenty-First-Century Major Figure (4 SH)
Examines in detail the work and critical reception of a major writer of the twentieth or twenty-first century.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- Repeatability: May be repeated up to 4 times.
- Equivalent: ENGL 4687.
ENGL 3995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.

ENGL 4000 Topics in Early Literatures (4 SH)
Focuses on a particular aspect of medieval or Renaissance British literature, such as medieval romance or Renaissance representations of gender and sexuality.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated up to 5 times.
• Equivalent: ENGL 3150.

ENGL 4010 Topics in Shakespeare (4 SH)
Examines a focused topic, theme, or critical approach to Shakespeare.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 3614.

ENGL 4020 Topics in 17th- and 18th-Century Literatures (4 SH)
Focuses on a particular topic in 17th- or 18th-century British or American literature, such as women and the novel or the captivity narrative.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated once.

ENGL 4040 Topics in 19th-Century Literatures (4 SH)
Focuses on a particular topic in 19th-century British or American literature, such as lyric poetry or popular print culture.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated once.

ENGL 4060 Topics in 20th- and 21st-Century Literatures (4 SH)
Focuses on a particular topic in 20th- or 21st-century British or American literature, such as capitalism or the Harlem Renaissance.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated once.

ENGL 4070 Topics in Genre (4 SH)
Explores the characteristics of a particular literary form over time through works by various authors.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 3398.

ENGL 4080 Topics in Film (4 SH)
Studies a theme or problem (film and society, film and politics), a period in film history (American film from 1945 to the present), a film genre (the western, film noir), or a film director (Hitchcock, Coppola).
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• Repeatability: May be repeated without limit.
• Equivalent: CINE 3391 and ENGL 3391.

ENGL 4100 Topics in Literary Criticism (4 SH)
Studies a specific problem, method, or school of literary criticism, such as poststructuralism or feminist criticism.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 3339.

ENGL 4110 Topics in Rhetoric and Writing Studies (4 SH)
Focuses on a particular topic in rhetoric and writing studies, such as rhetorical education, technologies of literacy, or writing and identity.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated once.

ENGL 4400 Opening the Archive (4 SH)
Offers a seminar designed to introduce students to the rich archival holdings in the greater Boston area and to offer training in the materials and methods of primary source research. Primary materials include a wide range of resources, including books, manuscripts, letters, pamphlets, broadsides, journals, maps, illustrations, photographs, etc., from the seventeenth through the twentieth centuries.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major, integrating knowledge and skills through experience.
• Equivalent: ENGL 3350.

ENGL 4410 Research in Rhetoric and Writing (4 SH)
Introduces students to, and offers them practice in, a range of research methodologies (e.g., ethnography, archival research, historical inquiry) and methods (e.g., interviewing, observation, rhetorical analysis) for studying rhetoric, writing, and writers.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing or permission of instructor.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
ENGL 4684 Topics in Postcolonial Literature (4 SH)
Focuses on a nation (e.g., the African/Nigerian novel, Indo-Anglian writing, Jamaican dub poetry), theme (e.g., women writers, cosmopolitanism, narrating the nation), or genre (e.g., magical realism, political drama, translation) in postcolonial literature.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 3240.

ENGL 4688 Topics in Comparative Textual Studies (4 SH)
Explores topics that cross national boundaries or historical periods, such as print culture in the transatlantic world, black women writers, and visual rhetoric.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Repeatability: May be repeated up to 4 times.
• Equivalent: ENGL 3250.

ENGL 4710 Capstone Seminar (4 SH)
Offers an advanced senior seminar organized around an important critical question in the discipline. This writing-intensive course is designed to be a summative experience for English majors, offering in-depth study of the theories, methods, and practices of critical work on a particular topic while providing students opportunities for reflecting on the connections between their capstone and other work they have done as majors. Offers students an opportunity to produce significant research projects on the critical issues raised by the seminar.
• Prerequisite: Senior standing and completion of Advanced Writing in the Disciplines; English majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.

ENGL 4720 Capstone Project (4 SH)
Offers students an opportunity to design, develop, and complete a major intellectual project in a workshop setting. Students must enter this course with an approved project and the support of a faculty member in the relevant area of study. In addition to producing original research, offers students an opportunity to contextualize their work in relation to their focus within English studies, their experience of the major, and their intellectual and professional goals.
• Prerequisite: Completion of Advanced Writing in the Disciplines and senior standing; English majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

ENGL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.

ENGL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.

ENGL 4972 Internship (4 SH)
Offers students internships under the direction of a faculty member in such areas as publishing, education, or business and technical writing. Requires students to produce both a portfolio of professional work and a final paper reflecting on their internship experience.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
ENGL 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Repeatability: May be repeated without limit.

ENGL 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ENGL 4997 Senior Thesis (4 SH)
Offers students an opportunity to prepare an undergraduate thesis under faculty supervision.
• Prerequisite: (a) ENGL 4710 or LING 4711 and (b) ENGW 3310 or ENGL 3310.

ENGL 5101 Critical Issues (3 SH)
Introduces the terms and discourses of literary theory as it is currently practiced and debated, and provides the historical context for such practices and debates.
• Prerequisite: Junior, senior, or graduate standing.

ENGL 5102 Key Concepts in Rhetoric and Composition (3 SH)
Serves as an introduction to the fields of rhetoric and composition. Provides a foundational vocabulary for understanding the concerns of these fields by considering the history and current meanings of terms crucial to both, for example, “knowledge,” “authority,” “discourse,” “text,” “context,” and “argument.”
• Prerequisite: Junior, senior, or graduate standing.

ENGL 5103 Proseminar (3 SH)
Introduces the history and current scholarly practices of English studies. Surveys theoretical, methodological, and institutional issues in the development of the discipline; introduces students to the research of the English department’s graduate faculty; and offers opportunities for the practice of key components of scholarly production, including formulating research questions, using databases, conducting literature reviews, and writing and presenting scholarship in common formats other than the long research paper, such as conference proposals, oral presentations, and book reviews.
• Prerequisite: English degree students only.

ENGL 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENGL 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENGL 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ENGL 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

ENGL 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

ENGL 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

ENGL 7111 Rhetorical Theory (3 SH)
Introduces major concepts, figures, and issues in rhetoric from the classical period to the present day. Explores theories about the scope of rhetoric, the nature of persuasion, and the relationship between language and knowledge.

ENGL 7112 Rhetorical Criticism (3 SH)
Trains students to analyze critically the rhetorical work of written and spoken texts, as well as other artifacts, discourses, and practices. Emphasizes prominent methods of rhetorical criticism, drawing on neo-Aristotelianism, genre theory, feminist studies, dramatism, and cultural studies. Introduces students to current debates in the field as well as to perennial issues, such as the purposes of criticism, the relationship between theory and practice, the interaction of text and context, and the role of the critic.
ENGL 7121 Composition Studies (3 SH)
Focuses on theories about writing, reading, and learning, and how these theories are played out in practice in often competing and contradictory ways. Examines and critiques the four paradigms that dominate composition theory and practice today: the classical model, the expressivist model, the cognitivist model, and the social-constructivist model.

ENGL 7123 Approaches to Teaching Writing (3 SH)
Considers several currently influential approaches to the teaching of writing in schools and colleges, with attention to differences not only in the practices they entail but in the theories and research that inform them.

ENGL 7201 Perspectives on American Literature (3 SH)
Attempts to discover or disrupt common themes and recurrent patterns in American literature through a close reading or a critique of primary texts.

ENGL 7202 African-American Literature (3 SH)
Focuses on the development of the traditions, critical paradigms, recurrent themes, and patterns of African-American literature through close readings of selected texts and critics. Considers such writers as Houston Baker, Jr., Henry Louis Gates, Jr., Frederick Douglass, Harriet Jacobs, William S. Braithwaite, Larry Neal, Ralph Ellison, Barbara Christian, Richard Wright, Ishmael Reed, Bell Hooks, and Audre Lorde.

ENGL 7206 American Literature and Culture 1 (3 SH)
Examines early American cultural patterns as they emerge from a wide variety of texts including accounts of exploration and settlement; diaries; poetry; Native American oratory and sacred texts; slave, captivity, and witchcraft narratives; political tracts; novels; and letters. Emphasis is on how issues of colonialism, cross-cultural contact, race relations, and the rise of political and national consciousness affected literary art and rhetorical expression from 1492 to 1800.

ENGL 7207 American Literature and Culture 2 (3 SH)
Focuses on American writing from 1800 to 1900, emphasizing the ways in which literary texts reflected, enacted, questioned, and controverted cultural assumptions and constructions in the period. Topics include nationalism and territorial expansion; libertarian ideology and such practices as slavery, limited citizenship, and restricted franchise; immigration and “nativism”; and industrialization and pastoralism.

ENGL 7211 Topics in American Literature (3 SH)
Explores a significant topic in American literature; for example, realism, humor, the frontier, southern writing, or ethnic American literature (Asian American, Native American, Latino/a and African American).

ENGL 7212 Topics in African-American Literature (3 SH)
Explores a topic, theme, or genre in depth in African-American literature, such as slave narratives, women writers, the Harlem Renaissance, autobiography, or contemporary writers.

ENGL 7213 Topics in Early American Literature (3 SH)
Focuses on the work of one writer, a group of writers, or a theme or structure common to several writers-Jonathan Edwards, women writers, the poets of the seventeenth and eighteenth centuries, or typology, for example-in the first two hundred years of American literature. Topics change with time and demand.

ENGL 7214 Topics in Nineteenth-Century American Literature (3 SH)
Considers such literary and cultural topics as transcendentalism, the literature of the Civil War, slave narratives, women’s narratives, and the literature of social reform.

ENGL 7215 Topics in Twentieth-Century American Literature (3 SH)
Examines an issue or issues in twentieth-century American literature, such as women in twentieth-century American writing; surrealism in modern and contemporary American poetry; naturalism and the city in the modern American novel; autobiography by American women writers of color; and race, ethnicity, and the oral tradition in ethnic American literature.

ENGL 7221 Major American Novelist (3 SH)
Examines in detail the work of a major American novelist and its historical context and cultural milieu.

ENGL 7222 Major American Playwright (3 SH)
Examines in detail the work of a major American playwright and its theatrical style and social impact-the work, for example, of Eugene O’Neill, Tennessee Williams, Lillian Hellman, Arthur Miller, Edward Albee, August Wilson, or Ntozake Shange.

ENGL 7223 Major American Poet (3 SH)
Examines in detail the work of a single major American poet, placing it within its literary and cultural contexts. Some possible subjects are Whitman, Dickinson, Frost, Eliot, H.D., Williams, Hughes, Stevens, Lowell, Moore, Bishop, Merrill, and Ashbery.

• Repeatability: May be repeated without limit.
ENGL 7224 Major Figures in African-American Literature (3 SH)
Focuses on a major African-American novelist, poet, or dramatist, the existing criticism, and the author’s historical context and cultural milieu. Authors considered are Richard Wright, Toni Morrison, Langston Hughes, Zora Neale Hurston, Imamu Amiri Baraka, August Wilson, Lorraine Hansberry, Alice Walker, John Wideman, and Gloria Naylor.
• Repeatability: May be repeated without limit.

ENGL 7225 Individual American Writer (3 SH)
Offers topics to be announced.
• Repeatability: May be repeated without limit.

ENGL 7226 Individual Modern American Novelist (3 SH)
Examines in depth the work of a major figure in twentieth-century American fiction, focusing on the cultural context out of which he or she emerges.
• Repeatability: May be repeated without limit.

ENGL 7231 Nineteenth-Century American Prose, 1820–1865 (3 SH)
Focuses on the characteristics of the romantic movement and New England transcendentalism in the works of the principal prose writers of the period. Studies themes and techniques of such writers as Poe, Hawthorne, Melville, Emerson, Fuller, and Thoreau.

ENGL 7232 Nineteenth-Century American Prose, 1865–1900 (3 SH)
Covers the post–Civil War novel in America, including the realistic and naturalistic movements, and such authors as Twain, Howells, Henry James, Kate Chopin, and Edith Wharton. Includes some notable nonfiction writers, such as Henry Adams and William James.

ENGL 7233 Nineteenth-Century American Poetry (3 SH)
Explores poetry written in the United States in the nineteenth century. Authors considered may include Dickinson and Whitman; New England poets including Whittier, Longfellow, Sigourney, and Holmes; and African-American poets, such as Frances Ellen Watkins Harper. Issues considered may include poetry and American literary nationalism; gender, sentimentalism, and poetry; and abolition and the Civil War in poetry.

ENGL 7241 Modern American Prose (3 SH)
Includes close examination of such prose forms as the essay, short story, autobiography, biography, history, and so on. May select writers with some special purpose in view, but focuses on those generally representative of the 1912-1950 period.

ENGL 7243 Modern American Drama (3 SH)
Analyzes philosophic and aesthetic trends among such playwrights as O’Neill, Williams, Miller, Albee, Hellman, and Simon.

ENGL 7244 African-American Novel (3 SH)
Surveys major nineteenth- or twentieth-century African-American novelists, such as Francis Harper, Charles Chestnutt, Zora Neale Hurston, Nella Larsen, Toni Morrison, Ralph Ellison, James Baldwin, and Ishmael Reed.

ENGL 7251 Contemporary American Fiction (3 SH)
Surveys major developments in American fiction of the period from roughly 1945 to the present against the cultural background of that period. Considers such categories as postmodernism, southern fiction, Jewish fiction, black fiction, women’s fiction, and multicultural fiction since the civil rights era, and such writers as Mailer, Kerouac, Welty, Malamud, Didion, Gaines, Silko, and Chin.

ENGL 7261 Medieval Literature (3 SH)
Offers a survey of the major works of the medieval period, excluding Chaucer. Focuses on texts in Middle English from the twelfth century through the fifteenth, and covers the range of available genres and forms including the short religious and secular lyric, debate poetry, the dream vision, religious prose, the romance, fifteenth-century Chaucerian imitations, and fifteenth-century ballads. The critical focus may include questions and problems of sources, influence, genre, voice, and the representation of the subject.

ENGL 7262 Renaissance Literature (3 SH)
Studies major prose, poetry, and dramatic literature by such authors as Erasmus, Wyatt, Surrey, More, Sidney, Marlow, Spenser, Raleigh, and Shakespeare.

ENGL 7263 Seventeenth-Century Literature (3 SH)
Covers major prose, dramatic literature, and poetry of the seventeenth century including Bacon, Behn, Cavendish, Hobbes, Browne, Bunyan, Donne, Herbert, Jonson, Marvell, and others.

ENGL 7264 Restoration and Early Eighteenth-Century Literature (3 SH)
Surveys drama, poetry, and criticism including Restoration theater, Dryden, Pope, Swift, Finch, Addison, Steele, and Gay.

ENGL 7266 Victorian Literature (3 SH)
Treats such topics as Victorian masculinities; female poetic identity; the move to aestheticism and decadence in the latter nineteenth century; and resemblances of the 1890s to our own fin-de-siècle. Considers such figures as R. Browning, E.B. Browning, Christina Rossetti, Florence Nightingale, Swinburne, Pater, Stevenson, Wilde, H.G. Wells, and Freud.
ENGL 7271 Chaucer (3 SH)
Focuses on the works of Chaucer in their late medieval settings; examines both the intertextual tradition that produced such texts as The Book of the Duchess, The Canterbury Tales, and Troilus and Criseyde, and the literary context in which Chaucerian texts have been and continue to be read. Critical issues may include questions of voice and persona, the relationship of author to text, the problems of influence and genre, and medieval views of race, class, and gender.

ENGL 7272 Shakespeare’s Tragedies (3 SH)
Investigates the question of genre and the critical debates surrounding the major tragedies. Plays studied include King Lear, Hamlet, and Macbeth.

ENGL 7273 Shakespeare’s Comedies (3 SH)
Considers Shakespeare’s three major types of comedy (comedy of action, festivity comedy, and the problem comedies) and the comic impulse of the later romances.

ENGL 7274 Topics in Shakespeare (3 SH)
Addresses special issues, such as “Shakespeare on Film,” the hybrid material of the history plays, and his nondramatic works (sonnets “Rape of Lucrece” and “Venus and Adonis”).
• Repeatability: May be repeated without limit.
• Equivalent: CINE 6274.

ENGL 7275 Milton (3 SH)
Presents Milton’s poetic and intellectual achievement through analysis of his major work. Emphasizes Paradise Lost as an expression of Renaissance thought and the culmination of the epic tradition.

ENGL 7276 Topics in Medieval Literature (3 SH)
May consider the following: Anglo Saxon literature (including poems such as Beowulf, Judith, The Wanderer, The Seafarer, and a selection of prose); the poems of the Pearl Poet (Sir Gawain and the Green Knight, Pearl, Cleanness); women and/or in the Middle Ages; medieval literature and medievalism; the medieval romance, Malory’s Morte Darthur; religious, mystical, and didactic works; medieval travel literature; or William Langland’s Piers Plowman.
• Repeatability: May be repeated without limit.

ENGL 7277 Topics in Seventeenth-Century Literature (3 SH)
Considers specific topics in the literature of the sixteenth and seventeenth centuries, such as the sonnet sequence, Renaissance women, and utopian and travel literature.
• Repeatability: May be repeated without limit.

ENGL 7278 Topics in Eighteenth-Century Literature (3 SH)
Explores in depth a topic, theme, or genre in eighteenth-century British literature, such as satire; London’s city culture; literature theory; the emerging women writers; the essay; or a major writer, for example, Jonathan Swift, Jane Austen, or Henry Fielding.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

ENGL 7279 Topics in Romanticism (3 SH)
Explores a topic, theme, or genre in Romantic literature, such as Romantic autobiography or Romantic conceptions of the poet; may also explore intensively the work of one major British writer of the Romantic era.
• Repeatability: May be repeated without limit.

ENGL 7280 Topics in Victorian Literature (3 SH)
Offers a focus on special topics such as gender issues, the 1890s, Victorian fantasy, and science fiction.
• Repeatability: May be repeated without limit.

ENGL 7281 Topics in Twentieth-Century British Literature (3 SH)
Examines the cultural contexts that produced twentieth-century British literature; the representation of gender, race, and class; and the modern, the postmodern, and the postcolonial.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

ENGL 7282 Topics in Eighteenth-Century Novel (3 SH)
Focuses on Behn, Defoe, Fielding, Richardson, Walpole, Sterne, Beckford, and Austen.

ENGL 7283 Topics in Romantic Poetry (3 SH)
Surveys representative forms and works of the major poets of the English Romantic Period (1798-1832): Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and representative women writers, such as Baire, Barbauld, and Hemans. Studies poetry in the historical and intellectual context of its time.

ENGL 7284 Victorian Poetry (3 SH)
Focuses on Tennyson, R. Browning, E.B. Browning, Arnold, Christina Rossetti, D.G. Rossetti, Swinburne, and Hopkins, with emphasis on issues of gender, poetic form, and the movement toward modernism.

ENGL 7285 Victorian Novel (3 SH)
Explores the Victorian novel emphasizing recent critical approaches (for example, gender studies, new historicist, or psychoanalytic). Consider such figures as C. Bronte, E. Bronte, Dickens, Eliot, Gaskell, Trollope, and Hardy.
ENGL 7295 Twentieth-Century British Drama (3 SH)
Explores the evolution of British drama from Shaw to Tom Stoppard, emphasizing the influence of Ibsen and later European dramatists; the Irish influence of Yeats, Synge, and O’Casey; the traumas of two world wars; and the steady growth in the variety and power of British dramatic productions. Also considers such writers as Samuel Beckett, John Osborne, Harold Pinter, and Caryl Churchill.

ENGL 7296 Twentieth-Century British Fiction (3 SH)
Explores twentieth-century British fiction, emphasizing recent critical approaches (feminist, postcolonial, or narratological). Considers such figures as Forster, Conrad, Lawrence, Woolf, Lessing, E. Waugh, Rushdie, Byatt, Carter, Murdock, and Naipaul.

ENGL 7303 Creative Writing Workshop (3 SH)
Comprises advanced work in creative writing.

ENGL 7311 Linguistics (3 SH)
Examines how linguists have begun to map out the part of our mental space devoted to language. Their inquiry centers on several questions: What do people know when they know a language? How does that knowledge get there? How is it organized? This course concentrates on all three. Explores some of the rules that we unconsciously follow as language users, which results in a new way of thinking about language. With this new perspective, we move on to issues that are often the topic of social and political debates: gender in language, dialects (for instance, Boston English, Chicano English, and African-American English or Ebonics), standards and attitudes, and nature vs. nurture, among others.

ENGL 7312 Syntax (3 SH)
Explores how speakers of a language know a remarkable range of subtle facts about their language, facts that they were never explicitly taught. For instance, in the sentence, “Betty talked to Wilma about herself,” herself is ambiguous (it can be Betty or Wilma). But in “Betty expected Wilma to talk about herself,” herself can refer only to Wilma. Why should this be? The difference comes from the subtle rules that underlie every speaker’s ability to speak and understand their native language. Examines just what these rules look like, and how we come to know them. Through weekly readings and problem sets, students begin to map out their own “mental grammar,” the system that forms their unconscious knowledge of language.

ENGL 7313 Semantics (3 SH)
Investigates the realm of meaning in language, and explores the different accounts for how we understand words and are able to use them to create complex meanings. What does a word mean, and how do we know what it means? Part of the course considers meaning at the word level: how can we define words and what relationships hold between sets of words? Another part examines meaning at the sentence level: sentential ambiguity, relations between sentences, and how the whole meaning of a sentence can be understood. A third part focuses on language at the discourse level, looking at the ways that language can be used directly or indirectly to accomplish speech acts.

ENGL 7321 Topics in Linguistics (3 SH)
Offers varied topics and may focus on one or more of the core areas in linguistics: syntax, semantics, morphology, and phonology. Or it may focus on other areas, such as the lexicon, dialect, metaphor, language acquisition, prescriptive grammar, or language and society.
• Repeatability: May be repeated without limit.

ENGL 7322 Linguistics and Literature (3 SH)
Introduces stylistics, the study of formal properties of poetry and prose. Considers general questions: Are there constraints on creativity? What relationship holds between form and meaning? What is the nature of metaphor? How can we characterize author style, genre style? Analyzes texts of representative major writers for linguistic features. Focuses on how linguistic methods can contribute to critical response.

ENGL 7323 Linguistics and Writing (3 SH)
Explores topics in textuality and text cohesion, distinguishing unified text from a string of unrelated sentences. Studies lexical, semantic, and syntactic cohesion, paragraph patterning, and information flow. Analyzes diverse nonfictional prose selections for style features. Considers expressive, persuasive, scientific, informative, and exploratory forms of discourse.

ENGL 7324 History of the English Language (3 SH)
Traces the development of English using linguistic readings and historical documents (letters, journals, or literary selections) from various periods and representing a range of styles (formal to informal). Studies changes in the sound system, inflectional system, vocabulary, and syntax of English, as well as the development of prose style. Considers issues in language change: the influence of foreign invasion, relocation, dialect dominance, and literacy.
ENGL 7325 Issues in English Grammar (3 SH)
Explores how as native speakers of a language we manipulate a vast number of symbols, as each day we make up and understand a stream of brand-new sentences. This effortless and completely unconscious ability depends on a set of unconscious rules, a linguistic system called the “mental grammar.” Investigates what this grammar looks like in an attempt to understand the basics of how language works. Our focus is on three areas: syntax (sentence structure), morphology (word structure), and phonology (sound structure). Part of each class has a “workshop” format with a slant toward “doing” linguistics: working with data, analyzing it, and ultimately explaining it.

ENGL 7326 Gender and Language (3 SH)
Considers language as a reflector of social practice and as a means of influence and expression of power. Through a review of current research, explores such questions as is language inherently biased? Do men and women use language differently? Covers speech styles, patterns of conversational interaction, and language use in institutional settings: the courtroom, the doctor’s office, the business meeting, the TV talk show, the university classroom. Reviews material from diverse fields including politics, advertising, news media, and literature.

ENGL 7331 Film Studies (3 SH)
Introduces the basic methods of film analysis, the history of cinema, and recent theoretical debates within film studies. Provides familiarity with ways of analyzing films in terms of editing, shot composition, framing, mise-en-scène, and the like, with the historical changes in Hollywood and in international cinema, and with such current theories as structuralism and semiotics.
• Equivalent: CINE 6331.

ENGL 7332 Topics in Film (3 SH)
Focuses on some specific dimension of film studies—a genre of film, such as film noir, a director like Alfred Hitchcock or Francis Ford Coppola, a film movement like expressionism or social realism, or a particular historical moment in film history, such as post-1967 Hollywood. Topics chosen determine texts and films.
• Repeatability: May be repeated without limit.
• Equivalent: CINE 6332.

ENGL 7333 American Film (3 SH)
Offers a history of American film from the beginnings to the present. Pays particular attention to the way we negotiate social norms and values, reproduce or contest dominant ideologies, and represent (or fail to represent) their historical movement. Considers films from Birth of a Nation to Citizen Kane to The Godfather to Thelma and Louise.
• Equivalent: CINE 6333.

ENGL 7334 Contemporary Film (3 SH)
Offers a survey of contemporary film, both American and international. Studies the major new developments in film, from the new ethnic filmmaking to the recent turn to gender and sexuality. Also engages some of the central critical and theoretical issues and debates in film studies, from spectatorship to postmodernism. A large part of the course is devoted to the analysis of visual and narrative form and to the link between form and meaning.
• Equivalent: CINE 6334.

ENGL 7341 Contemporary Critical Theory (3 SH)
Introduces the study of modern and contemporary literary theory and criticism including “New Critical,” Marxist, feminist, psychoanalytic, structuralist, poststructuralist, phenomenological, and other approaches.

ENGL 7342 Topics in Criticism (3 SH)
Examines such topics in critical theory as narrative, cultural criticism, representation, reader response, feminist theory, postcolonial studies, and comparative literature.
• Repeatability: May be repeated without limit.

ENGL 7351 Topics in Literary Study (3 SH)
Focuses on literature on a thematic, formal, or generic basis. May include black women writers, poetry of nature.
• Repeatability: May be repeated without limit.

ENGL 7352 Topics in Genre (3 SH)
Examines such topics in genre criticism as biography, autobiography, satire, and children’s literature.
• Repeatability: May be repeated without limit.

ENGL 7353 Topics in Fiction (3 SH)
Examines such subjects as short fiction, the romance, and the short-story cycle.
• Repeatability: May be repeated without limit.

ENGL 7354 Topics in Drama (3 SH)
Examines such subjects as tragic drama, comic drama, and absurdist drama.
• Repeatability: May be repeated without limit.

ENGL 7355 Topics in Poetry (3 SH)
Examines such subjects as epic poetry, the lyric, poetry of the seasons, and confessional poetry.
• Repeatability: May be repeated without limit.

ENGL 7356 Topics in Nonfiction Prose (3 SH)
Examines writings in nonfiction prose in such areas as biography, history, science, and technology. Varies according to the design of the instructor.
• Repeatability: May be repeated without limit.
ENGL 7357 Topics in Literary Relations (3 SH)
Explores relations among national literatures. Covers such subjects as modernism in England and America, and romanticism in nineteenth-century England and America.
• Repeatability: May be repeated without limit.

ENGL 7358 Topics in Literature and other Disciplines (3 SH)
Examines such subjects as literature and the visual arts, literature and psychology, and literary impressionism.
• Repeatability: May be repeated without limit.

ENGL 7359 Topics in Comparative Literature (3 SH)
Offers topics to be announced.
• Repeatability: May be repeated without limit.
• Equivalent: CINE 6359.

ENGL 7360 Topics in Rhetoric (3 SH)
Focuses on specialized topics in rhetoric, such as visual rhetoric, rhetorical criticism, rhetoric of science, issues in contemporary rhetorical theory, and rhetoric and cultural studies. Varies by semester.
• Repeatability: May be repeated without limit.

ENGL 7361 Modern Poetry (3 SH)
Examines the themes, techniques, and cultural contexts of modern American and British poetry, 1900-1950. Considers a range of representative poets and poems; such “movements” as imagism, proletarian poetry, and the Harlem Renaissance; such practices as collage poetics; and such issues as canon formation and the intersections of modernism and postmodernism.

ENGL 7362 Contemporary Poetry (3 SH)
Examines the themes, techniques, and cultural contexts of postmodern American and British poetry, 1950 to the present. Considers a range of representative poets and poems; such groups as Beat, neo surrealism, African-American, and L-A-N-G-U-A-G-E poets; such practices as field composition and performance poetry; and such issues as appropriation and the intersections of modernism and postmodernism.

ENGL 7370 Topics in Digital Humanities (3 SH)
Focuses on theoretical and methodological intersections among technology, computation, humanities research, and pedagogy. May cover topics such as multimodal scholarly composition, “new” and “old” media, public humanities, text encoding, text mining, digital archives, humanities tool building, geospatial analysis, topic modeling, and network mapping. Content varies by semester.
• Repeatability: May be repeated without limit.

ENGL 7379 Ethnography (3 SH)
Introduces a diverse set of methods, including observation and interviewing, for understanding humans in social and cultural contexts. Topics range from the nuts and bolts of designing and implementing a project to responding to the crisis of representation. Students conduct an ethnographic study and read ethnographies in anthropology and in their fields of interest. Is geared to teachers preparing to conduct classroom observations, technical communicators studying how people interact with documents and technologies, or anyone interested in ethnography as a research method and representational practice.

ENGL 7391 Reading and the Teaching of Reading (3 SH)
Provides teachers with the opportunity to develop a coherent theory of reading instruction coordinated with teaching writing. Recommended for teachers who have previously taken a course in the theory and teaching of writing.

ENGL 7392 Writing and the Teaching of Writing (3 SH)
Examines the theory and practice of writing and teaching writing. Required for stipended graduate assistants (SGAs) in their first year.

ENGL 7393 Writing and Learning Across Curriculum (6 SH)
Examines in depth how writing may be used to promote thinking and learning across a wide variety of disciplines. Intended primarily for high school and college instructors in the humanities, social sciences, and natural sciences. Usually given only through the Institute on Writing and Teaching at Martha’s Vineyard.

ENGL 7394 Writing Programs in Schools and Colleges (3 SH)
Examines both the nature of writing programs in schools and colleges and the issues that curricular changes raise for these institutions. Intended for English teachers on all levels who wish to become composition leaders in their schools. Usually given only through the Institute on Writing and Teaching at Martha’s Vineyard.
• Prerequisite: Extensive course work in composition theory and practice.

ENGL 7395 Topics in Writing (3 SH)
May include the following topics: literacy and literacies; basic writing; issues of gender, race, and class in the classroom; writing assessment; or collaborative learning.
• Repeatability: May be repeated without limit.

ENGL 7396 Composition Pedagogy (3 SH)
Examines exemplary theory, research, and practice in the teaching of writing. Considers such topics as the writing process, the role of reading in the writing classroom, development and assessment, and teaching in a diverse society.
ENGL 7397 Responding to Learners (3 SH)
Examines and puts into practical use a variety of methods of analyzing writing. Studies both professional and student writing. Provides the tools for analyzing and improving student writing, assessing the writing of their students, and designing appropriate writing assignments and activities. Provides an opportunity to begin the development of an integrated writing curriculum from the elementary to the college level.

ENGL 7398 Writing and Reading in Content Areas (3 SH)
Examines some characteristic student and professional writing in the humanities, sciences, and social sciences. Attempts to help participants see how students can use writing as a way of knowing and learning, not just in the English class but, for example, in the biology, history, or even mathematics class. Usually given only through the Institute on Writing and Teaching at Martha’s Vineyard.

ENGL 7603 Designing Teacher Research (2 SH)
Prepares participants for research to be conducted in ENGL 7663 during the academic year at the home institution. Examines some published case studies of teaching and writings, and explores relevant methods of data analysis, observation techniques, interview and questionnaire construction, sampling procedures, experimental design, and writing protocol analysis. Usually given only through the Institute on Writing and Teaching at Martha’s Vineyard.

ENGL 7663 Teacher-Research Fieldwork (3 SH)
Allows participants to conduct the independent research planned in ENGL 7603. Provides resources available for this research at the home institution including the participants’ individual teaching practices, course or departmental curriculum, the writing of their students and of students in other classes, the practices of other teachers and administrators, as well as published books, reports, and articles on composition. Provides for student to collect, collate, and interpret data according to the guidelines established at the institute and then prepare a project in which they present their findings. Usually given only through the Institute on Writing and Teaching at Martha’s Vineyard.

ENGL 7976 Directed Study (1 to 4 SH)
Offered by arrangement.

ENGL 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

ENGL 7979 Directed Research Project (3 SH)
Offers independent work under the direction of members of the department on chosen topics.

ENGL 7990 Thesis (3 SH)
Offers thesis supervision by members of the department.

ENGL 7996 Thesis Continuation (0 SH)
Offers thesis supervision by members of the department.

ENGL 8405 Directed Research Project (3 SH)
Offers independent work under the direction of members of the department on chosen topics.

ENGL 8406 Directed Writing Project (3 SH)
Offers independent work under the direction of members of the department on chosen topics.

ENGL 8407 Teaching Practicum (1 SH)
Gives students the opportunity to observe a senior faculty member teaching an undergraduate course in American or British literature, literary studies, rhetoric, composition studies, or linguistics. Students meet regularly with the faculty member to discuss teaching practices and other pedagogical issues and submit a term project discussing the experience in the context of the scholarship of teaching.

ENGL 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

ENGL 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.

ENGL 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.

ENGL 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
ENGL 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

ENGL 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • Repeatability: May be repeated without limit.

ENGL 9986 Research (0 SH)
Offers the student the opportunity to conduct full-time research.
  • Repeatability: May be repeated up to 3 times.

ENGL 9990 Dissertation (0 SH)
Offers dissertation supervision by members of the department.
  • Repeatability: May be repeated once.

ENGL 9996 Dissertation Continuation (0 SH)
Offers dissertation supervision by members of the department.
  • Prerequisite: ENGL 9990.
  • Repeatability: May be repeated without limit.

ENGLISH WRITING (ENGW)

ENGW 1101 Introductory Writing—SOL (Speakers of Other Languages) (4 SH)
Introduces students to the components of the writing process, from generating ideas to drafting and revising. In a workshop setting, students learn to read texts of some complexity (which in turn serve as the occasion for their own writing), and to write expository prose that makes use of a variety of rhetorical strategies and research methods while demonstrating a control of the conventions of standard edited written English. Requires students to write multiple drafts and emphasizes the writing process as well as the quality of the finished product. Students must keep a portfolio of their work.
  • Prerequisite: Diagnostic placement for nonnative speakers.
  • Equivalent: ENGL 1101.

ENGW 1102 First-Year Writing for Multilingual Writers (4 SH)
Designed for students whose first or strongest language is not English. Parallels ENGW 1111 but focuses on the concerns of multilingual writers. Students study and practice writing in a workshop setting; read a range of texts in order to describe and evaluate the choices writers make and apply that knowledge to their own writing; explore how writing functions in a variety of academic, professional, and public contexts; and write for various purposes and audiences in multiple genres and media. Offers students an opportunity to learn how to conduct research using primary and secondary sources and to give and receive feedback, to revise their work, and to reflect on their growth as writers.
  • NU Core: First-year writing.
  • NUpath: Writing in the first year.
  • Equivalent: ENGL 1102, ENGL 1111, and ENGW 1111.

ENGW 1110 Introductory First-Year Writing (4 SH)
Designed for students who would benefit from an extra semester of writing instruction before taking ENGW 1111. Students study and practice writing in a workshop setting. Introduces students to college-level writing, reading, and research. Offers students an opportunity to give and receive feedback, to revise their work, and to reflect on their growth as writers.
  • Equivalent: ENGL 1110.

ENGW 1111 First-Year Writing (4 SH)
Designed for students to study and practice writing in a workshop setting. Students read a range of texts in order to describe and evaluate the choices writers make and apply that knowledge to their own writing and explore how writing functions in a range of academic, professional, and public contexts. Offers students an opportunity to learn how to conduct research using primary and secondary sources; how to write for various purposes and audiences in multiple genres and media; and how to give and receive feedback, to revise their work, and to reflect on their growth as writers.
  • NU Core: First-year writing.
  • NUpath: Writing in the first year.
  • Equivalent: ENGL 1102, ENGL 1111, and ENGW 1102.
ENGW 3302 Advanced Writing in the Technical Professions (4 SH)
Offers writing instruction for students in the College of Engineering and the College of Computer and Information Science. Students practice and reflect on writing in professional, public, and academic genres—such as technical reports, progress reports, proposals, instructions, presentations, and technical reviews—relevant to technical professions and individual student goals. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3302.

ENGW 3303 Advanced Writing in the Environmental Professions (4 SH)
Provides writing instruction for students in fields related to environmental studies. Students develop an in-depth analytic or recommendation report about a complex environmental concern related to their majors and/or their co-op or other personal or professional experiences. In a workshop setting, students evaluate scholarly and popular sources, practice a variety of professional and academic forms of writing and communication, and develop expertise in audience analysis, critical research, peer review, and revision. Writing is guided in stages from initial topic exploration and a formal proposal through drafts and progress reports to a final polished report, presented in a bound portfolio with a cover letter, an abstract, and other writing samples.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3303.

ENGW 3304 Advanced Writing in the Business Administration Professions (4 SH)
Offers writing instruction for students in the D’Amore-McKim School of Business. Students practice and reflect on writing in professional, public, and academic genres—such as proposals, recommendation reports, letters, presentations, and e-mails—relevant for careers in business. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3304.

ENGW 3305 Advanced Writing in the Criminal Justice Professions (4 SH)
Offers writing instruction for students in criminal justice. Students practice and reflect on writing in professional, public, and academic genres—such as reports, protocols, press releases, and public service announcements—relevant for careers in criminal justice and related fields. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3305.

ENGW 3306 Advanced Writing in the Health Professions (4 SH)
Offers writing instruction for students in the Bouvé College of Health Sciences. Students practice and reflect on writing in professional, public, and academic genres—such as literature reviews, case studies, protocols, and care instructions—relevant for careers in nursing, pharmacy, and other health professions. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3306.

ENGW 3307 Advanced Writing in the Sciences (4 SH)
Offers instruction in writing for students considering careers or advanced study in the physical or life sciences. By exploring research literature and reflecting on their own experiences, offers students an opportunity to identify issues of interest in their field and analyze how scientific texts make claims, invoke other scientific literature, offer evidence, and deploy key terms. Through analysis and imitation, exposes students to the challenges of the scientific project, such as the use of quantitative data and visual presentation of evidence. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3307.
ENGW 3308 Advanced Writing in the Social Sciences (4 SH)
Offers instruction in writing for students considering careers or advanced study in the social sciences. By exploring research literature and reflecting on their own experiences, offers students an opportunity to identify issues of interest and analyze how texts make claims, invoke other social science literature, offer evidence, and deploy key terms. Through analysis and imitation, exposes students to the challenges of the social science project, including the collection of data on human subjects and the ethical presentation of evidence. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3308.

ENGW 3309 Advanced Writing in the Humanities (4 SH)
Offers instruction in writing for students considering careers or advanced study in the humanities. By exploring critical literature and reflecting on their own experiences, offers students an opportunity to identify issues of interest and analyze how texts make claims, invoke primary and secondary texts, offer evidence, and deploy key terms. Through analysis and imitation, exposes students to the challenges of the humanities project, including the framing of interpretive questions and the presentation of textual evidence. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3309.

ENGW 3310 Advanced Writing in Literature (4 SH)
Builds upon courses in the English major by focusing on “writing about literature” as a genre, a kind of writing that has its own history and set of styles and conventions. Analyzes a variety of strategies that readers, including published scholars, use in writing about literature. Examines how such strategies are shaped by different literary theories and approaches to texts, as well as by assumptions about what constitutes an argument and what is an appropriate persona or voice to adopt in literary studies. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3310.

ENGW 3311 Advanced Writing for Prelaw (4 SH)
Offers instruction in writing for students considering legal careers. Introduces students to legal reasoning and to the contexts, purposes, genres, audiences, and styles of legal writing. Emphasizes the role of writing and argument in U.S. legal culture. Using strategies drawn from rhetorical theory and criticism, students examine briefs, memoranda, opinions, and other legal texts to identify and describe techniques of analysis and persuasion. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3311.

ENGW 3313 Advanced Writing in Education (4 SH)
Offers instruction in writing for students considering careers in education. Students practice and reflect on writing in professional, public, and academic genres in education, including teaching narratives, classroom ethnographies, case studies, educational policies, standards and outcomes, curricula, syllabi, lesson plans, etc. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and develop expertise in audience analysis, critical research, peer review, and revision.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3313.

ENGW 3314 Advanced Writing in the Arts, Media, and Design (4 SH)
Examines writing in the arts and in the fields of media and design. Explores writing for a range of public and professional audiences, including scholarly and critical. Emphasizes understanding different literacies: alphabetic, visual, musical, and sculptural. Genres might include critical reviews, grant writing, promotional pieces, interactive narratives, newspaper articles, and Web pages, among others. Offers students an opportunity for analysis, reflexive imitation, and creative interdisciplinary work.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing; restricted to students in the College of Arts, Media and Design.
- NU Core: Advanced writing in the disciplines.
- NUpath: Advanced writing in the disciplines.
- Equivalent: ENGL 3314.
ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines (4 SH)
Offers writing instruction for students interested in interdisciplinary study or who wish to explore multiple disciplines. Students practice and reflect on writing in professional, public, and academic genres relevant to their individual experiences and goals. In a workshop setting, offers students an opportunity to evaluate a wide variety of sources and to develop expertise in audience analysis, critical research, peer review, and revision.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Advanced writing in the disciplines.
• NUpath: Advanced writing in the disciplines.
• Equivalent: ENGL 3301 and ENGW 3301.

ENTREPRENEURSHIP AND INNOVATION (ENTR)

ENTR 1201 The Entrepreneurial Universe (4 SH)
Introduces students to the world of entrepreneurship. Covers the importance of entrepreneurship, the characteristics of entrepreneurs, and the entrepreneurship process. Describes entrepreneurship in its various forms, including startup growth ventures, entrepreneurship in small and medium enterprises, and microbusinesses.
• Equivalent: ENTR 2201.

ENTR 2206 Global Social Enterprise (4 SH)
Designed to provide students with an in-depth exposure to entrepreneurship in the social sector, a rapidly growing segment of the global economy. Uses the case method to expose students to leading entrepreneurs who have developed and implemented business models to solve social problems such as extreme poverty, disease, illiteracy, and economic and social dislocation. Focuses on uniquely creative and driven people who have dedicated their lives to making a difference in the lives of others through values-based entrepreneurship.

ENTR 2215 Understanding Family Enterprise (4 SH)
Covers business, personal, and family issues found in family owned and managed companies, including management of the business, succession planning, entitlement, hiring, nonfamily employees, boards of advisors and directors, compensation, managing conflict, and communications. Designed for individuals who plan to enter into the management of a family business. Focuses on small and midsize firms with annual revenue of $5 million to $500 million.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENTR 3215.

ENTR 2301 Innovation! (4 SH)
Designed for students across the entire University who wish to learn about innovation—the creative process, the different types of innovation, how innovations are created, and how innovations can be transformed into commercial reality either as new products or new services and either in startups, existing corporations, and nonprofit entities. Offers students an opportunity to obtain the fundamental insight needed to understand the innovation process and to become a player in it.
• NU path: Exploring creative expression and innovation.
• Equivalent: ENTR 1204.

ENTR 2303 Entrepreneurial Marketing and Selling (4 SH)
Designed to help aspiring and serious entrepreneurship students to generate and evaluate robust marketing opportunities that may serve as the foundation for a new venture. Once a new opportunity has been vetted, students then have an opportunity to work on developing an entrepreneurial marketing plan. Covers methods for recognizing, discovering, or creating opportunities and validating those opportunities. One of the biggest challenges entrepreneurs face is coming up with the right opportunity for a new venture. This is an applied and experiential course involving field research. Two key deliverables are the opportunity assessment project and the entrepreneurial marketing plan.
• Equivalent: ENTR 3301.

ENTR 2414 Social Responsibility of Business in an Age of Inequality (4 SH)
Studies how businesses can be agents for social good, both locally and around the world. In an era of growing social and economic inequality both in the United States and globally, many “enlightened” businesses are reconsidering their roles in creating opportunity for disadvantaged or marginalized people and communities. Focuses on businesses that have the resources to invest in innovative social responsibility programs that address the impact of rising social and economic inequality. Considers the tension between the single-minded notion of maximizing profit for investors and serving a broader stakeholder community. The role of entrepreneurship and entrepreneurial thinking plays a key role in student learning. This is an integrative course that includes areas such as business policy, governance, strategy, and decision making.
ENTR 3210 Social Impact Investing: Connecting Compassion and Capital (4 SH)
Studies the investors, entrepreneurs, and enterprises comprising the global impact investing universe. Social impact investing is a rapidly emerging sector within the global investment community in which investors fund innovative enterprises dedicated to creatively solving the world’s most difficult social problems, such as extreme poverty, access to clean water, sanitation, agricultural productivity, and literacy. Historically, these initiatives were organized as nonprofits or charities and received funding from donations and grants from foundations and government agencies. Today, many social entrepreneurs are instead using for-profit and hybrid business models to attract investment capital in the form of equity investments, loans, and other forms of so-called patient capital. Offers students an opportunity to develop a practical, real-world, and sustainable impact investing portfolio.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENTR 2210.

ENTR 3212 Innovation for Social Change (4 SH)
Examines three fundamental principles of social innovation—user-centered design, integrated systems thinking, and impact measurement—and applies them to corporate, nonprofit, government, and philanthropic contexts. Through case teaching, multidisciplinary project-based learning, guest speakers, and design research, exposes students to leading ideas and policy perspectives from various sectors and regions. Seeks to embolden student commitment to creative problem-solving approaches that transcend silos and sectors. A final team project is formulated and designed with local partners, including an implementation strategy with investors that addresses the toughest problems confronting human society involving water, food, energy, education, housing, and security for marginalized and vulnerable populations.
• Prerequisite: Sophomore standing or above.

ENTR 3217 Global Family Business Leadership (4 SH)
Offers students an opportunity to develop an understanding of the nuanced challenges facing entrepreneurial leaders in different cultural settings. While family businesses have been found to be both numerically and economically significant in most countries, these enterprises worldwide share many common issues. However, there are differences that emanate from specific institutional and cultural contexts. Understanding these differences and how they can affect leadership of a family business is increasingly important for stewards of family businesses in a global marketplace. Understanding the nature of international differences and appreciating the opportunities they offer for growth-oriented family business leaders is especially important as family businesses face unique barriers to international expansion. Required participation in spring break international field project.
• Prerequisite: (a) ENTR 2215 or ENTR 3215 (either may be taken concurrently) and (b) junior or senior standing.

ENTR 3219 Microfinance: Fostering Entrepreneurship in the Developing World (4 SH)
Investigates, analyzes, and addresses one of the core questions surrounding microfinance: Can business, through microlending programs, truly address the needs of the desperately poor (3 billion people living on two dollars or less per day) in a meaningful, scalable, and sustainable way? Engages students in a theoretical analysis and practical examination of the field of microfinance. Examines the impact of microcredit and microenterprise development on alleviating extreme poverty in developing countries.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENTR 2219.

ENTR 3220 International Entrepreneurship and Innovation (4 SH)
Covers, from an international perspective, entrepreneurial opportunity identification and evaluation; market analysis and intelligence; joint venture and partnerships; agents, value-added resellers, and representatives; regulations, laws, and customs; regional and cultural issues; financing foreign ventures; and choice of domestic and international legal entities. Offers students an opportunity to understand the complexities faced by entrepreneurs doing business in a global environment and to obtain the knowledge that helps them to successfully cope with that environment. Focuses on and emphasizes the perspective of the entrepreneur but also canvases the role of the intrapreneur as an innovator and the innovation process in the international context.
• Prerequisite: ENTR 2301 (which may be taken concurrently) and junior or senior standing.

ENTR 3305 Business Modeling for Entrepreneurs (4 SH)
Focuses on business modeling for new ventures from both strategic and financial perspectives. Business models have become a source of competitive advantage for new ventures, as important as products, services, and technology. Topics include different types of business models and their implications for revenue, operating expenses, profitability, and startup capital. Offers valuable tools for estimating, designing, and innovating business models; the financing requirements for a venture; sources of capital for venture startup; and deal structures. In addition to examining a series of business model cases, students analyze and assess current business model innovations occurring in high-growth industries.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENTR 2305.
ENTR 3306 Global Entrepreneurship (4 SH)
Offers an opportunity to learn how entrepreneurs start, finance, and manage small businesses. Includes a field experience in South Africa, which involves identifying startups and small business for assistance in developing a business plan and seeking debt and/or equity financing. Students have an opportunity to consider the unique challenges encountered by entrepreneurs in economically disadvantaged communities and the additional challenges presented by South Africa’s history of racism and its current struggles with HIV/AIDS. Teaches students the basic concepts and tools associated with small business management, such as preparing financial models and a written business plan and investment presentation, with the goal that they can provide meaningful consulting assistance to township entrepreneurs.

ENTR 3308 Business Economic History of South Africa (4 SH)
Covers the economic history of modern South Africa through lectures from faculty at the partner university in South Africa and also from the Northeastern professor. Includes the country’s transition from apartheid to its present economic and political situation. Offers an opportunity to learn how South Africa has managed to overcome the struggles of its recent past and become one of the leading emerging economies of the world with a flourishing business community. Includes readings in and study of modern South African economics, law, history, politics, and culture.
• NU Core: Experiential learning.

ENTR 3316 Microfinance and Economic Development in Latin America (4 SH)
Utilizes case study methods, student presentations, discussion groups, and research to illustrate effective methods of microfinance as a poverty-alleviating tool. Offers students an opportunity to embark on extensive research on microfinance institutions. Includes a field experience component in Latin America, which involves identifying village banking sites, meeting with entrepreneurs, interviewing applicants or potential borrowers, assisting with microbusiness startups, and distributing microfinance loan capital in the creation of a village bank system.
• Repeatability: May be repeated without limit.

ENTR 3318 Business, Economics, and History of Hispaniola and Latin America (4 SH)
Covers the business and economic history of the field location (Caribbean, Central America, or Latin America) through lectures from faculty at the partner organization and the partner university, as well as at Northeastern. Offers students an opportunity to learn about the region’s flourishing business community and global development climate. Includes readings in economics, law, history, politics, and culture; extensive site visits; and guest lecturers.
• Repeatability: May be repeated without limit.

ENTR 3319 Innovation Workshop (4 SH)
Examines how to identify market trends and innovations that can lead to exciting new products and services. Discusses how to form and manage product development teams, brainstorm new ideas, observe and learn from target users, design new products and services, and see how these translate into financial outcomes. Explores the role of development and manufacturing partners. Offers students an opportunity to do field research and some form of prototyping for ideas of their own creation resulting in a business presentation for investors and the prototype design.
• Prerequisite: ENTR 2301 or ENTR 2303 and sophomore standing or above.
• Equivalent: ENTR 2319.

ENTR 3320 Base of Pyramid Innovation (4 SH)
Explores how innovations are deployed in the developing world. There are more than 4 billion people who could experience an improvement in livelihood from innovations developed to suit their needs. However, due to the design constraints of the developing world, innovators cannot simply deploy to these places without appropriate adaptations. Offers students an opportunity to help develop business models for identified technological innovations in collaboration with local deployment partners in chosen developing countries. The course consists of the following components: understanding an identified technological innovation and the local context that guided its development, developing business model concepts and prototypes, innovating business models in response to feedback, validating the business models developed, and building a deployment plan for implementation.
• Prerequisite: Sophomore standing or above.
• Equivalent: ENTR 2320.

ENTR 3325 Sustainable Innovation (4 SH)
Explores the societal, regulatory, financial, engineering, and marketing dimensions of sustainable innovation. Examines fundamental frameworks for thinking about these dimensions, and then examines how companies and governments act based on case studies. Requires students to do a field project on the application of class concepts to Northeastern University across a broad range of venues, from the consumption of energy and materials to educational and community outreach programs.
• Prerequisite: ENTR 2301 or ENTR 2303 and sophomore standing or above.
ENTR 3326 Sustainability in the Latin American Business Environment (4 SH)
Provides a theoretical foundation of the study of business activities in the Latin American business context to ensure that externalities are valued in the economic context of the enterprises and also considered in the decision-making process. Explores different methodologies of evaluating sustainability in the entrepreneurial sector of the country of study and of assessing the social and environmental impact of their action. Offers students an opportunity to identify the impacts and directly assist in the development of decisions to control, mitigate, recuperate, and compensate for negative impacts.
  • Prerequisite: (a) FINA 2720 or an environmental science course and (b) sophomore standing or above.
  • Corequisite: ENTR 3328.

ENTR 3328 Field Research in Sustainable Business (4 SH)
Offers students an opportunity to explore, in teams with other university students in the country of study, sustainable business practices in companies ranging from agricultural enterprises to high-technology startups. Working with these companies, offers students an opportunity to create business plans and explore the trade-offs between traditional profits and environmental and social constraints. This course is designed to provide students with a firsthand experience in the dilemmas and trade-offs faced by developing countries seeking to promote economic development while protecting their resources.
  • Prerequisite: (a) FINA 2720 or an environmental science course and (b) sophomore standing or above.
  • Corequisite: ENTR 3326.
  • NU Core: Experiential learning.

ENTR 3330 Lean Design and Development for Entrepreneurs (4 SH)
Studies how to rapidly create new products and services. Starting with an introduction to new product and service design and the innovation life cycle, the course applies the management concept of lean, agile development to concept creation, customer research, prototype development, and market validation. Offers students an opportunity to apply these skills to their own new product or service ideas and develop prototypes during the semester. In addition, the course explores cost-effective approaches for finding and managing third-party suppliers for design, engineering, and early stage production and delivery. Students are assessed not only for the quality of their ideas and project execution but also for their ability to work in teams and communicate results.
  • Prerequisite: ENTR 2301 or ENTR 2303.
  • Equivalent: TECE 2330.

ENTR 3336 Resource Management and Renewable Energy in Iceland (4 SH)
Studies the economic history of Iceland in order to explore sustainable development and its implications. Emphasizes renewable energy and commercial fishing, land use, and tourism from the twentieth century onward. Settled in the ninth century, over the course of a few hundred years of human activity the long-term equilibrium of the island was disrupted, causing severe environmental degradation. By the turn of the twentieth century, Iceland was one of the poorest countries in Europe. Over the last hundred years, Iceland transformed itself, making it a leader in the sustainable use of natural resources. Studies the process that brought about this transformation and focus on renewable energy and sustainable resource management.
  • Prerequisite: FINA 2720 and sophomore standing or above.
  • Corequisite: ENTR 3338.

ENTR 3338 Field Research in Sustainable Energy in Iceland (4 SH)
Explores the use of sustainable sources of energy, as well as sustainable resource management, in Iceland. Through study and field trips to power plants and businesses, offers students an opportunity to investigate the role played by hydropower and geothermal energy in providing a sustainable source of energy in a developed economy and to learn how governments and businesses work together to develop and manage renewable energy and natural resources to create a sustainable environment.
  • Prerequisite: FINA 2720 and sophomore standing or above.
  • Corequisite: ENTR 3336.

ENTR 3346 Family Business in Italy (4 SH)
Seeks to provide students with a comprehensive contemporary overview of Italian family business dynamics, politics, history, culture, and society, with an intentional focus on the comparisons between northern Italy vs. southern Italy. Uses formal and informal activities (lectures, company and historical site visits, dialogues) to offer students an opportunity to engage with Northeastern professors, guest lecturers, and Italian family business leaders in dialogue and discussion of contemporary challenges sustaining business across generations as well as related topics concerning the impact of current events, culture, history, and global issues.
ENTR 3348 Family Business: A Global Perspective (4 SH)
Studies family multinationals and the role of the family in internationalization. Many family companies are competing successfully and thriving in an increasingly globalized business environment despite assessments that they lack sufficient resources and capabilities to go global. Neither the literature on multinationals nor the growing field of family business studies has systematically investigated family multinationals yet. This course situates itself at the crossroads of internationalization studies on the one hand and family business research on the other. Offers students an opportunity to develop an understanding of the differences and the long-term transgenerational learnings that emerge from the longevity of global family businesses in different cultural settings. Explores the opportunities for family business growth by identifying pathways relevant to family business leaders. Taught abroad.
• Repeatability: May be repeated without limit.

ENTR 3401 Management of Operations and Growth in Small- and Medium-Sized Enterprises (4 SH)
Offers teams of students an opportunity to consult with owners of small- and medium-sized enterprises (SMEs) to develop project proposals and perform field casework specific to the needs of their SME clients. A highlight of this course is the SME consulting project. Through the project and course material, covers how to manage an SME from the day-to-day operations to strategic planning for growth. Exposes students to a variety of ways that an SME can achieve profitability and growth by generating lasting customer relationships, offering exemplary service, managing cash flow, implementing marketing strategies, and developing new and retooled products/services to reach new markets.
• Prerequisite: Sophomore standing or above.

ENTR 3403 Managing Operations in a Technology-Based Startup Firm (4 SH)
Offers students an opportunity to acquire a skill set that allows them to develop a project management plan for transforming an idea or concept into a viable working product. Emphasizes the need for cross-functional collaboration throughout every phase of the effort. Explores concurrent technology practices, prototyping methods, and the approaches required for achieving the integration of business and technology interests. Utilizes case studies as part of the new-product-development process.
• Prerequisite: Sophomore standing or above.
• Equivalent: TECE 3401.

ENTR 3410 Entrepreneurship and Intrapreneurship in Innovation-Driven Markets (4 SH)
Seeks to provide students with frameworks and analytical methods for developing successful growth strategies for startups and established corporations operating in hyper-competitive, technology-intensive global industries. Reviews the key theories and tools needed to understand how technological change creates new market opportunities and allows the emergence of new business models; how firms can use technology and innovation to outcompete rivals in existing markets or to create new, fast-growing markets. Spells out how the evolution of technology and market forces in an industry affects the type of firm capabilities needed to succeed over time. Examines the business models and growth strategies of some of the most dynamic companies around the world and then elaborates on what this might mean for the student’s own career as an entrepreneur in a start-up, as an intrapreneur in a large company, or as a change agent in a family business. Combines conceptual rigor with practical relevance and personal application.
• Prerequisite: Junior or senior standing.

ENTR 3520 Impact Investing and Social Finance (4 SH)
Explores impact investing, a transformative way to work with money to achieve a more inclusive and sustainable economy. Large investors are entering the world of impact investing, a rapidly emerging space where social and ecological effects of finance are championed over maximizing shareholder value. New investment vehicles such as social impact bonds and Web exchanges are changing the role of financing institutions to better serve the needs of low-income populations around the world. Applies interdisciplinary frameworks, tools, and cases, with hands-on teamwork and guest speakers, to critically examine the field. Offers students an opportunity to learn to develop and test concepts that integrate social responsibility, sustainability, and mutual accountability into current financial and economic systems while expanding social capital markets.
• Equivalent: ENTR 4520.

ENTR 4225 Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances (4 SH)
Analyzes whether, why, and how multibusiness corporations expand their operations into new business areas by questioning decisions to grow organically or through mechanisms such as acquisitions or alliances. Uses rigorous case-based discussions, expert readings, and major current events to discuss issues related to the choice of make, buy, or partner. Evaluates how these different corporate entrepreneurial strategies are used to help firms be more competitive and innovative.
ENTR 4501 Business Planning for Technology Ventures (4 SH)
Designed as a senior course for entrepreneurship majors. Covers the issues raised when creating a technology venture that goes through multiple rounds of financing in order to become a successful large company. Topics include managing growth, writing business plans, raising money, and formulating exit strategies. Focuses on projects to obtain venture financing from venture capitalists, angels, and corporate investors.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ENTR 4503 Business Planning for Small and Medium Enterprises (4 SH)
Designed for seniors interested in launching a new venture or growing an existing business venture. Includes developing a business plan, strategy development for small- to medium-sized enterprises, sales forecasting, pro-forma development, debt financing, and service developments. Sponsored by the Center for Family Business, the focus of projects is to obtain a bank loan to start a business or grow an existing small- to medium-sized venture.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing; business majors and combined majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

ENTR 4506 Advanced Studies in Social Enterprise (4 SH)
Focuses on a single developing region. Offers an opportunity to analyze the role of socially-driven entrepreneurship or “social impact enterprises” (SIEs) in alleviating poverty and its symptoms (for example, disease, illiteracy and chronic unemployment) in that country. To prepare for an intensive field experience working with local SIEs on one or more hands-on projects, students have an opportunity to study the history, politics, and development of the country, with an emphasis on the role that private-sector initiatives have played and hope to play in addressing widespread poverty and with a focus on the failures and successes in economic and business development, economic growth, and poverty alleviation. Offers students an opportunity to develop a plan for a micro-investment strategy focused on these and/or similar businesses and organizations having a significant social impact in a developing country. Includes an optional nine-day field component in a developing country during spring break; students who do not participate in the field component are given an alternative research assignment.
• Prerequisite: (a) ENTR 2206 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; ENTR 3210 and ENTR 3219 recommended.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: ENTR 3405.

ENTR 4510 New Venture Laboratory Abroad (4 SH)
Offers students an opportunity to experience firsthand some of the challenges that entrepreneurs are confronted with while searching for entrepreneurial opportunities or solving problems related to critical issues in today's operating environment. Constitutes the follow-up experiential complement to any entrepreneurship-related course that focuses on a specific area. Requires students to work in teams to tackle problems of strategic importance to an assigned venture. Projects vary widely but typically involve investigating potential markets for a new technology/product/service, evaluating the competitive and strategic landscape, and finding the right path to successful opportunity exploitation. Takes a hands-on approach involving considerable time with customers and experts. Taught abroad.
• Prerequisite: ENTR 2301 and junior or senior standing.

ENTR 4512 Social Entrepreneurship and Sustainable Development in India (4 SH)
Offers a Dialogue of Civilizations course in India focusing on a social entrepreneurial journey of researching and designing sustainable economic solutions to social problems. The overriding premise of the course is that the inception and implementation of a social innovation begins by understanding a social problem within a particular context and developing a systems-based approach to imagining solutions to reduce or solve the social problem. Through a learning-by-doing approach, offers students an opportunity to delve into critical social problems in the country—gender inequality, financial exclusion, climate vulnerability, environmental degradation, water access, disease, illiteracy, human trafficking, food insecurity, etc.—and work alongside local counterparts.
• Prerequisite: Sophomore standing or above.

ENTR 4514 Development Practice and Global Citizenship in India (4 SH)
Offers a Dialogue of Civilizations course in India focusing on the personal, reflective journey of the individual and the collective journey of becoming an active global citizen. Offers students an opportunity to enter the personal journey by exploring development practice—what it means to have a life and career as a development practitioner—and by engaging in reflective practice, a set of techniques for synthesizing and analyzing our lived experience, both personal and professional. Also offers students an opportunity to engage in the global citizen journey by learning to facilitate dialogues between their class and their new colleagues and friends in India to better understand their hopes and fears about the globalized context in which we all live.
• Prerequisite: Sophomore standing or above.
ENTR 4520 Impact Investing and Social Finance (4 SH)
Explores impact investing, a transformative way to work with money to achieve a more inclusive and sustainable economy. Large investors are entering the world of impact investing, a rapidly emerging space where social and ecological effects of finance are championed over maximizing shareholder value. New investment vehicles such as social impact bonds and Web exchanges are changing the role of financing institutions to better serve the needs of low-income populations around the world. Applies interdisciplinary frameworks, tools, and cases, with hands-on teamwork and guest speakers, to critically examine the field. Offers students an opportunity to learn to develop and test concepts that integrate social responsibility, sustainability, and mutual accountability into current financial and economic systems while expanding social capital markets.
- Prerequisite: Sophomore standing or above.
- Equivalent: ENTR 3520.

ENTR 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
- Repeatability: May be repeated without limit.

ENTR 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- Prerequisite: ENTR 4970.
- Repeatability: May be repeated without limit.

ENTR 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: ENTR 2301 or ENTR 2303 and junior or senior standing; business majors, combined majors, and engineering majors only.
- NUpath: Integrating knowledge and skills through experience.
- Equivalent: TECE 4991.

ENTR 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

ENTR 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- Repeatability: May be repeated without limit.

ENTR 4976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ENTR 4978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

ENTR 6200 Enterprise Growth and Innovation (3 SH)
Explores the challenges and processes for harnessing technological innovation for new-business development. Integrates technology strategy, innovation in marketing, product development, and organization design for the purpose of enterprise growth. Through readings, cases, and exercises, studies how firms from different industries gain competitive advantage through distinctive products and services, and leverage their technologies and skills into new emerging markets. Also focuses on processes for conceiving, financing, and organizing new ventures.
- Prerequisite: Business students and engineering students only.
- Equivalent: ENTR 6208.
ENTR 6208 Innovation and Enterprise Growth (2 or 3 SH)
Explores the challenges and processes for harnessing technological innovation for corporate growth. Integrates innovation in four key dimensions: markets and users, technology (for both products and services), organization, and business models. Uses readings, cases, and exercises to teach students how firms from different industries accelerate corporate growth by internally generating new products and services and how to do this fast and efficiently by leveraging their skills, product technologies, and production processes into growth opportunities. Features a team-based applied project in corporate entrepreneurship. Offers students an opportunity to develop fully featured business plans using business planning tools from BUSN 6202. Focuses on growth through internal development, as opposed to mergers and acquisitions.
• Prerequisite: Full-time MBA students only.
• Equivalent: ENTR 6200.

ENTR 6210 Managing Operations in Early Stage Ventures (3 SH)
Stresses the operating problems of managing small businesses. Case studies develop analytical approaches for appraising the risks and rewards of potential growth opportunities as well as operating problems. Problems range from locating, evaluating, marketing, and financing a small company to the survival and growth of more established businesses. Guest speakers and entrepreneurs provide pertinent business perspectives to in-class activities.

ENTR 6211 Entrepreneurship: Services and Retail Business Creation (3 SH)
Covers the issues surrounding the creation of a new business in the service and retail sectors. Emphasizes issues relating to the startup, growth, and operation of business ventures in these areas. Topics include developing a business plan for startup, market positioning, services design, operations management, sales forecasting, cash flow management, and venture financing with a heavy emphasis on debt financing. Students are asked to develop business plans for services and retail ventures of their own choosing as the class project.
• Prerequisite: 9 SH of MBA core courses.

ENTR 6212 Business Planning for New Ventures (3 SH)
Gives students the opportunity to build a complete business plan for new high-potential ventures. Covers all aspects of the planning process, from the point of view of both the prospective entrepreneur and the potential investor. Explores the demands of the entrepreneurial career through reading, self-assessment exercises, and group projects. Guest speakers from startup companies, law firms, and venture capital firms provide a window on current experiences in the small-business world. Recommended for prospective entrepreneurs as well as others who may become involved with new ventures.

ENTR 6214 Social Enterprise (3 SH)
Designed to provide students with an in-depth exposure to entrepreneurship in the social sector, a rapidly growing segment of the global economy. Uses the case method to expose students to leading entrepreneurs who have developed and implemented business models to solve social problems such as extreme poverty, disease, illiteracy, and economic and social dislocation. Focuses on uniquely creative and driven people who have dedicated their lives to making a difference in the lives of others through values-based entrepreneurship.

ENTR 6215 New Venture Creation for Entrepreneurs and Corporate Innovators (3 SH)
Offers a methods-based course for innovators seeking to become entrepreneurs, either in their own businesses or leading a new venture within an existing corporation. Offers students an opportunity to apply methods for opportunity identification, customer segmentation, user-centered design, business modeling, and field-testing new venture concepts. From this foundation, students create detailed financial projections, written business plans, and investor presentations.

ENTR 6216 Global Social Entrepreneurship and Innovation (3 SH)
Explores using innovation to build and create value in the larger global context. Examines some of the latest innovation practices: (1) to build and create value within emerging economies, (2) to facilitate social entrepreneurship, (3) to promote sustainable development, and (4) to build and create value at the bottom of the pyramid. Exposes students to what successful entrepreneurs must learn to balance business demands with the larger need for innovative thinking. Stresses the application of successful practices to generate results. Topics include creating and sharing knowledge and intellectual property, exploiting systems and networks, redefining disruptive innovation, and the steps necessary to make innovation and entrepreneurship happen in a variety of global contexts. Uses real-life examples and case studies to illustrate successful practices.

ENTR 6217 Lean Innovation (3 SH)
Explores how corporate venturing and entrepreneurial teams can quickly and effectively bring new concepts to market. Demonstrates how small technical teams can quickly investigate opportunity spaces, develop and select concepts, and translate these into prototypes. Other topics include industrial design thinking, project teams, prototyping, and commercialization of design. Explores the challenges and solutions to managing a technology-based product within an established corporation and details frameworks on how innovative projects can be inexpensively tested and deployed within the organization.
• Prerequisite: MS-in-innovation students only.
ENTR 6218 Business Model Design and Innovation (3 SH)
Introduces major topics in the modern understanding of business models: their essence and role in securing competitive advantage, key components and design of business models, business model change and innovation, technology commercialization through sustaining business models, financial representation of a business model, and validation of developed business models.
• Prerequisite: Business students and engineering students only.

ENTR 6219 Financing Ventures from Early Stage to Exit (3 SH)
Introduces students to the financing process for ventures from early stage to exit. Exposes students to various financing options, which may include crowdsourcing, the American JOBS Act, and foreign-sourced capital, as well as different types of debt and equity financing. Offers students an opportunity to learn about analyzing financial aspects of term sheets, including valuation methodologies and other financing documents.
• Prerequisite: Business students and engineering students only.

ENTR 6220 Family Business Leadership and Governance (3 SH)
Explores the unique challenges and strengths of family firms. Uses a learning framework with particular emphasis upon the insights and lessons learned by successful family business leaders. Offers students an opportunity to heighten their awareness of themselves concerning their roles in the family firm and their future career plans, as well as to develop key leadership skills associated with strategic planning and implantation within family enterprises. Explores particular functional issues unique to family firms in the areas of marketing, finance, control and human resource management, as well as family and business governance.
• Prerequisite: Business students only; not open to students in the online MBA, online MSF/MBA, and online MST programs.

ENTR 6221 Managing Creativity for Entrepreneurs (3 SH)
Introduces students to design thinking, offering them an opportunity to learn to think creatively in designing new products or services in order to start companies—and not just for incremental change but for game-changing, disruptive innovation. Covers idea generation, creative design, opportunity assessment, and selling ideas to investors. The course is activity based, guiding students through the steps of generating ideas and turning them into prototypes. At the conclusion of the course, offers students an opportunity to present their business ideas to angel investors.
• Prerequisite: Online MBA and MSF/MBA students only.

ENTR 6222 Competing in Dynamic, Innovation-Driven Markets (3 SH)
Reviews the key theories and tools needed to understand how technological change creates new markets and prompts new business models, how technology-based firms can outcompete rivals in fast-growing markets characterized by high uncertainty, and how the evolution of technology in an industry affects the type of firm capabilities needed to succeed over time.
• Prerequisite: Restricted to students in business administration, engineering management, and energy systems.

ENTR 6223 Cross-Cultural Innovation Management (3 SH)
Introduces students to the meaning of innovation. Offers students an opportunity to build their knowledge and skills in enhancing innovation across cultures, to obtain tools for managing innovation and for creating an innovation culture, and to implement measures of innovation. Walks students through each one of the innovation phases, from problem identification and idea generation to manufacturing and market penetration. Consists of hands-on experiential exercises focused on the management of innovation.
• Prerequisite: Business administration students only.

ENTR 6224 Intellectual Property and Other Legal Aspects of Business and Innovation (3 SH)
Introduces the major areas of the legal environment for innovation and new ventures and their relationship to early stage decisions and product and business development. Analyzes the nature, practical impact, and competitive usefulness of laws in the areas of intellectual property, contracts, employment, e-commerce, regulatory compliance, and entity formation. Offers students an opportunity to integrate and apply their understanding of legal, financial, business, technology, and ethical factors; sharpen their analytic skills; and use their skills and understanding to recognize opportunities for adding value and managing risk.

ENTR 6225 Corporate Entrepreneurship through Global Growth, Acquisitions, and Alliances (3 SH)
Offers students an opportunity to analyze whether, why, and how multibusiness corporations expand their operations into new business areas by questioning decisions to grow globally through mechanisms such as acquisitions or alliances. Uses rigorous case-based discussions, expert readings, and major current events to discuss issues related to the choice of make, buy, or partner. Offers students an opportunity to evaluate how these different corporate entrepreneurial strategies are used to help firms be more competitive and innovative.

ENTR 6260 Advanced Topics in Entrepreneurship (3 SH)
Offers an in-depth examination of selected issues and problems in entrepreneurship that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: ENTR 6200 or ENTR 6208.
ENTR 6290 Developing New Ventures for Startups and Corporations (2 SH)
Focuses on the venturing process, specifically how innovative ideas are identified and translated into successful results. Introduces methods for assessing the attractiveness of new ideas and issues involved in the formation of successful venture teams. Offers students an opportunity to learn how to develop a business plan, including how to do research and analysis for each section and how to integrate the entire plan for the best result. Also introduces venture concept validation, business model validation, venture funding types and stages, venture financial performance projections, and the foundations of a great pitch.
• Prerequisite: Executive MBA students only.
• Equivalent: MGMT 6294.

ENTR 6293 Design Thinking for Market-Driven Innovation (3 SH)
Uses digital mashups, iterative design, and “play” to unlock creative potential in the way products and services work for customers. Based on the principle that innovation is a discipline that is capable of being learned and being practiced and that arts-based learning and design thinking can unlock creative potential and foster an environment that encourages innovation. A team-based group project applies the principles of iterative design introduced in this course.
• Prerequisite: Business students only.
• Equivalent: BUSN 6293.

ENTR 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

ENTR 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

ENTR 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

ENTREPRENEURSHIP, TECHNOLOGICAL (TECE)

TECE 6200 Innovation and Entrepreneurial Growth (3 SH)
Covers the intersection of the innovation management and entrepreneurship literature. Topics include a review of the innovation literature; use of technology as a competitive tool; developing focused growth strategies; architectures and platforms for products, systems, and services; and the interplay of technology markets and organizations. The course is not only theoretical but also practical in that it covers trends in specific technology fields.
• Prerequisite: First-year graduate student standing.

TECE 6222 Emerging and Disruptive Technologies (3 SH)
Covers the role emerging technologies play in innovation for new ventures and established corporations. Includes a mix of theory and practical knowledge. Topics covered include technology disruption, diffusion, life cycles, and research-and-development strategy. Explores, in detail, the technical and market opportunities for current and emerging technologies across a broad spectrum of industries.

TECE 6230 Entrepreneurial Marketing and Selling (3 SH)
Examines the specific situation of entrepreneurial marketing. Topics include how to perform a market analysis when there are limited resources and tight schedules to be met. Also addresses new market situations, opportunity assessment, customer segmentation, going to market, and writing a marketing plan.

TECE 6240 Finance For Technology-Based Entrepreneurial Firms (3 SH)
Examines the special issues of finance in a technology-based entrepreneurial firm. Special situations arise because of the length of time a startup firm is in the research-and-development stage; the firm may require years before any revenue is generated. Introduces students to cash flow analysis, budgeting, raising money, banking, exit strategies, pro formas, and writing a financial plan.

TECE 6250 Lean Design and Development (3 SH)
Covers the intersection of customer research with product design, specifically lean design and how to map abstract attributes that customers seek into concrete product designs that can actually be built. Other topics include managing the technology business interface, creating product teams, and drafting product development plans.
• Prerequisite: First-year graduate student standing.

TECE 6260 Measuring and Managing the Cost of Production and Growth (3 SH)
Examines the new and growing topic of accounting for new product development and its influence on project selection, product design, and profitability. Topics include managerial and financial accounting, accounting for new product development, project costs, and business data.

TECE 6300 Managing a Technology-Based Business (3 SH)
Covers topics specific to managing a business or a strategic business unit within a firm. Considers the special issues related to technology-based firms. Topics include creating a culture, operations planning, staffing for technical excellence, dealing with technology vendors, dealing with advisers, supply chain management, and writing operations plans.
• Prerequisite: First-year graduate student standing.
TECE 6320 International Business and Intellectual Property (3 SH)
Covers two topics that are very important to technological entrepreneurs: selling products and services internationally and protecting one’s intellectual property globally. Topics include targeting and selling abroad, agencies for small business export, differences in operating abroad, forming international alliances, and protecting intellectual property in the international marketplace.

TECE 6321 Intellectual Property in an Entrepreneurial Firm (2 SH)
Covers the subject of intellectual property as it applies to the new entrepreneurial firm. Topics covered include patents, trademarks, trade secrets, and intellectual property law. Explores the role that intellectual property plays in developing business strategies.

TECE 6340 The Technical Entrepreneur as Leader (3 SH)
Focuses on the personal skills an entrepreneur needs to lead and persuade others. Students read about and complete exercises on leadership and selling ideas. In addition, students meet members of the entrepreneurship community in New England. Stresses communications skills, both written and oral, along with self-discovery of leadership style.

TECE 6360 Strategic Entrepreneurship in a Technical Field (3 SH)
Explores various aspects of developing a business plan to a professional level. Students write a business plan for a product or service idea and present the plan to a jury.

TECE 6374 Special Topics (1 to 4 SH)
Examines state-of-the-art topics that are of interest to the faculty member presenting the lectures.
• Prerequisite: First-year graduate standing.
• Repeatability: May be repeated without limit.

TECE 7671 Development Project (2 SH)
Constitutes the first phase of the capstone project. Students select or are assigned to a project. The initial work involves the development of a needs and requirements statement for their project. Incorporates all of the literature search and groundwork for the larger capstone.
• Prerequisite: Acceptance into the MS in Technological Entrepreneurship program.
• Repeatability: May be repeated up to 5 times.

TECE 7673 Development Project in Entrepreneurship (3 SH)
Requires students, working with an adviser to develop the initial phase of the project, to test concepts and build prototypes of the product/technology they plan on developing for their business. An important component of the course is the requirement that students develop a proof of concept to present to potential investors.
• Prerequisite: TECE 6200, TECE 6230, and TECE 6260.
• Repeatability: May be repeated without limit.

TECE 7976 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of faculty on a selected topic. Course content depends upon the faculty member.
• Repeatability: May be repeated without limit.

TECE 7978 Independent Study (1 to 4 SH)
Offers work performed under individual faculty supervision.
• Repeatability: May be repeated without limit.

ENVIRONMENTAL STUDIES (ENVS)

ENVS 2342 Eating and the Environment (4 SH)
Focuses on the impact that our daily consumptions and purchases make on the environment and our health. Examines major themes related to eating and the environment, including agriculture, soil resources and pollution, water and air pollution, pesticides, herbicides, fertilizers, deforestation, food additives, and nutritional supplements. Aims to encourage students to develop smarter consumer habits by providing them with the skills necessary to choose the most environmentally friendly and healthy food available, leading to a higher quality of life.
• Prerequisite: ENVR 1101 or permission of instructor.
• Equivalent: IDSC 2342.

ENVS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

ENVS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ENVS 4970 and junior or senior standing.
• Repeatability: May be repeated without limit.

ENVS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

ENVS 4992 Directed Study (1 to 4 SH)
Offers students an opportunity for special readings and research in environmental studies.
• Repeatability: May be repeated without limit.
ENVS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

ENVS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
- NU Core: Experiential learning.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

ENVS 4997 Senior Thesis (4 SH)
Offers students an opportunity to prepare an undergraduate thesis under faculty supervision.
- Prerequisite: Senior standing.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

FINANCE AND INSURANCE (FINA)

FINA 1209 Personal Finance (4 SH)
Emphasizes the development of individually focused financial information and a comprehensive financial plan designed to enable the individual to manage his or her financial affairs. Integrates personal goals—such as buying a home, retirement, investing, and insurance needs—to help assure that the financial plan incorporates the major decision stages an individual faces.
- Prerequisite: Not open to business majors or combined majors.

FINA 2201 Financial Management (4 SH)
Designed to develop the financial skills and logical thought processes necessary to understand and discuss financial policy decisions in a global economy. Specific objectives include developing an understanding of the time value of money; using financial statements in decision making; and understanding the nature of financial markets, the cost of capital, valuation of stocks and bonds, management of short-term assets, short-term and long-term financing, capital markets, and multinational financial management. Addresses the impact of legal, social, technological, and ethical considerations on efficient economic outcomes. Requires a financial calculator and provides an opportunity to develop computer spreadsheet skills.
- Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; business majors and combined majors only.
- Equivalent: FINA 2202 and FINA 2209.

FINA 2202 Financial Management in a Global Context (4 SH)
Covers the financial skills and thought processes necessary to understand and discuss financial policy decisions in a global economy. Emphasizes return and risk management issues faced by financial managers as they operate internationally. Topics include the effects of currency translation and valuation; understanding the time value of money; translating, consolidating, and evaluating financial statements in decision making; determination of the cost of capital; valuing stocks and bonds available in different global markets; and managing short-term assets and liabilities and short-term financing. Addresses the impact of legal, social, technological, and ethical considerations faced by financial managers in companies that operate globally. Requires a financial calculator. Offers students an opportunity to develop computer spreadsheet skills.
- Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; international business majors only.
- Equivalent: FINA 2201 and FINA 2209.

FINA 2209 Financial Management (4 SH)
Does not count as credit for business majors. Counts as FINA 2201 for business minors only.
- Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; nonbusiness majors only.
- Equivalent: FINA 2201 and FINA 2202.

FINA 2720 Sustainability in the Business Environment (4 SH)
Examines a variety of environmental problems, including global warming, use and disposal of toxic substances, and depletion of natural resources such as water and petroleum. Many of these problems arise because these resources are available to all and so their overuse is an externality that is not included in manufacturing costs. Businesses have been involved in both identifying sustainability issues in their individual organizations and providing a variety of innovative solutions. Uses a combination of readings and case analyses to assess how both government regulations—such as taxes, subsidies, building codes, prohibitions of use—and business solutions—including zero emissions, green design, producer take-back, life cycle assessment, and corporate environmental reporting—address these problems.
- Prerequisite: Sophomore standing or above.
FINA 3301 Corporate Finance (4 SH)
Designed to develop the skills needed to make and implement financial policy decisions in a global economy. Specific objectives include developing an understanding of financial analysis; company valuation; capital markets; cost of capital; capital asset pricing and risk management; short- and long-term financial policies; working capital management; multinational financial management; and special topics including lease financing, debt refunding, mergers and acquisitions, and bankruptcy and restructuring. Offers opportunities to consider many broader issues including the relevance of globalization; the world economy; technological advances; and legal, social, and ethical issues related to the practice of corporate finance. Stresses written and oral communication skills and teamwork. Uses cases and spreadsheets extensively.
• Prerequisite: (a) FINA 2201, FINA 2202, or FINA 2209 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; business majors and combined majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

FINA 3303 Investments (4 SH)
Focuses on investment management as the study of risk and return of financial securities and real assets. Students design and assess models that evaluate investments while recognizing the constraints of the real world. Explores domestic and international financial markets and the securities traded therein. Discusses techniques for valuation of financial assets. Analyzes qualitative concepts such as market efficiency, intrinsic value, and risk. Provides the ability to build unique valuation models to suit the particular investment alternative that students wish to scrutinize. Also stresses portfolio construction, management, and protection, as well as performance assessment. During the semester, students have an opportunity to create and manage a stock portfolio.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4310 Working Capital Management (4 SH)
Examines strategies and analytical approaches to managing current assets and current liabilities. Explores corporate cash management under changing money market conditions. Discusses the use of interest rate futures and working capital management in a multinational context. Provides a summary overview of entrepreneurial finance, with a focus on small businesses, corporate ventures, and intrapreneurship. Applies knowledge of corporate finance in the context of starting, acquiring, managing, and divesting a business or a business unit within a corporation. Topics include analyzing the financial needs of new ventures, exploring sources of financing, managing decline, determining valuation, and reviewing exit strategies.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4312 Issues in Corporate Governance (4 SH)
Examines the nature of conflicts over control of the corporation. Applies modern finance theory and practice to the issues raised and draws on seminal works in the finance and economics literature that influence the current debate in this area. Discusses legal and ethical considerations that are especially important in corporate-control issues. Uses cases involving well-known takeovers, as well as current hostile takeover battles, to illustrate the theories discussed.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4320 International Financial Management (4 SH)
Introduces international financial markets including balance of payments, history of the international monetary system, exchange-rate determination, foreign-exchange-exposure hedging strategies, and international capital markets. Examines how the financial strategies and policies of multinational corporations differ from domestic corporations and how financial management is utilized in an international setting to achieve corporate goals.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4410 Valuation and Value Creation (4 SH)
Explores recent developments in financial management and financial analysis through the use of modern finance theory to make capital allocation decisions that lead to long-run value maximization for the corporation. Focuses on applications and financial model building. Examines risk analysis by building spreadsheet models for valuation and risk-analysis applications. Utilizes valuation analysis models to merge financial, corporate, and business strategies to measure and manage corporate value. Develops an understanding of the mechanics of the valuation process, along with an understanding of the drivers of value and development of strategies for value creation. Topics covered are relevant to value consultants, corporate managers, and securities analysts.
• Prerequisite: (a) FINA 2201, FINA 2202, or FINA 2209 and (b) junior or senior standing; business majors and combined majors only.
FINA 4412 Personal Financial Planning (4 SH)
Emphasizes the development of personal financial management knowledge by applying the techniques and perspectives of financial planning professionals. Builds upon and applies skills gained in FINA 2201 to personal finance decisions such as retirement planning, home mortgages, and overall risk management. Offers students an opportunity to develop their own financial plan and understand how that plan will change as they age and their life situation changes. Note that while this course is not designed to prepare students to take the Certified Financial Planner exam, many of the topics, such as retirement planning, investment and securities planning, and estate planning, are among those discussed.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4420 Mergers and Acquisitions (4 SH)
Offers a practical, planning-based approach to managing the mergers and acquisitions (M&A) process. Analyzes how M&As create or destroy value; commonly used takeover tactics and defenses; M&A valuation techniques; alternative deal structures; and the financial, strategic, legal, and regulatory aspects of M&As. The first section covers how and when to apply the appropriate tools and skills to successfully complete a transaction. The second section offers students an opportunity to apply what has been learned to solve real-world business problems. Discusses all major elements of the acquisition process in the context of a logical process.
• Prerequisite: FINA 3301.

FINA 4516 Real Estate Finance (4 SH)
Surveys the field of real estate including principles of real estate law, transactions brokerage, management, development, valuation, taxation, finance, and investment. Provides a framework of real estate finance and investment, in both theory and practice. Examines all aspects of real estate financing including the primary and secondary mortgage markets, real estate financial institutions, regulations, and mortgage-backed securities. Analyzes the return, risk, and various strategies in real estate investments with financial methods and techniques. Uses case discussions, spreadsheet analysis, and investment projects to make learning effective.
• Prerequisite: FINA 3303; business majors and combined majors only.

FINA 4514 Investment Banking (4 SH)
Examines the investment banking business. Investment bankers are one of the most important conduits through which funds flow from savers to corporations needing to invest in plant and equipment. Offers an opportunity to examine the major functions of large investment banks in regard to their investment banking, market making, and asset management businesses; to determine the financing needs of domestic and international corporations, not-for-profit organizations, and government entities by using concepts learned in earlier courses; and to learn to link these financing needs with products that are available in the capital markets, usually through the investment banking houses.
• Prerequisite: FINA 3303; business majors and combined majors only.

FINA 4512 Financial Risk Management (4 SH)
Explores the concepts of financial futures, options on financial futures, and listed options markets as developed to help corporations and financial institutions manage financial risk. Covers financial derivatives and standard hedging techniques first, followed by a study of market risk and strategies in managing market risk.
• Prerequisite: FINA 3303; business majors and combined majors only.

FINA 4526 Core Topics in Alternative Investments (4 SH)
Covers alternative investments, including real assets such as real estate and real estate investment trusts, hedge funds, commodities, private equity, and structured products. This course is highly quantitative and focuses on methods for understanding risk, return, and benchmarking of these investments. Offers students an opportunity to obtain a deeper understanding of each of these asset types.
• Prerequisite: FINA 3303.

FINA 4518 Risk Management and Insurance (4 SH)
Emphasizes the functional area of corporate risk management. Covers such areas as organizing and controlling the risk management function; identifying, measuring, controlling, and financing risk; selecting the best method of risk treatment; and implementing and monitoring risk management. Topics of exposure analysis include property, liability (public, employer, products, officers and directors, and professionals), income, and extraordinary expense losses. Covers treatment methods such as self-insurance, offshore captive, retention groups, and commercial insurance. Includes recent developments such as tort reform integration of risk management with modern financial theory, as well as implications and analysis of recent tax reforms.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4524 Credit Analysis (4 SH)
Explores all aspects of credit evaluation from the perspective of banks and other institutions. Introduces industry-grade credit analysis. Credit analysis is used by all manner of banks and other institutions, such as insurance companies, hedge funds, private equity groups, and even elements of local, state, and federal governments, to evaluate clients and potential borrowers who need loans and other structured debt products.
• Prerequisite: FINA 3301.

FINA 4516 Real Estate Finance (4 SH)
Surveys the field of real estate including principles of real estate law, transactions brokerage, management, development, valuation, taxation, finance, and investment. Provides a framework of real estate finance and investment, in both theory and practice. Examines all aspects of real estate financing including the primary and secondary mortgage markets, real estate financial institutions, regulations, and mortgage-backed securities. Analyzes the return, risk, and various strategies in real estate investments with financial methods and techniques. Uses case discussions, spreadsheet analysis, and investment projects to make learning effective.
• Prerequisite: FINA 3303; business majors and combined majors only.
FINA 4602 Turnaround Management (4 SH)
Examines strategies for identifying companies likely to fail and selecting and implementing remedial actions. Topics include business turnarounds, troubled companies, workouts, bankruptcies, and liquidations, using case studies and readings. Students evaluate a turnaround plan.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209; business majors and combined majors only.

FINA 4604 Fixed-Income Securities (4 SH)
Exposes students to the theory, application, and evidence concerning highly sensitive interest rate products. Explores recent developments in pension fund management, asset/liability management, duration matching, “gap” management, and other important issues confronting domestic and international financial and corporate management. Offers students the opportunity to learn how to customize a risk management program.
• Prerequisite: FINA 3303; business majors and combined majors only.

FINA 4608 Advanced Financial Strategy (4 SH)
Covers strategic financial decision making in dynamic and technology-driven organizations operating in domestic and international settings. Through case studies, discussions with senior financial executives, and student projects, students gain insight into capital investing and financing decisions in the new economy. An analytical paradigm linking business strategy, financial management, and valuation is utilized to explore financial decision making throughout the life cycle of companies, intended to optimize shareholder value creation. Topics include fundamental financial analysis, capital budgeting under conditions of high risk and uncertainty, startup financing, creative financing, mega-mergers, risk management, and valuation.
• Prerequisite: FINA 3301; business majors and combined majors only.

FINA 4610 Entrepreneurial Finance, Innovation Valuation, and Private Equity (4 SH)
Covers qualitative and quantitative aspects of entrepreneurial finance, such as venture capital and angel financing. Also covers private equity (i.e., buyout/leveraged-buyout firms), but in less detail. Introduces valuation in entrepreneurial finance, including valuation of startups, using real options to value innovation-intensive firms, valuation in staged financing, etc. Casework emphasizes the practical aspects of qualitative and quantitative issues related to venture capital financing, entrepreneurship, and innovation from the perspective of the financier and the startup firm. Discusses issues related to the venture capital industry, such as the limited partnership structure, term-sheets and contracts, exit of portfolio firms, and international investments.
• Prerequisite: FINA 2201, FINA 2202, or FINA 2209 and working knowledge of Excel or other spreadsheet programs; business majors and combined majors only.

FINA 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

FINA 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: FINA 4970.
• Repeatability: May be repeated without limit.

FINA 4983 Special Topics in Finance (4 SH)
Examines areas of current interest and special topics in finance. Employs a mix of lectures, cases, and projects. Topics depend on the instructor.
• Prerequisite: FINA 3301, FINA 3303, and junior or senior standing.
• Repeatability: May be repeated up to 2 times.

FINA 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Repeatability: May be repeated without limit.

FINA 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
FINA 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.

- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

FINA 6200 Value Creation through Financial Decision Making (3 SH)
Highlights the role of financial management as a source of value creation in a competitive global environment characterized by rapid technological, personal, and market changes. Offers students an opportunity to develop tools and techniques of financial analysis and valuation to support financial decision making. Presents future managers with actual business problems to learn to apply the tools of financial analysis to strategic decisions faced by the firm, such as capital budgeting and capital structure.

- Prerequisite: ACCT 6201 (may be taken concurrently) and MGSC 6200; professional accounting and business administration students only.
- Equivalent: FINA 6208.

FINA 6201 Financial Theory and Policy (3 SH)
Covers the fundamentals of financial decision making. Introduces students to the basic framework of corporate finance. Topics include tools and applications of financial asset valuations, the risk-return tradeoff, modern portfolio theory, methods of calculating the risk of financial assets, tools and applications for analyzing a firm’s capital investment decisions, capital structure and dividend policy issues, theory and evidence concerning corporate restructuring, such as mergers and hostile takeovers, and issues concerning international financial management and the legal, ethical, and regulatory environment of financial management.

- Prerequisite: Finance students only.

FINA 6202 Analysis of Financial Institutions and Markets (3 SH)
Introduces the domestic and international financial system and the institutions within it. Develops data and quantitative analysis tools utilized for economic and financial modeling and analysis. Emphasis is on regression analysis and its application, including how to build and interpret statistical models. Topics include the major types of financial institutions that operate within the global economy and the financial instruments employed by them; how exchange rates, interest rates, and security prices are determined and how they affect the global economy; and how governments and central banks impact economic and financial conditions.

- Prerequisite: Finance students only.

FINA 6203 Investment Analysis (3 SH)
Familiarizes students with domestic and international financial markets and the securities traded therein. Discusses a variety of techniques for valuation of financial assets and relies heavily on quantitative methods. Critically analyzes such qualitative concepts as market efficiency, intrinsic value, and risk. The contents of this course, descriptive, theoretical, and applied, should provide students with the ability to build unique valuation models to suit the particular investment alternative they wish to scrutinize. Also provides students with an understanding of how investment theory and investment practice relate.

- Prerequisite: FINA 6200, FINA 6201, or FINA 6208.

FINA 6204 International Finance Management (3 SH)
Develops specific concepts, policies, and techniques for the financial management of the multinational firm. Topics include operation of the foreign exchange markets, foreign exchange risk management, sources and instruments of international financing, foreign direct investment and the management of political risk, multinational capital budgeting, and financing control systems for the multinational firm.

- Prerequisite: FINA 6200, FINA 6201, or FINA 6208; business students only.

FINA 6205 Financial Strategy (3 SH)
Develops financial, analytical, and communication skills necessary to develop and implement a financial strategy consistent with firm value creation in a dynamic environment. Stresses the impact of ethical and legal considerations, global markets, and technological innovation on efficient economic outcomes. Emphasizes written and oral communication skills. Upon completion of this course, students should be able to identify and analyze a firm’s strategic opportunities and propose a suitable financial strategy that is consistent with firm value creation.

- Prerequisite: FINA 6200, FINA 6201, or FINA 6208; business students only.
FINA 6206 Finance Seminar (3 SH)
Structures discussion of current topics in the finance literature. Students read and present the works of leading researchers. Topics are broad and may cover various areas of corporate finance, investments, and institutions. Students also complete an original project emphasizing current methodologies of analysis.
- **Prerequisite:** FINA 6203; finance and finance/business administration students only.

FINA 6208 Financial Management for Value Creation (4 SH)
Introduces basic concepts of financial management—the management of the flow of funds available to an organization. Uses practice-oriented education to help students develop knowledge, skills, critical-thinking abilities, and behaviors consistent with the objective of creating value. Includes frameworks, principles, tools, techniques, and procedures to illustrate their application. Topics include financial analysis, forecasting and planning, working capital management, valuation, capital budgeting, cost of capital, dividend policy, mergers, sources and methods of financing, financial structure, financial markets, financial strategy, risk management, and the timing of financial policies in domestic and international settings. Discusses ethical, legal, regulatory, environmental, societal, cultural, diversity, technological, and demographic issues related to financial management as appropriate.
- **Prerequisite:** ACCT 6208.
- **Equivalent:** FINA 6200.

FINA 6209 Introduction to International Accounting and Finance (3 SH)
Offers students an opportunity to obtain a graduate-level understanding of accounting principles and standards and resulting financial statements. Emphasizes problems caused from differences in accounting standards and tax codes. Traces the impact of exchange-rate changes on the reporting of profits and owner’s equity.
- **Prerequisite:** MSIB students only.

FINA 6211 Financial Risk Management (3 SH)
Provides an overview of all of the hedging markets and hedging instruments. Explores specific hedging use of options, forwards, futures, swaps, and options on futures. Focuses on advanced financial risk management of interest rates, currency rates, equity returns, and fixed income returns. Students use readings and case problems to study when and how to use hedging instruments to alter a portfolio’s risk exposure.
- **Prerequisite:** FINA 6203 (which may be taken concurrently).

FINA 6212 Fixed Income Securities and Risk (3 SH)
Exposes students to theory, applications, and evidence concerning highly sensitive interest rate products. Discusses recent developments in pension fund management, asset/liability management, duration matching, “gap” management, concurrent interest rate and exchange rate management, and other important issues now confronting domestic and international financial and corporate management. Studies how to customize a risk management program.
- **Prerequisite:** FINA 6203 (which may be taken concurrently); business students only.

FINA 6213 Investment Banking (3 SH)
Discusses policy, strategy, and administration of financial services firms. Topics include issuance of securities, the service function within financial services, pricing a negotiated issue of common stock or competitive bid issue, and meeting capital requirements of a securities firm.
- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6214 Mergers and Acquisitions (3 SH)
Explores the environments that have recently given rise to a large number of corporate mergers and the business factors underlying these corporate combinations. Examines the financial, managerial, accounting, and legal factors affecting mergers. Studies how to appraise a potential merger and structure a merger on advantageous terms.
- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6215 Business Turnarounds (3 SH)
Concentrates on the diagnosis, prescription, and implementation of actions pertinent to business turnarounds, troubled companies, workouts, bankruptcies, and liquidations. Case studies and readings guide the student through the maze of financial, ethical, legal, general business, and strategic aspects of turnarounds, culminating in the student evaluating and developing a turnaround plan.
- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6216 Valuation and Value Creation (3 SH)
Explores recent developments in financial management and financial analysis through the use of modern finance theory to make capital allocation decisions that lead to long-run value maximization for the corporation. Focuses on applications and financial model building, risk analysis for valuation applications, and business strategies to measure and manage corporate value and value creation. Topics are relevant to value consultants, corporate managers, and securities analysts.
- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.
FINA 6217 Real Estate Finance and Investment (3 SH)
Provides students with a comprehensive understanding of real estate finance. Emphasizes factors affecting real estate investment. Topics include valuation (appraisal), market analysis, development, taxation, ownership types, short-term financing, mortgage markets, and investment strategies. Designed for students interested in a general overview of real estate finance, as well as those intending to pursue a career in the real-estate field.

- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6218 Personal Financial Planning (3 SH)
Emphasizes the development of personal financial management knowledge by applying the techniques and perspectives of financial planning professionals. Examines the various aspects of financial planning, exploring how individual characteristics, such as age and economic circumstances, as well as the macroeconomy, impact decisions. Offers students an opportunity to develop a financial plan and identify how that plan changes with age and life circumstances. Note that while this course is not designed to prepare students to take the Certified Financial Planner exam, many of the topics, such as retirement planning, investment and securities planning, and estate planning, are among those discussed.

- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6219 Portfolio Management (3 SH)
Develops portfolio construction, revision, and performance measurement. Highlights portfolio construction in an efficient capital market. Topics include risk-return analysis, the effects of diversification on risk reduction, and the costs of inflation, taxes, and transaction costs on fixed income and equity security portfolios. Examines financial models of capital asset pricing as the basis for the analysis of portfolios from the institutional investor’s viewpoint.

- **Prerequisite:** FINA 6203 (which may be taken concurrently).

FINA 6220 Healthcare Finance (3 SH)
Implements financial management and economic principles to analyze real-world healthcare issues. Emphasizes and encourages problem solving and creative thinking through the use of texts, cases, and models of the healthcare industry. Students are exposed to financial, managerial, and risk management strategies unique to the healthcare industry.

- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6221 Entrepreneurial Finance (3 SH)
Uses the basic processes, principles, tools, and concepts of finance within the parameters of a small business to develop a complete financial plan. Constructs a comprehensive plan that projects the future circular flow of funds by analyzing and then integrating the impact of both investment decisions (use of funds) and financial decisions (source of funds).

- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6222 Risk Management and Insurance (3 SH)
Introduces the concepts of risk and risk bearing in the business firm. Topics include risk identification and analysis, measurement of loss possibilities, and the principal methods of managing such contingencies. The focus is broad enough to include some nontraditional areas, such as speculative risk and foreign operations. Discusses insurance in detail as a major method of managing certain types of risks. Emphasis is on aspects that directly relate to the financial management function, such as insurance markets and products, selecting insurers and insurer intermediaries, legal frameworks involved in the transfer of risk to insurers, pricing of insurance contracts, and principles followed by insurers in selecting risks.

- **Prerequisite:** FINA 6200, FINA 6201, or FINA 6208.

FINA 6225 Entrepreneurial Finance for High Tech Companies (3 SH)
Provides an overview of entrepreneurial finance with a focus on high-technology companies. Specific topics covered include analyzing the financial needs of high-technology ventures, including working capital management, risk analysis, capital budgeting, sources of financing, valuation; and exit strategies, including licensing, joint ventures, mergers and acquisitions, and initial public offerings (IPOs). Uses a combination of text material, books, and cases.

FINA 6230 Venture Capital and Startup Financing (3 SH)
Covers qualitative and quantitative aspects of entrepreneurial finance, such as venture capital and angel financing. Follows the firm’s life cycle, with modules on valuation, raising capital, security choice, and the structure and valuation of exit decisions in the presence of information uncertainty. Offers students an opportunity to analyze the role of financial contracts in addressing information and incentive problems in such uncertain environments, which is typical for entrepreneurial firms. Casework emphasizes the practical aspects of qualitative and quantitative issues related to venture capital financing, entrepreneurship, and innovation from the perspective of the financier and the startup firm. Seeks to prepare students for careers connected to entrepreneurial finance, for example, as budding entrepreneurs or as venture capitalists.

- **Prerequisite:** Online MBA and MSF/MBA students only.
FINA 6260 Entrepreneurial Finance, Innovation Valuation, and Private Equity (3 SH)
Covers qualitative and quantitative aspects of entrepreneurial finance, such as venture capital and angel financing. Also covers private equity (i.e., buyout/leveraged buyout firms) but in less detail. Introduces students to valuation aspects in entrepreneurial finance, including valuation of startups, using real options to value innovation-intensive firms; valuation in staged financing; etc. Case-work emphasizes the practical aspects of qualitative and quantitative issues related to venture capital financing, entrepreneurship, and innovation from the perspective of the financier and the startup firm. Also covers many issues related to the venture capital industry, such as the limited partnership structure of the venture capital/private equity industry, venture capital term sheets and contracts, exit of portfolio firms, and international investments.
• Prerequisite: FINA 6200, FINA 6201, or FINA 6208.
• Repeatability: May be repeated without limit.

FINA 6280 Corporate Finance for Dynamic Industries (6 SH)
Explores in detail financial strategies, policies, and methods utilized by innovation-intensive organizations to create and sustain shareholder value. Studies investment and financing decisions for companies operating in domestic and international markets and applies principles to the large corporation as well as startups. Strategies for focusing innovation to build shareholder value are also an important component of this immersion in corporate finance.
• Prerequisite: MS-in-innovation students only.

FINA 6281 Mergers and Acquisitions for Enterprise Growth, Strategy, and Mechanics (3 SH)
Examines the strategic, financial, and legal aspects of mergers and acquisitions. Explores issues of performing due diligence, deriving company valuations, deal structure, and the complexities of postmerger integration. Exposes students, through a combination of case studies and discussions of current deals in industries, to this important component of enterprise growth.
• Prerequisite: Business administration and finance students only.

FINA 6282 Strategies for Companies in Crisis (3 SH)
Examines companies in crisis, the flip side to the rapidly growing companies usually discussed in the High Tech MBA program. Focuses on approaches that help companies regain momentum and resume growth. Discusses downsizing and layoffs; operating, financial, and strategic turnarounds; bankruptcy; restructuring; product selection; quality management incentives; and other topics.
• Prerequisite: Business administration and finance students only.

FINA 6283 Economics of Growth and Innovation (3 SH)
Utilizes current economic events and changes that have transformed the competitive landscape to generate discussion about the future course of the world economy. Examines the intersection between economics and politics and the methods and means used by companies to compete. Uses simulations to illustrate the impact of market turmoil and competition on company performance. Offers students an opportunity to obtain a solid framework of economic knowledge to enable them to understand changes in the economy and to predict how policies will affect the economy and their company.
• Prerequisite: High technology students only.

FINA 6284 Financing Innovation and Growth (3 SH)
Offers an immersion in corporate finance with a specific focus on the financing of innovation and growth at firms. Topics include analyzing and applying finance from the perspective of intrapreneurship as well as entrepreneurship.
• Prerequisite: MS-in-innovation students only.

FINA 6290 Financial Tools and Decision Making for Executives (3 SH)
Offers students an opportunity to develop skills needed to make and implement corporate financial policy decisions in a global economy. Introduces financial markets and the valuation of financial assets that trade in these markets. Studies financial analysis, financial planning, working capital management, cost of capital, and short- and long-term financial policies.
• Prerequisite: Executive MBA students only.

FINA 6291 Creating Value in a Global Business Environment (3 SH)
Offers students an opportunity to learn how firms can successfully sustain value creation and compete for capital in capital markets. Creating and sustaining corporate value is required for a company’s survival and growth. Introduces modern finance concepts to better understand how companies are valued and how they create value. Includes topics such as long-term financial strategy, capital planning analysis, venture capital and the initial public offering (IPO) process, mergers and acquisitions, and joint ventures. Explores situations in which theoretical finance assumptions do not apply in practice and discusses how the theory might be modified or relaxed to reflect the situation at hand.
• Prerequisite: Executive MBA students only.

FINA 6292 Advanced Topics in Finance (3 SH)
Examines current, specialized, and advanced topics in the areas of corporate finance, investments, risk management, valuation, private equity, venture capital, and other areas as appropriate. Course content, pedagogy, and prerequisites vary by topic and instructor.
• Prerequisite: Restricted to students in selected MBA and MSF programs.
FINA 6360 Fund Management for Analysts (1 SH)
Introduces a variety of operating documents typical to an active mutual fund. Offers students an opportunity to apply lessons from investment and portfolio management classes by presenting investment recommendations to a panel and communicating with peers in a thoughtful and forceful manner. Investment decisions are made based on student analysis and recommendations that include knowledge of macroeconomic expectations, corporate financing issues, dept-repayment concerns, and employee and technological changes.
• Repeatability: May be repeated up to 3 times.

FINA 6361 Fund Management for Managers (1 SH)
Builds on FINA 6360. Designed to provide students further analytical knowledge, including exposure to and opportunity to perform managerial tasks related to the management and operation of mutual funds. Included in these tasks are reconsideration of the fund’s investment policy statement and asset allocation plan as well as preparation of accounting statements, dealing with compliance issues, addressing ethical concerns, measuring and managing risk, and performing marketing and fund-raising activities.
• Prerequisite: FINA 6219 (may be taken concurrently) and FINA 6360; students in selected MBA and MSF programs only.
• Repeatability: May be repeated up to 3 times.

FINA 6960 Exam Preparation—Master's (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

FINA 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

FINA 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

FSEM 1101 First-Year Inquiry Seminar (1 SH)
Offers students an opportunity to explore a specific area of academic research in a small-group seminar environment. Students meet regularly with a faculty member to read and discuss the faculty member’s research. Research topics vary, but general themes discussed include (a) how a specific research topic emerges and evolves over time, (b) the selection and implementation of specific research methodologies, (c) the contextualization of particular research studies within broader academic and real-world conversations, and (d) how the specific research contributes to philosophical and/or practical discussions in the world in which we live. The latter may include discussing how the research findings might help answer questions and/or be used in solving problems and making decisions.
• Prerequisite: Undeclared first-year students only.
• Repeatability: May be repeated up to 3 times.

FRNH 1101 Elementary French 1 (4 SH)
Designed for students with very little or no prior knowledge of French. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.
• Prerequisite: FRNH 1101, FRNH 1301, or placement test.
FRNH 1201 Elementary French 1—BSIB (4 SH)
Designed to meet the special needs of students majoring in international business and who have very little or no prior knowledge of French. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in France and the varied cultures within the world of French speakers. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.

• Prerequisite: International business majors only.

FRNH 1202 Elementary French 2—BSIB (4 SH)
Continues FRNH 1201. Designed for the special needs of international business students. Reviews and continues the study of grammar and basic language skills. Offers progressively more intensive practice in oral and written communication. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.

• Prerequisite: FRNH 1201, FRNH 1301, or placement test; international business majors only.

FRNH 1301 Elementary French Immersion 1 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

FRNH 1302 Elementary French Immersion 2 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

FRNH 2101 Intermediate French 1 (4 SH)
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current French periodicals.

• Prerequisite: FRNH 1102, FRNH 1302, or placement test.

FRNH 2102 Intermediate French 2 (4 SH)
Continues FRNH 2101. Stresses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. Strives to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French. Provides preparation for advanced courses.

• Prerequisite: FRNH 2101, FRNH 2301, or placement test.

FRNH 2151 Intermediate French for Business Purposes (4 SH)
Emphasizes communicating in a business environment, tailoring grammar and sentence pattern coverage, vocabulary, and cultural topics to a business setting. Combines contemporary business topics and intermediate business French. Offers students an opportunity to be prepared to communicate in speaking and writing in a business setting in France and with a better understanding of the current business culture in France.

• Prerequisite: FRNH 2101, FRNH 2201, FRNH 2301, or permission of instructor.

FRNH 2201 Intermediate French 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current French periodicals.

• Prerequisite: FRNH 1202, FRNH 1302, or placement test; international business majors only.

FRNH 2202 Intermediate French 2—BSIB (4 SH)
Continues FRNH 2201. Designed to meet the special needs of international business students. Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current French periodicals.

• Prerequisite: FRNH 2201, FRNH 2301, or placement test; international business majors only.

FRNH 2301 Intermediate French Immersion 1 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

FRNH 2302 Intermediate French Immersion 2 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
FRNH 2900 Specialized Instruction in French (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.

- **Repeatability:** May be repeated without limit.

FRNH 3101 Advanced French 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

- **Prerequisite:** FRNH 2102, FRNH 2302, or placement test.

FRNH 3102 Advanced French 2 (4 SH)
Builds on FRNH 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

- **Prerequisite:** FRNH 3101 or FRNH 3301.

FRNH 3201 Advanced French 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Stresses the fundamentals of French to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary French novel or a French cultural reader, screenplay, or collection of short stories. Strives to help students read and comprehend modern French writing with confidence, and to be able to talk and write about it in good French. Provides preparation for advanced courses.

- **Prerequisite:** FRNH 2202, FRNH 2302, or placement test; international business majors only.

FRNH 3202 Advanced French 2—BSIB (4 SH)
Continues FRNH 3201. Focuses on advanced conversation and composition work for international business students. Is the final language course before students go abroad. Enhances and reinforces those practical language and communication skills that students will encounter when they are abroad.

- **Prerequisite:** FRNH 3201 or FRNH 3301; international business majors only.

FRNH 3301 Advanced French Immersion 1 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

FRNH 3302 Advanced French Immersion 2 (4 SH)
Designed for students who are in a French-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

FRNH 3800 Special Topics in French (1 to 4 SH)
Focuses on a unique aspect of the French language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).

- **Prerequisite:** At least an intermediate level of skill in the language.
- **Repeatability:** May be repeated up to 3 times.

FRNH 3900 Specialized Instruction in French (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.

- **Prerequisite:** At least an advanced level of competence in the language.
- **Repeatability:** May be repeated without limit.

FRNH 4201 Advanced Proficiency French 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on FRNH 3202. Offers students an opportunity to continue building vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.

- **Prerequisite:** FRNH 3202 or FRNH 3302; international business majors only.

FRNH 4202 Advanced Proficiency French 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on FRNH 4201. Offers students an opportunity to continue building vocabulary and master fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.

- **Prerequisite:** FRNH 4201; international business majors only.
FRNH 4800 Special Topics in French (1 to 4 SH)
Focuses on a unique aspect of the French language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

FRNH 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NU path: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

FRNH 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

FRNH 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

FRNH 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

FRNH 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

GAME 1110 Recitation for GAME 1110 (0 SH)
Provides small-group discussion format to cover material in GAME 1110.

GAME 1850 Experimental Game Design (4 SH)
Explores traditions of games, play, participation, and procedurality in twentieth-century art movements, including Dada, Surrealism, Fluxus, conceptual art, the Situationists, Happenings, participatory performance and Tactical Media, avant-garde music, and contemporary art games. Through readings, lectures, and studio assignments, offers students an opportunity to understand and apply key principles by creating a series of artworks using various strategies drawn from these traditions, including appropriation, scores, intervention, and expression.
- NU Core: Arts level 1.

GAME 2010 The Business of Games (4 SH)
Surveys a wide array of game-specific industry topics, including pitching and development of talking points, business models and revenue structures, studio organization and style, intellectual property, contracts, project management expectations, project green-lighting, production pipelines, return on investment, outsourcing, and marketing. Exploring historical shifts and evolution of the video game market offers students an opportunity to obtain perspective on the status of the industry and potential growth in the economy.

GAME 2150 Programming for Games (4 SH)
Offers students an opportunity to build computer game components and small complete games that explore physical principles in games, artificial intelligence, collision detection, and particle systems while gaining familiarity with common game engine libraries.
- Prerequisite: CS 2500 and MATH 1260.

GAME 2200 Games and Learning (4 SH)
Describes the classical work on the relationship of play to learning and real life. Focuses on how players learn in and from games. Discusses how learning theories and principles relate to the design of entertainment games and games for impact. Also explores how game mechanisms can be applied beyond games such as in websites and education. Offers students, both in individual and group assignments, an opportunity to analyze and design game mechanisms to support learning, including writing game reviews and developing game concepts. Culminates in a final project in which students need to develop an analog or digital prototype.
- Prerequisite: PSYC 1101 and sophomore standing or above.
- NU path: Exploring creative expression and innovation, analyzing and using data.
GAME 2355 Narrative for Games (4 SH)
Examines and explores the structure and aesthetics of narrative, specifically in games. Begins by breaking down narrative into its various component parts that include, but are not restricted to, linear/branching narrative, emergent/inherent narrative, narrative obstacles, game pacing and narrative clock, character objectives, protagonist/antagonist, player/character, momentum and emotional journey, and tragic/comic elements. Offers students an opportunity to understand each narrative component through detailed case studies and the creation of narrative artifacts.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• NUpath: Exploring creative expression and innovation.

GAME 2500 Foundations of Game Design (4 SH)
Seeks to define the practice of game design within the larger context of playful interaction design, while constantly maintaining a player-centric approach. Unfolds the process of designing games between phases of analysis, synthesis, and evaluation. Establishes the role of game designer as an expert with a vision for determined player experiences and a vocal advocate for players. Seeks to offer students a broad methodology consisting of brainstorming methods, prototyping techniques, process management practices, and evaluation procedures to solve a wide array of design problems in an iterative manner.
• NUpath: Exploring creative expression and innovation.

GAME 2555 Games for Change (4 SH)
Offers students sound introduction to the psychological and behavioral theories of entertainment media with the goal of implementing these theories to the future design and evaluation of games for change. Focuses more on the psychological, behavioral, and social aspects of video games than on pure technical aspects. Organized around a collection of selected readings and real-world games and discussions. The final project is based on reflective thinking, critical evaluation, and creative application.
• Cross-list: COMM 2555.
• NUpath: Exploring creative expression and innovation.
• Equivalent: COMM 2555.

GAME 2650 Introduction to Game Research Methods (4 SH)
Surveys research methods and epistemologies relevant to game researchers, designers, and artists, including experimental studies; analytics, formal and historical analysis; ethnography; qualitative social research; and design research. Engages students in lectures, readings, and game faculty guest lectures presenting practical examples of methods discussed in the class. Seeks to familiarize students with core literatures on games, library research, and research design through a series of hypothetical research project drafts and the completion of a research project using a specific method covered in the class.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.

GAME 2750 Games Criticism and Theory (4 SH)
Covers fundamental theories of art, meaning-making, expression, cultural reflection, and criticism concerning media, games, and playful artifacts. Assigns several papers that offer students an opportunity to choose and apply different critical lenses to games, game criticism, and their own gameplay experience. A long-form paper allows students to train writing theoretically informed and argumentatively cogent critical presentations of games and gameplay experience.
• Prerequisite: GAME 1110 or GAME 2500 (either of which may be taken concurrently).
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

GAME 2755 Games and Social Justice (4 SH)
Analyzes games from a social justice perspective, encouraging students to consider issues of social stereotyping, normalization, exclusion, and inequity as they apply to games from all sectors of the industry. Discusses and analyzes games using a variety of social theories from a diverse set of fields, including gender studies, critical race theory, and LGBTQ studies. Provides a studio setting in which students have an opportunity to engage in critical making of playable experiences that are based upon and deeply integrate social justice theories in their design.

GAME 2950 Game Studio (4 SH)
Offers an experiential learning course in which students collaborate with faculty on a project for credit, which may include research, game creation, or a combination of the two. Offers students an opportunity to co-produce a publishable, distributable, or exhibitable game and/or research paper, which can become part of the student’s portfolio. Course may be taught by an individual faculty member or team-taught to explore a specific topic, such as documentary games, art games, physical interfaces, installations, historical games, live-action role-playing, etc. Offers students an opportunity to gain experience working on a real-world project, as well as being credited for collaboration with an established practitioner/researcher.
• Prerequisite: GAME 1110, GAME 2500, GAME 2650 (the latter may be taken concurrently), and sophomore standing or above.
• NU Core: Experiential learning.
• Repeatability: May be repeated once.
GAME 3055 Playful Design (4 SH)
Covers how to design for playful engagement across contexts. Surveys basic theories and findings on play in ethology, evolutionary psychology, developmental psychology, anthropology, sociology, and philosophy through readings and discussion. Through lectures and exercises, familiarizes students with traditional design areas of play (toys, playgrounds, amusement parks) and the history, theory, patterns, and methods of evoking playfulness in contexts beyond games, toys, and playgrounds. Encourages students to apply these insights into portfolio work by creating playful experience prototypes across media.
• Prerequisite: (a) ARTF 1122 or GAME 1110 and (b) sophomore standing or above.
• NUpath: Exploring creative expression and innovation.

GAME 3150 Game Design Algorithms (4 SH)
Seeks to extend student knowledge of common algorithms used in game design. Explores issues of cross-platform coding, midscale games, networked games, dynamic content systems, and working in a team-based coding environment. Working in small groups, students have an opportunity to develop and optimize a multiplayer game over the course of the semester.
• Prerequisite: GAME 2150.

GAME 3250 Artificial Intelligence for Games (4 SH)
Seeks to extend student knowledge of artificial intelligence techniques used in game design. Explores finite state machines, goal-driven agent behavior, graphs, in-game scripting, path finding, and fuzzy logic. Offers students an opportunity to work in pairs to develop intelligent agents to navigate a variety of game scenarios. Combines student projects competitively and collaboratively to test the robustness of the artificial intelligence solutions.
• Prerequisite: GAME 2150.

GAME 3300 Game Interface Design (4 SH)
Analyzes both successful and unsuccessful game interfaces from a historical and cultural perspective. Uses interactive design assignments to offer students an opportunity to develop an understanding of game user interface design standards. Encourages students to develop innovative interface designs that support new game content models.
• Prerequisite: GAME 1110.

GAME 3400 Level Design and Game Architecture (4 SH)
Analyzes game-level designs in a variety of genres and forms. Building upon basic drawing and design skills, students have an opportunity to develop paper prototypes and simple game “mods” in the context of story and game play. Students use computer-based tools to examine story and game play. Encourages students to take this elective in preparation for or in parallel to the Game Projects courses.
• Prerequisite: GAME 1110; ARTF 1122 and ARTF 1124 recommended (required for combined majors).
• NUpath: Exploring creative expression and innovation.

GAME 3700 Rapid Idea Prototyping for Games (4 SH)
Studies digital and nondigital prototyping techniques through weekly activities in which students build and critique prototypes around a variety of game design themes. Offers students an opportunity to build a portfolio of small proof-of-concept game prototypes over the course of the semester. Additionally, covers how to iterate on a single prototype through a semestrlong project in which students have an opportunity to work individually on a larger game design.
• Prerequisite: GAME 1110 or GAME 2500.
• NUpath: Exploring creative expression and innovation.

GAME 3800 Game Concept Development and Production (4 SH)
Offers student teams an opportunity to conceptualize, design, document, and develop a complete game, including content, level design, user interface, and game mechanics as specified in design documents. Offers a set of brainstorming techniques. Students segment the concepts into individual systems and prototype them in an iterative manner, formally iterating over the whole game to improve the player experience. Requires students to maintain a schedule and project management documents. Results in the presentation of the complete game for critique.
• Prerequisite: (a) GAME 3700 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

GAME 3899 Topics in Game Design (4 SH)
Offers a lecture or studio course in game design on a topic not regularly taught in a formal course. Topics may vary from offering to offering.
• Repeatability: May be repeated up to 3 times.
GAME 4055 Motivational Game Design (4 SH)
Explores what motivations drive human behavior and how design
can be used to motivate behavior in games. Offers students an
opportunity to learn the main research models and findings about
fun, enjoyment, and motivation, as well as to explore how design
patterns facilitate these engaging qualities and how to apply this
knowledge in practice through readings, lectures, autobiographical
research, and the co-creation of a wiki of design lenses.
• Prerequisite: GAME 2500 and junior or senior standing.

GAME 4155 Designing Imaginary Worlds (4 SH)
Offers students an opportunity to learn to conceive, design, and
convey imaginary worlds across a wide range of media. The
crafting of fictional worlds has become an important skill in the
media landscape, whether for video and tabletop games, comic
books, novels, film, or television. Analyzes existing works in
diverse genres such as fantasy, science fiction, superhero, and
supernatural worlds. Explores, through creative projects, the ways
in which the use of different media are suited to portray different
aspects of an imaginary world.
• Prerequisite: Junior or senior standing; restricted to students in
  the College of Arts, Media and Design, the College of Computer
  and Information Science, and the College of Engineering.
• NUpath: Exploring creative expression and innovation.

GAME 4355 Game Scripting (4 SH)
Offers students an opportunity to understand the basic principles
of game engines and how to control games and game engines
through relatively simple scripting techniques. Examines several
different game engines, including those where scripting is visual
and those where scripting is textual. Studies critical concepts,
including the game loop and triggering/collision events. Offers
students an opportunity to propose scripts to add to games and to
work in teams to devise these scripts (pair programming) and the
associated presentations (proposal and completed work). Students
choose game engines and scripts to implement based on critical
analysis of existing games and on their own aspirations for being
innovative game designers.
• Prerequisite: (a) CS 2500 or IM 3250 and (b) junior or senior
  standing.

GAME 4700 Game Design Capstone 1 (4 SH)
Offers the first course in a two-semester capstone sequence. Offers
students an opportunity to take on individual roles in a large-group
project, creating a complete game from preproduction through
implementation and testing. Students spend the first half of the
first semester developing a proposal and testing ideas through
simple prototypes, building on their skills from GAME 3700 and
GAME 3800. Students then have an opportunity to spend the
second half of the first semester, and all of the second semester,
developing, play-testing, and iteratively refining a multi-level
game.
• Prerequisite: GAME 3800.
• NU Core: Experiential learning.
• NUpath: Demonstrating thought and action in a capstone.

GAME 4701 Game Design Capstone 2 (4 SH)
Continues GAME 4700. Offers students an opportunity to
continue developing, play-testing, and iteratively refining the
multilevel game begun in GAME 4700.
• Prerequisite: GAME 4700.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought
  and action in a capstone.

GAME 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research
or produces a product related to the student’s major field.
Combined with Junior/Senior Project 2 or college-defined
equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

GAME 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student
conducts research or produces a product related to the student’s
major field.
• Prerequisite: GAME 4970.
• Repeatability: May be repeated without limit.

GAME 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty
supervision.
• NUpath: Integrating knowledge and skills through experience.

GAME 4992 Directed Study (1 to 4 SH)
Provides study for the student whose unique academic needs or
interests cannot adequately be satisfied in any of the scheduled
courses of the department.
• Repeatability: May be repeated up to 3 times.

GAME 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the
department on a chosen topic. Course content depends on
instructor.
• Repeatability: May be repeated without limit.
GAME 4994 Internship (4 SH)
Provides students an opportunity for internship work.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

GAME 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
- NU Core: Experiential learning.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

GAME SCIENCE AND DESIGN (GSND)

GSND 5110 Game Design and Analysis (4 SH)
Provides theoretical background and foundation for analyzing and designing games. Examines fundamental domains that are necessary to understand what games are and how they affect players, including but not limited to interface design, level design, narrative, learning, and culture. Presents relevant concepts and frameworks from a wide variety of disciplines—psychology, phenomenology, sociology, anthropology, media studies, affect theories, learning theories, and theories of motivation—for each domain. Explains the core elements of game design, introduces students to formal abstract design tools, explores several models of design process and iteration, and offers students an opportunity to practice game design in groups.
- Prerequisite: Senior or graduate standing; restricted to students in selected colleges.
- Corequisite: GSND 5111.

GSND 5111 Seminar for GSND 5110 (1 SH)
Offers students an opportunity to discuss and analyze selected games, applying concepts from GSND 5110. Exposes students to a varied mix of AAA and indie titles and demonstrates how to analyze and appreciate them.
- Prerequisite: Senior or graduate standing; restricted to students in selected colleges.
- Corequisite: GSND 5110.

GSND 5122 Business Models in the Game Industry (1 SH)
 Examines the underlying business structure of the interactive digital entertainment industry and the characteristics of the various participants, notably developers and publishers. Seeks to deliver insight into key business models within the game industry and how the economic challenges interact. Explores the game business landscape across the industry spectrum, ranging from AAA, mobile, casual to indie development. Examines market strategies currently in practice and how they are linked with game analytics. Topics range from retail vs. online, free-to-play modes vs. pay-to-play, as well as basic monetization and distribution channels. Designed to serve as an overview of the various stakeholders in the industry and how they interact.
- Prerequisite: Senior or graduate standing; restricted to students in selected colleges.

GSND 5130 Usability and Empirical User Research (4 SH)
Focuses on methods and methodologies from human-computer interaction (HCI) and their use in different applications, including apps, Web applications, games, and virtual worlds. Covers the basics of user-oriented evaluation, associated topics, and usability methods. Introduces the design process, usability heuristics, HCI paradigms, task models, and cognitive models. Examines quantitative and qualitative analysis of data. Offers students an opportunity to delve into experimental design, institutional-review-board approvals, ethics, research subject recruitment, and experiment implementations. Applies concepts through concrete projects, case examples, and exercises. Expects students to be running assignments continually and trying out different evaluation methods and methodologies.
- Prerequisite: Senior or graduate standing; restricted to students in selected colleges.

GSND 6240 Exploratory Concept Design (4 SH)
Explores the process of designing new modalities of interaction utilizing novel uses of established technology, e.g., pervasive and affective technologies. Focuses on philosophy and practice of creating and evaluating experimental interactions. Recontextualizes gameplay concepts through permutations of basic elements such as controls, platforms, cameras, interfaces, etc. Leverages constraints as vehicles to push the boundaries of accepted design. Explores four key approaches to experimental interaction through course projects and assignments: discovering, examining, and exploring potential new technologies and interaction principles; rapidly designing and prototyping experimental interactions; pitching, justifying, and explaining designs and prototypes to others; and addressing new technologies and forms of interaction from a research perspective, focusing on their larger implications and potential impact on play.
- Prerequisite: Restricted to students in selected colleges.
GSND 6250 Spatial and Temporal Design (4 SH)
Explores the development and understanding of spaces used by people in 3D and 2D virtual environments. Uses an iterative process of making, criticizing, experiencing, and analyzing spatial form; compositional ideas for form making; and critical thinking. Offers students an opportunity to develop the arbitrary, yet necessary, mind-set needed to make assumptions about aesthetic spatial values and expected player behaviors. Analyzes the connection between spatial-aesthetic elements and their effects on players’ psyches. Experiments with how spaces, textures, shapes, and colors can support different synchronous moods. Explores how to shape spaces that fit the rational, emotional, and behavioral profile of different types of players. Applies concepts learned from architecture and game-level design to extend students’ creative and critical abilities.

- Prerequisite: Restricted to students in selected colleges.

GSND 6320 Psychology of Play (4 SH)
Explores theories of perception, motivation, needs, learning, goals, and belief systems as they pertain to games and play. Examines psychological principles, including visual and audio perception, emotions, behavior, personality, and the more recent scientific discoveries around psychological models explaining play behavior or motivation theories behind play. Introduces how players learn in and from games based on the relationship of play to learning theories. Forms a solid theoretical basis for a new segmentation tool—psychographics. Explores visual and cultural archetypes, digging into comics, movie sets, and cartoons to distillate what makes people tick in certain ways relating to universal theories of perception and gestalt theories. Applies the theories through critical analysis of play behavior and games.

- Prerequisite: GSND 5110; restricted to students in selected colleges.

GSND 6330 Game User Research (4 SH)
Focuses on topics of player psychology—cognition; memory; emotions; attention; and game-focused theories such as engagement, fun, user experience, player-need-satisfaction model, and flow. The development cycle of any game relies on the understanding of the players, the target market of the game product. Covers game usability engineering and game-specific evaluation methods, such as play testing, rapid iterative testing and evaluation (RITE), play-heuristic evaluation, and retrospective play reviews. Offers students an opportunity to learn how to analyze qualitative and quantitative data and to apply parametric and nonparametric statistical evaluation methods, qualitative data coding and analysis, and descriptive statistics. Requires students to apply visualization techniques of data and reporting.

- Prerequisite: (a) GSND 5130 or (b) both CS 5340 and CS 6350; restricted to students in selected colleges.

GSND 6340 Advanced Game User Research (4 SH)
Builds on GSND 6330, covering the domain of psycho-physiological testing and more advanced statistics. Introduces theory and research in major areas of human psychology, including cognition, emotions, and attention. Studies the principles, theory, and applications of psycho-physiological assessment inside and outside interactive digital entertainment. Offers students an opportunity to understand the basics of eye tracking—eye movements, fixations, saccades. Applies methods of data collection, cleaning, and analysis for both physiological and eye-tracking data. Covers all issues of using such measurements, including validity of conclusions and confounding variables. Covers the process of triangulation and repotting in-depth along the entire process of the game production life cycle.

- Prerequisite: GSND 6330; restricted to students in selected colleges.

GSND 6350 Game Analytics (4 SH)
Introduces the topic of game analytics, defined as the process of discovering and communicating patterns in data with a goal of solving problems and developing predictions in user behavior supporting decision management, driving action, and/or improving game products. Covers the fundamental tools, methods, and principles of game analytics, including the knowledge-discovery process, data collection, feature extraction and selection, pattern recognition to aid in prediction and churn analysis, visualization, and reporting. Covers analytics across game forms, notably online games and delivery platforms. Presents analytical tools recommended during development and tools designed for ongoing maintenance of games.

- Prerequisite: Restricted to students in selected colleges.

GSND 6984 Research (1 to 4 SH)
Offers students an opportunity to conduct research under faculty supervision.

- Prerequisite: Game science and design students only.

- Repeatability: May be repeated up to 4 times.

GSND 7990 Thesis (4 SH)
Focuses on preparing a master’s thesis under faculty supervision.

- Prerequisite: Game science and design students only.

GSND 7995 Games Project (4 SH)
Offers students an opportunity to obtain practical experience working on a project with a faculty member. Allows students to work with faculty in the program to develop their own project and apply the knowledge gained through the master’s courses.

- Prerequisite: Restricted to students in selected colleges.

GSND 7996 Thesis Continuation (0 SH)
Offers continued work on the thesis project.

- Prerequisite: GSND 7990; game science and design students only.
GENERAL ENGINEERING (GE)

GE 1000 Introduction to the Study of Engineering (1 SH)
Presents an introduction to the various disciplines of engineering and strategies for success in the classroom, within the profession, and within the University community. Provides an initial orientation to engineering cooperative education. Covers the support services provided by both college and University and explores the richness of our community’s diversity. Defines diversity, and offers students the opportunity to study and understand diverse cultures and communities in the academic environment. Oral presentations are required.

GE 1110 Engineering Design (4 SH)
Presents the engineering design process using case studies for a variety of engineering disciplines. Develops problem-solving skills used in engineering design. Introduces students to the use of spreadsheet tools to solve engineering problems including data reduction, and visualization of data and functions. Design topics include problem formulation and specification, creativity, evaluation tools, patents, ergonomics, system design, manufacturing, ethics in engineering, and presentation techniques. Presents engineering graphics focusing on developing three-dimensional visualization skills and computer-aided design (CAD) application. Students develop an original design solution to a technical problem as a term project.
• NU Core: Science/technology level 1.
• Equivalent: GENR 1110.

GE 1111 Engineering Problem Solving and Computation (4 SH)
Uses a structured approach to solve engineering problems. Draws applications from a variety of engineering disciplines, which serve as a tool for introducing students to engineering analysis and design. Introduces a math application package for matrix applications and various real-life engineering problems. Includes the design of problem-solving algorithms using a high-level programming language.
• NU Core: Science/technology level 1.

GE 1201 Alternative Energy Technologies Abroad (4 SH)
Offers an interdisciplinary course that seeks to build an understanding of alternative energy systems and technologies and how they can impact the environment. Emphasizes how energy resources are being utilized currently in the United States and abroad and shows the need for new alternative energy technologies and their impact on sustainability. Introduces a variety of alternative/renewable energy technologies and their environmental impact. Lecturers include industry leaders in the field. Offers students an opportunity to visit companies to learn how these engineering technologies are being implemented. Aims to explain relevant alternative energy technologies in an interactive environment, where students engage in the field and examine their impact on society.
• Repeatability: May be repeated without limit.

GE 1202 Engineering Innovation and Discovery Abroad (4 SH)
Offers students an opportunity to apply engineering design principles to identify societal needs in the community abroad and propose real-life solutions that can be used to work with the local citizens to help improve their quality of life. Students actively engage in fieldwork with community members and help identify problems, societal needs, and the challenges to implementing technological solutions through innovation and social entrepreneurship. Project fieldwork includes, but is not limited to, local university peer partnerships; site visits with local families, businesses, and agricultural areas; and community service projects.
• Repeatability: May be repeated without limit.

GE 1210 Scientific Revolutions Abroad (4 SH)
Studies two revolutions in scientific thought—the Scientific Revolution of the seventeenth and eighteenth centuries and the computational revolution of the twentieth century. The Scientific Revolution gave scientists optimism that, in principle, they could understand everything about the world around them. In contrast, the revolutions in complexity, logic, computation, mathematics, and physics of the twentieth century put fundamental limits on what scientists could know and understand. Taught in Italy, this course explores the natural connections between the history of science taking place during the Italian Renaissance and scientific sites, including local museums, observatories, universities, laboratories, and archaeological sites. This material is contrasted with key results from chaos theory, computational complexity, logic, physics, quantum mechanics, and the theory of computation, all developed in the twentieth century.

GE 1501 Cornerstone of Engineering I (4 SH)
Introduces students to the engineering design process and algorithmic thinking using a combination of lectures and hands-on projects and labs while encouraging critical thinking. Offers students an opportunity to develop creative problem-solving skills used in engineering design, to structure software, and to cultivate effective written and oral communication skills. Topics include the use of design and graphics communication software, spreadsheets, a high-level programming language, programmable microcontrollers as well as various electronic components, and 3D printing. Requires students to develop an original design solution to a technical problem as a final term project.
• Prerequisite: Engineering students only.
GE 1502 Cornerstone of Engineering 2 (4 SH)
Continues GE 1501. Introduces students to a math application package for matrix applications along with various real-life engineering problems solved using programming. Seeks to further bolster real-life thinking by considering ethical reasoning in design and analysis, including ethical theories, professional codes, and emerging micro/macro issues in engineering. All quantitative tools and ethical topics are introduced separately and then woven into all design and problem-solving stages of the student projects. Additional topics include 3D assembly drawings and modeling, along with review and further work in design. Students work on open-ended design problems and develop working models and prototypes to demonstrate and present their designs.
• Prerequisite: GE 1501 (may be taken concurrently); engineering students only.
• NUpath: Employing ethical reasoning.

GE 2000 Introduction to Engineering Co-op Education (1 SH)
Provides students preparation for the first co-op experience. Focuses on skills that provide a basis for successful co-op engagement including expectations and requirements, an introduction to professional credentials, résumé construction, self-assessment and goal setting, interviewing, professional and co-op ethics, issues of diversity in the workplace community, academic planning and decision making, and an introduction to career portfolios.
• Prerequisite: GE 1000.

GE 2361 Mathematical Methods for Engineers (4 SH)
Covers applications to applied mechanics, thermofluids, and dynamics/control problems relevant to engineering. Topics include differential equations applied to modeling and characterization of processes, linear algebra used for multidimensional and complex system computations and modeling, and statistics and probability used for controls and signal analysis, among other applications. Introduces the foundational basis for approximate methods of engineering analysis, including its application to finite element analysis.
• Prerequisite: MATH 1342.
• NU Core: Mathematical/analytical thinking level 2.

GE 2400 Limits on Scientific Knowledge: Chaos, Complexity, and Computability (4 SH)
Explores the principle of determinism, the belief that the future behavior of a system can be completely determined from its current state. This fundamental philosophy guided researchers from the ancient Greeks to Newton as they developed the laws of physics, chemistry, astronomy, and mathematics, which culminated in Newton's laws of motion. Focuses on four important conceptual challenges, discovered during the twentieth century, which reduce the applicability of determinism and limit our ability to understand our world: chaos, complexity, uncertainty, and noncomputability. Discusses the dramatic effect these limits have had on diverse scientific disciplines and how scientists and engineers work to overcome them.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
• NUpath: Writing intensive in the major.

GE 3000 Professional Issues in Engineering (1 SH)
Provides students with an opportunity to reflect on both academic and co-op experiences in the context of planning for the senior year and beyond. Issues include professional and ethical issues, resolving ethical conflicts, awareness of engineers as professionals in a diverse world, strengthening decision-making skills, career portfolios, and lifelong learning needs, goals, and strategies. Students reflect upon issues of diversity from their experience in the University and in their cooperative education placements. Explores the role of different work and learning styles and diverse personal characteristics on the workplace and the classroom. Professional issues include impact of the cultural context, both in the United States and around the world, on the client, government relations, and the workplace.
• Prerequisite: Junior or senior standing.

GE 3300 Energy Systems: Science, Technology, and Sustainability (4 SH)
Offers students an opportunity to obtain a sound scientific, technological, and economic understanding of our modern energy system and the challenge of energy sustainability. Covers principles of energy, work, and thermodynamics; technologies from supply and demand side, including extraction of primary energy, conversion into fuels and electricity, important energy end-uses, and energy losses; fossil, nuclear power plants, and renewable energy technologies (wind, solar, wave, hydro, geothermal, biofuels); transmission and distribution for electricity and fossil fuels; energy demand by buildings, transportation, and industry, emphasizing efficient technologies; sustainability concepts, including net energy/exergy analysis and life-cycle assessment, energy-related emissions, decentralized generation, smart grids, district heating, and net-zero energy facilities.
• Prerequisite: (a) MATH 1241, MATH 1250, or MATH 1341 and (b) PHYS 1151, PHYS 1161, or PHYS 1171.
GE 4608 Nanotechnology in Engineering (4 SH)
Explores a wide range of new technologies based on, or influenced by, breakthroughs in nanoscience. Includes such nanotechnologies (the refinement of functional properties of materials, devices, or systems that are in at least one dimension smaller than 100 nm) as spintronics, quantum computing, carbon nanotube electronics, nanoparticle cancer remediation strategies, biomolecular electronics, and nanomachines. A general goal is the engineering of new or enhanced macroscopic properties from nanostructure or nanoscale materials and components. Offers students an opportunity to become well versed in this important burgeoning field through review of the scientific literature, classroom lecture, seminars by international leaders of nanotechnology, and student team projects.
• Prerequisite: Senior standing.
• Equivalent: CHME 4608, EECE 4608, and ENGR 4608.

GE 4900 Career Management (1 SH)
Provides an interactive course designed to enhance an engineering student’s professional and career-related education through a series of classes taught by managers, engineers, and other professionals with industry experience. Topics include career services resources, developing skills to be an effective manager, the balance between personal and professional life, mentors, making career choices, time management vs. energy management, and others.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

GE 4993 Independent Study (1 to 4 SH)
Focuses on a subject that crosses traditional engineering boundaries.
• Prerequisite: Senior standing.
• Repeatability: May be repeated without limit.

GE 5000 Special Topics in Engineering (4 SH)
Offers a course in which content is determined by the instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated up to 3 times.

GE 5010 Customer-Driven Technical Innovation for Engineers (4 SH)
Studies the role of engineering innovation in addressing customer needs in early start-ups and the need to conceive successful innovative engineering design as part of a commercialization strategy. Emphasizes understanding how engineering innovation can meet real technical market needs and how to gather the necessary, relevant technical information early in the innovation process to produce a successful engineering design. Uses a series of practical engineering design projects to demonstrate how students can assess the technical capabilities of the start-up in producing an innovative design, how to communicate with customers in an iterative engineering design process, and how to correspondingly design and innovate to meet customer technical requirements.
• Prerequisite: Junior, senior, or graduate standing.

GE 5020 Engineering Product Design Methodology (4 SH)
Studies the iterative engineering design cycle of technology-intensive devices and tools with a focus on end-user technical specifications. Expects students to develop an engineering device or tool in a team-based workshop environment. Functional product concepts are generated by assessing technical needs of the intended user and refining the designs through testing with the end user. Focuses on methods of soliciting and documenting user technical feedback, relating that feedback to technical product requirements and specifications, and considering engineering manufacturing aspects. This course does not cover concepts in lean or rapid prototyping or methodologies relevant to services.
• Prerequisite: Junior, senior, or graduate standing.

GE 5030 Iterative Product Prototyping for Engineers (4 SH)
Seeks to develop in-depth knowledge and experience in prototyping by focusing on engineering processes and instrumentation that are used in different industries. Studies the prototyping cycle, from initial process flow and sketching to prototype development to testing and analysis, with an emphasis on iteration. Analyzes how different kinds of engineering prototypes can address design and user-interface needs vs. functional needs, such as looks-like and works-like prototypes. Offers students an opportunity to obtain operating knowledge of methods including 3D printing, SolidWorks, off-the-shelf hardware-software interfaces, simulation, embedded systems, product testing, prototype analysis, and prototype iteration.
• Prerequisite: Junior, senior, or graduate standing.
GE 5100 Product Development for Engineers (4 SH)
Focuses on the main processes needed to develop a complex, high-technology product. Emphasizes the most important techniques and approaches used in a startup environment. Seeks to benefit students of all engineering disciplines including computer science and biomedical, industrial, electrical, mechanical, computer, and chemical engineering. Includes a running practical project in which a new product is designed and executed through a series of small projects for each phase of the product development process. Topics include the product life cycle, new product development processes, project planning and management, new product idea generation, the systems approach to product development, design for manufacturing, market testing and launch, and escalation to manufacturing.
• Prerequisite: Junior, senior, or graduate standing.

GENERAL STUDIES (GENS)

GENS 1101 Transitioning, Learning, and Connecting Seminar (1 SH)
Designed to enhance academic success and help students transition to university life and academics. Uses a multimedia approach, diverse perspectives, and collaborative learning to challenge students to examine their assumptions and values by analyzing, synthesizing, and evaluating contemporary social issues and trends in popular culture. Emphasizes exploration of academic and career interests for student life-long success.
• Prerequisite: Specific programs only.

GENS 1102 Strategic Thinking and Learning Seminar 2 (1 SH)
Continues GENS 1101. Emphasizes the theme of ethics and values by examining choices and challenges faced by individuals and groups during some key events of historical significance. Encourages students to reflect on their generation and current social problems using literature, media, and technology. Addresses the sophomore transition process to the destination colleges.
• Prerequisite: Freshman standing only.

GENS 1102 Transitioning, Learning, and Connecting Seminar 2 (1 SH)
Effective Spring 2017
Continues the exploration of academic and career interest for life-long success. Focuses on research, argumentation, and oral presentations. Addresses the sophomore transition process to the destination colleges.
• Prerequisite: Specific programs only.

GRMN 1101 Elementary German 1 (4 SH)
Designed for students with very little or no prior knowledge of German. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in German. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.
• Prerequisite: GRMN 1101, GRMN 1301, or placement test.

GRMN 1102 Elementary German 2 (4 SH)
Continues GRMN 1101. Includes completion of basic grammatical usage, reading of contemporary German material, and increased stress on oral and aural skills.
• Prerequisite: Specific programs only.

GRMN 1101 Elementary German 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Designed for students with very little or no prior knowledge of German. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in German. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources.
• Prerequisite: GRMN 1201, GRMN 1301, or placement test; international business majors only.

GRMN 1202 Elementary German 2—BSIB (4 SH)
Continues GRMN 1201. Designed to meet the special needs of international business students. Includes completion of basic grammatical usage, reading of contemporary German material, and increased stress on oral and aural skills.
• Prerequisite: GRMN 1201, GRMN 1301, or placement test; international business majors only.

GRMN 1301 Elementary German Immersion 1 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
GRMN 1302 Elementary German Immersion 2 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GRMN 2101 Intermediate German 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary German materials.
• Prerequisite: GRMN 1102, GRMN 1302, or placement test.

GRMN 2102 Intermediate German 2 (4 SH)
Builds on GRMN 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary German materials.
• Prerequisite: (a) GRMN 2101, GRMN 2301, or placement test and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

GRMN 2151 Intermediate German for Business Purposes (4 SH)
Designed for learners who possess the equivalent of one year of German study. Emphasizes communicating in a business environment by tailoring grammar and sentence pattern coverage, vocabulary, and cultural topics to the business setting. Combines contemporary business topics and intermediate business German. Offers students an opportunity to learn to communicate in a business setting in Germany, orally and in writing, as well as to better understand the current business culture in Germany.
• Prerequisite: GRMN 2101, GRMN 2201, GRMN 2301, or permission of instructor.

GRMN 2201 Intermediate German 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Stresses more advanced German to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze contemporary German texts. Practice includes watching German films, and participating in interviews in German.
• Prerequisite: GRMN 1202, GRMN 1302, or placement test; international business majors only.

GRMN 2202 Intermediate German 2—BSIB (4 SH)
Continues GRMN 2201. Designed to meet the special needs of international business students. Provides opportunities to expand vocabulary and develop flexibility in the four basic language skills. Topics include grammar review and continued exposure to modern texts and business language usage.
• Prerequisite: GRMN 2201, GRMN 2301, or placement test; international business majors only.

GRMN 2301 Intermediate German Immersion 1 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Focuses on standard German. Continues development of grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GRMN 2302 Intermediate German Immersion 2 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GRMN 2900 Specialized Instruction in German (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.

GRMN 3101 Advanced German 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: GRMN 2102, GRMN 2302, or placement test.

GRMN 3102 Advanced German 2 (4 SH)
Builds on GRMN 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: GRMN 3101 or GRMN 3301.
GRMN 3201 Advanced German 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Strives to develop facility in speaking and writing German and stresses active use of the language. Includes weekly composition assignments and grammar reviews as needed.
- Prerequisite: GRMN 2202, GRMN 2302, or placement test; international business majors only.

GRMN 3202 Advanced German 2—BSIB (4 SH)
Continues GRMN 3201. Offers advanced conversation and composition work for international business students. Is the final language course before students go abroad. Enhances and reinforces those practical language and communication skills students will encounter when they are abroad.
- Prerequisite: GRMN 3201 or GRMN 3301; international business majors only.

GRMN 3301 Advanced German Immersion 1 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Focuses on standard German as well as the local dialect. Continues development of grammatical and conversational competence.

GRMN 3302 Advanced German Immersion 2 (4 SH)
Designed for students who are in a German-speaking country, this is an off-campus immersion course. Focuses on standard German as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

GRMN 3800 Special Topics in German (1 to 4 SH)
Focuses on a unique aspect of the German language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an intermediate level of skill in the language.
- Repeatability: May be repeated up to 3 times.

GRMN 3900 Specialized Instruction in German (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

GRMN 4201 Advanced Proficiency German 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on GRMN 3202. Offers students an opportunity to continue to build vocabulary and master the fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
- Prerequisite: GRMN 3202 or GRMN 3302; international business majors only.

GRMN 4202 Advanced Proficiency German 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on GRMN 4201. Offers students an opportunity to continue to build vocabulary and master the fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
- Prerequisite: GRMN 4201; international business majors only.

GRMN 4800 Special Topics in German (1 to 4 SH)
Focuses on a unique aspect of the German language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

GRMN 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

GRMN 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

GRMN 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated up to 3 times.

GRMN 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.
GRMN 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

GREEK (GREK)

GREK 1101 Elementary Modern Greek 1 (4 SH)
Designed for students with very little or no prior knowledge of modern Greek, this course provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. Uses an instructional approach, with practical vocabulary drawn from realistic situations, and aims at good pronunciation and ease in response. Incorporates helpful information about daily life in Greece and the varied cultures within the world of Greek speakers. Uses extracurricular practice to complement class work, enable students to work aloud at their own speed, reinforce their acquisition of essential structures, and acquaint them with a vast library of audiovisual resources.

- **Prerequisite:** GREK 1101 or GREK 1301.

GREK 1102 Elementary Modern Greek 2 (4 SH)
Continues GREK 1101. Reviews and continues the study of grammar and basic language skills. Offers progressively more intensive practice in oral and written communication. Uses laboratory practice to complement class work, enable students to work aloud at their own speed, reinforce their acquisition of essential structures, and acquaint them with a vast library of audiovisual resources.

- **Prerequisite:** GREK 1101 or GREK 1301.

GREK 1301 Elementary Greek Immersion 1 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GREK 1302 Elementary Greek Immersion 2 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GREK 2101 Intermediate Greek 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Greek materials.

- **Prerequisite:** GREK 1102 or GREK 1302.

GREK 2102 Intermediate Greek 2 (4 SH)
Builds on GREK 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Greek materials.

- **Prerequisite:** (a) GREK 2101 or GREK 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.

GREK 2301 Intermediate Greek Immersion 1 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GREK 2302 Intermediate Greek Immersion 2 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

GREK 2900 Specialized Instruction in Greek (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.

- **Repeatability:** May be repeated without limit.

GREK 3101 Advanced Greek 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

- **Prerequisite:** GREK 2102 or GREK 2302.

GREK 3102 Advanced Greek 2 (4 SH)
Builds on GREK 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

- **Prerequisite:** GREK 3101 or GREK 3301.
GREK 3301 Advanced Greek Immersion 1 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

GREK 3302 Advanced Greek Immersion 2 (4 SH)
Designed for students who are in a Greek-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

GREK 3800 Special Topics in Greek (1 to 4 SH)
Focuses on a unique aspect of the Greek language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an intermediate level of skill in the language.
- Repeatability: May be repeated up to 3 times.

GREK 3900 Specialized Instruction in Greek (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

GREK 4800 Special Topics in Greek (1 to 4 SH)
Focuses on a unique aspect of the Greek language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

GREK 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated up to 3 times.

GREK 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

GREK 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

HEALTH INFORMATICS (HINF)

HINF 0200 Health and Medicine for Nonclinicians (3 SH)
Examines the social organization of healthcare in the United States, including discussion of the settings in which healthcare is provided and the role of public and private organizations in funding and regulating healthcare. Provides an overview of how the biological aspects of the body integrate with the psychological and social aspects of the mind to influence both health behavior and healthcare delivery. Offers an opportunity to gain an understanding of how individuals, healthy and ill, access the healthcare system and move within the system to secure the appropriate level of care. Introduces basic healthcare terminology.

HINF 5101 Introduction to Health Informatics and Health Information Systems (3 SH)
Introduces the history and current status of information systems in healthcare: information architectures, administrative and clinical applications, evidence-based medicine, information retrieval, decision support systems, security and confidentiality, bioinformatics, information system cycles, the electronic health record, key health information systems and standards, and medical devices.
- Prerequisite: (a) Junior, senior, or graduate standing and (b) enrollment in Graduate Health Informatics Program.
HINF 5102 Data Management in Healthcare (3 SH)
Explores issues of data representation in healthcare systems, including patient and provider identification, audit trails, authentication, and reconciliation. Discusses underlying design of repositories for electronic health records (EHRs) and computerized provider order entry (CPOE) systems. Includes an overview of privacy issues, legislation, regulations, and accreditation standards unique to healthcare.
- Prerequisite: Junior, senior, or graduate standing.

HINF 5105 The American Healthcare System (3 SH)
Covers the organization, financing, and outcomes of the U.S. healthcare system. Studies opportunities and challenges to improve the cost and quality of healthcare and expand adequate coverage to all.
- Prerequisite: Enrollment in Health Informatics Graduate Program; non–health informatics students may be able to take the course with permission of the program director.

HINF 5110 Global Health Information Management (3 SH)
Studies the challenges of managing health information systems in the United States, Canada, India, China, the United Kingdom, Saudi Arabia, Singapore, Taiwan, Ghana, and Malawi. Differences in healthcare systems and national regulations make the process slightly different in each country. By exploring environments with varying degrees of regulation, students have an opportunity to think critically about the impact that a nation’s environment has on health information management. Discusses case studies to encourage students to think about health informatics from a managerial perspective across private companies, government, and nongovernment organizations.

HINF 5200 Theoretical Foundations in Personal Health Informatics (4 SH)
Offers an introduction to and foundation for personal health informatics by reviewing major theories and models of health behavior change and health education at individual, interpersonal, and community levels in a wide variety of settings and populations. Health behavior change is arguably our greatest hope for reducing the burden of preventable physical and mental disease and death around the world. A thorough understanding of health behavior change theories is thus essential to developing and translating personal health interface technologies into practice and policy that can result in more powerful interventions and more robust theories. Emphasizes cultural and health disparities, global applications, advances in health communications, and the use of electronic media (e-health) and mobile media (m-health).
- Prerequisite: (a) Senior standing and permission of instructor or (b) graduate standing.

HINF 5300 Personal Health Interface Design and Development (4 SH)
Explores the design of innovative personal health human–computer interface technologies. Examples include assistive technologies that aid persons with disabilities, consumer wellness promotion applications, patient education and counseling systems, interfaces for reviewing personal health records, and elder care and social network systems that monitor health and support independent living. Offers students an opportunity to work in teams to build a prototype personal health interface system to solve a real problem. Topics include needs assessment and participatory research, iterative user interface design methods for health interface development, computational sensing of health states and behavior, software architectures for iteratively testing prototype personal health interface technologies, human-computer interaction issues related to personal health technology, and technology transfer requirements to support future validation studies of technology.
- Prerequisite: Senior or graduate standing.

HINF 5301 Personal Health Technologies: Field Deployment and System Evaluation (4 SH)
Explores the deployment and evaluation of innovative personal health technologies. In this project-based course, students work in teams to deploy and evaluate a prototype personal health technology that has been previously developed by students in HINF 5300. Offers students an opportunity to develop a research plan to measure the effectiveness, usability, and/or feasibility of the technology; recruit study participants; deploy the technology; and analyze the data collected. Also offers students an opportunity to learn about each of these steps and work toward producing a publishable-quality research paper on the technology and results of the efficacy study, as well as to prepare a grant application that extends the technology and research methodology. Additional topics include technology transfer and implications on health policy.
- Prerequisite: Junior, senior, or graduate standing.

HINF 5976 Directed Study (3 SH)
Offers students an opportunity to examine standard health informatics material in fresh ways or new health informatics material that is not covered in formal courses.
- Prerequisite: Health informatics students only.
- Repeatability: May be repeated up to 2 times.
HINF 6201 Organizational Behavior, Work Flow Design, and Change Management (3 SH)
Reviews the concepts, issues, and practices of organizational behavior at the individual, group, and organizational levels. Offers an opportunity to learn how to gather information from users and understand the users’ point of view and problems. Examines processes and work flow in healthcare environments. Seeks to explain organizational structures and analyze business processes and how they are translated into specifications to build a RFP for vendors. Also examines fundamentals of organizational behavior and change management.

HINF 6202 Business of Healthcare Informatics (3 SH)
Focuses on the business practices relating to health information technology. Includes departmental design and management, capital and operating budgets, the budget planning process, and infrastructure design and strategic planning. Other topics include evaluation of vendors, vendor selection, clinical administration systems, and the design and management of integrated delivery networks.

HINF 6205 Creation and Application of Medical Knowledge (3 SH)
Explores the relationship between clinical data and clinical knowledge and how both are developed and deployed in organizations to support improvements in patient care and research. Topics covered include what medical data is available and how it should be accessed, analyzed, and organized to support evidence-based medicine and research. Analyzes current and future approaches to clinical decision support and expert system development and how they can be deployed via new or existing knowledge-management infrastructures.

HINF 6210 Data Management in Healthcare (3 SH)
Explores issues of data representation and retrieval in healthcare systems, including patient and provider identification, clinical data, audit trails, authentication, and reconciliation. Discusses underlying design of repositories for electronic health records (EHR), computerized provider order entry (CPOE), and enterprise data warehousing and reporting systems and mechanisms for data sharing and transfer. Includes an overview of privacy issues, legislation, regulations, and accreditation standards unique to healthcare.

HINF 6215 Project Management (3 SH)
Introduces students to managing healthcare informatics projects, including the tools and techniques used to manage small, medium, and large software and systems projects. Topics include project planning, project management tools, estimating, budgeting, human resource management, and the like. All phases of a project are discussed, and students are required to develop a project plan for a health informatics project as part of the course.

HINF 6220 Database Design, Access, Modeling, and Security (3 SH)
Designed to provide an introduction to the theory and application of database management systems. Topics covered include the relational model, basic and intermediate query formulation using structured query language, database design using the entity relational model, and database normalization and optimization. In addition to these traditional topics, this course covers a sample of emerging topics relevant to the healthcare professional, including personal health information, privacy and security considerations, XML as a data model, and clinical data warehousing and mining.

HINF 6225 Health Systems Lab (3 SH)
Provides an in-depth, small-group, and class experience in the process of identification, evaluation, and selection of healthcare technology systems to improve the quality and efficiency of healthcare and generate maximal return on investment for organizations in healthcare.
- Prerequisite: HINF 5101 and enrollment in Graduate Health Informatics Program or permission of program director.

HINF 6230 Strategic Topics in Programming For Health Professionals (3 SH)
Designed to provide an introduction to the theory and application of object-oriented programming. Topics related to the process of programming include establishing an environment, naming conventions, and troubleshooting. Coverage of principles of programming include variables, operators, and flow control. Object-oriented principles of inheritance, encapsulation, and polymorphism are implemented using Java.
- Prerequisite: HINF 5101 and enrollment in Graduate Health Informatics Program or permission of program director.

HINF 6240 Improving the Patient Experience through Informatics (3 SH)
Explores the current and future dynamics influencing care for patients. The patient experience is a key differentiator in delivery of healthcare. Technology makes a difference for the patient in both the delivery of advanced care applications and innovation. Discusses and explores technology and workflow enhancements that could work to improve the patient experience from a cost, quality, and care perspective. Examines best practices and organizations and evaluates how they are using informatics to deliver a better patient experience. Analyzes change management and why change is difficult within healthcare and explores case studies on how to make change happen and the role that change plays in connection with technology. People, process, and technology all need to be present to offer an ideal experience.
HINF 6325 Legal and Social Issues in Health Informatics (3 SH)
Introduces the ethical, legal, and social issues arising in the use of computerized technology and information systems in the delivery of healthcare. Case studies are used to discuss the role of law in the design and implementation of health informatics systems; the U.S. healthcare regulatory environment; and the structure, concepts, and process of decision making on health matters in legislative, administrative, and judicial bodies.
• Prerequisite: HINF 5101; full-time students can take HINF 6325 concurrently with HINF 5101 with permission of program director.

HINF 6330 Emerging Technologies in Healthcare (3 SH)
Examines trends and drivers of innovation in general and in healthcare and how emerging technologies are adapted and evaluated. Introduces students to how emerging technologies are being applied to improve electronic health records, computerized provider order entry systems, regional health information organizations, personal health records, telemedicine, new imaging systems, robotic surgery, pharmacogenomics, and national-level biosurveillance.
• Prerequisite: HINF 5101.

HINF 6335 Management Issues in Healthcare Information Technology (3 SH)
Uses case studies to identify typical issues confronting chief information officers in healthcare organizations, including human resource management, strategic planning, project management, vendor contract negotiations, budgeting, service levels, etc.
• Prerequisite: HINF 5101.

HINF 6340 Introduction to Genomics and Bioinformatics (3 SH)
Introduces the study of genes and their function and the principles, concepts, methods, and tools used to process data from biological experiments, focusing particularly on biological sequence data. Includes topics such as DNA and protein sequence alignment and analysis, sequence analysis software, and database searching.
• Prerequisite: HINF 5101.

HINF 6345 Design for Usability in Healthcare (3 SH)
Focuses on the design of usable, user-centered information technology (IT), particularly healthcare IT applications. Covers interaction design principles and methods and the role, function, and appropriate use of various design approaches.
• Prerequisite: HINF 5101 and enrollment in Health Informatics Graduate Program; non-health informatics students may be able to take the course with permission of the program director.

HINF 6350 Public Health Surveillance and Informatics (3 SH)
Offers students an opportunity to learn how public health information is generated, collected, transferred, and shared. Discusses the principles and practice of public health surveillance as well as the application of health informatics standards and methods in the design of surveillance systems. Also reviews the core components of analysis and interpretation of population data.
• Prerequisite: HINF 5101 and enrollment in Health Informatics Graduate Program; non-health informatics students may be able to take the course with permission of the program director.

HINF 6355 Key Standards in Health Informatics Systems (3 SH)
Reviews the different healthcare informatics standards for storing and exchanging data in healthcare technology systems. Covers where and how they are used, where and why they are not used, and an overview of some of the types of products available to facilitate their use. Seeks to demystify the details behind the standards. Offers students an opportunity to work through examples in small groups in class and discuss issues involving the standards’ adoption and use.
• Prerequisite: HINF 5101 and enrollment in Health Informatics Graduate Program; non-health informatics students may be able to take the course with permission of the program director.

HINF 6400 Introduction to Health Data Analytics (3 SH)
Introduces the field of health data analytics. Topics include understanding stakeholder needs; the variety of types of health data; software tools; as well as case studies from pharma, public health, electronic health records, claims data, and home-monitoring data. Emphasizes the importance of understanding the complexity and potential biases in how health data (direct or indirect) is collected and represented. Presents all data-analytic discussions within a context of health data and stakeholder information needs. Offers students an opportunity to practice presenting the results of analyses.

HINF 6404 Patient Engagement Informatics and Analytics (3 SH)
Studies patient engagement and health informatics systems and analyses of data collected from these systems. Patient engagement is the ability and willingness of patients to manage their own health and care combined with interventions to increase patient involvement in their own health and care, as well as other positive health behaviors. In these interventions, health informatics systems and analyses of data are used. Offers students an opportunity to engage in data analytic exercises to investigate the underlying design and implementation of health informatics systems used in patient engagement initiatives. Presents an overview of the current state, new technologies, and other areas (health reform, legal, privacy, quantified self) influencing the future direction of patient engagement.
HINF 6405 Quantifying the Value of Informatics (3 SH)
Examines the various ways in which health informatics delivers value to organizations. Organizations invest in informatics because they believe that doing so will enable them to meet their objectives. The course offers students a series of tools to use to quantify value, which can help them to articulate and assess the value of potential investments in informatics. Examines case studies to offer students an opportunity to practice articulating the value of informatics in real settings.

HINF 7370 Health Informatics Internship (1 SH)
Offers a form of experiential learning in which students do unpaid work off-campus in healthcare-related workplace settings. It is appropriate for students without professional experience in a healthcare-related organization who are not enrolling in co-op. Students are expected to work collaboratively with the instructor to identify an appropriate site placement. Faculty members provide guidance and mentoring and work collaboratively with on-site supervisors.
• Prerequisite: Enrollment in Health Informatics Graduate Program; students should consult with the program director and determine a site placement prior to registering for this course.

HINF 7701 Health Informatics Capstone Project (3 SH)
Offers students an opportunity to integrate knowledge gained in the classroom with real-world problems. Consists of practical work and research in a major area of health informatics. Potential areas of work include design or analysis of health informatics systems, programs, or applications; program planning; and policy development. Encourages community-based participatory projects. To the extent possible, capstone projects have as a goal an active contribution to the health informatics field. Students initiate and design capstone projects in consultation with working professionals. Faculty members provide guidance and mentoring.
• Prerequisite: Completion of at least three semesters of graduate study in health informatics; students should consult with the program director and mutually agree on a project prior to the start of the semester.

HINF 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HINF 8982 Readings (1 to 8 SH)
Offers selected readings under the supervision of a faculty member. Personal health informatics PhD students only.

HINF 9996 Dissertation Continuation (0 SH)
Continues work with the agreement of a dissertation supervisor.
• Repeatability: May be repeated up to 14 times.

HEALTH SCIENCE (HSCI)

HSCI 1000 College: An Introduction (1 SH)
Provides an introduction to the University, college, and health professions to enhance students’ understanding of self and the decisions they make academically and socially as members of the University’s diverse, multicultural community. Group activities and individual assignments along with active participation in a learning community help students adjust to life on an urban campus, develop a better understanding of the learning process, acquire essential academic skills, and make connections with the faculty and students in the college.
• Prerequisite: Health science majors with freshman standing only.

HSCI 1105 Nutrition (4 SH)
Explores the fundamental role of nutrition in promoting health and introduces the use of two different diet assessment tools to assist individuals in selecting food for health promotion. Explores the nutrient composition and purposes of the food pyramid guide. Covers the physiological functions of energy-providing nutrients in the body and interrelationships.
• NUpath: Engaging with the natural and designed world.
• Equivalent: HSCI 0150, HSCI 1106, and HSCI 1107.

HSCI 1106 Contemporary Issues in Nutrition (4 SH)
Explores the fundamental role of nutrition in promoting health. Offers an overview of nutrient functions, compositions, and digestion/absorption. Relates concepts covered in class to current topics of interest in nutrition. Offers students an opportunity to discuss their dietary behaviors in relation to the Dietary Guidelines for Americans.
• Prerequisite: Not open to Bouvé students.
• NUpath: Engaging with the natural and designed world.
• Equivalent: HSCI 0150, HSCI 1105, and HSCI 1107.
HSCI 2000 Professional Development for Bouvé Co-op (1 SH)
Introduces students to the Bouvé Cooperative Education Program and provides them with the opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Students also have an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Familiarizes students with workplace issues relative to their field of study and teaches them to use myNEUCOOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.

• Prerequisite: Bouvé students only.

HSCI 4510 Healthcare Ethics (4 SH)
Provides students with the opportunity to explore complex ethical issues that arise in clinical practice in the health professions. Particular attention is directed at the concepts of “do no harm,” quality of life, and conflict resolution. Patients’ rights and the protection of their confidentiality, privacy, and personal prerogatives are central to the course. Established legal cases are explored to assess the presence of ethical considerations. The role of the health professional in fostering a patient’s autonomy and implementing his/her own domain of professional responsibility is explored.

• Equivalent: HSCI 0110.

HSCI 4700 Health Science Capstone Introduction (0 SH)
Offers students an opportunity to integrate their course work, knowledge, and experiences to develop a proposal for a health science capstone project. The project is either research based or service based and is a culminating experience in the health science program. Upon completion and approval of the proposal, the student works with a mentor or mentors to implement their project in HSCI 4720 or HSCI 4730.

• Prerequisite: Senior standing; health science students only.

HSCI 4710 Health Science Capstone (4 SH)
Provides students with the opportunity to integrate their course work, knowledge, and experiences into a project that results in a written report and presentation regarding an issue within the field of health or healthcare, a culminating experience in the health science program. May include working with a mentor in a field experience in public health education or health policy, public affairs, social service, or other healthcare environment in which the student is qualified, ending with a presentation to the seminar class. Presenting to the agency or group students are working with on their projects may be required.

• Prerequisite: Senior standing; health-science majors only.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• Equivalent: HSCI 4720 and HSCI 4730.

HSCI 4720 Health Science Capstone—Service (4 SH)
Offers students an opportunity to integrate their course work, knowledge, and experiences into a project that results in a written report and presentation regarding an issue within the field of health or healthcare. The project is a culminating experience in the health science program. Includes working with a mentor in a field experience in public health education or health policy, public affairs, social service, or other healthcare environment in which the student is qualified. Requires students to present their projects to the seminar class and possibly to the agency or group with which they are working.

• Prerequisite: HSCI 4700 and senior standing; health science students only.
• NU Core: Capstone.
• Equivalent: HSCI 4710 and HSCI 4730.
HSCI 4730 Health Science Capstone—Research (4 SH)
Offers students an opportunity to integrate their course work, knowledge, and experiences into a project that results in a written report and presentation regarding an issue within the field of health or healthcare. The project is a culminating experience in the health science program. Students may choose to participate in an ongoing research project or create and implement their own research project as their capstone project. Requires students to present their projects to the seminar class and possibly to present a poster at a professional/research expo.
• Prerequisite: HSCI 4700 and senior standing; health science students only.
• NU Core: Capstone.
• Equivalent: HSCI 4710 and HSCI 4720.

HSCI 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

HSCI 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: HSCI 4970.
• Repeatability: May be repeated without limit.

HSCI 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

HSCI 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HSCI 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HSCI 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

HSCI 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

HSCI 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

HSCI 5230 Clinical Nutrition Applications in Health and Disease (3 or 4 SH)
Prepares health professionals to effectively communicate principles of diet and nutrition to their clients and the public. Covers public health promotion strategies, techniques used to teach diet and nutrition, and behavioral theories used in diet and nutrition intervention. Emphasizes clinical applications for the treatment of weight disorders, diabetes, cardiovascular disease, eating disorders, and nutrition in the life cycle.
• Prerequisite: Junior, senior, or graduate standing.

HSCI 5300 Patient-Centered Health Informatics (3 SH)
Introduces students to the ways in which personal health technologies (interactive computing applications used directly by nonprofessionals—social networking applications, mobile apps, and online communities) can support health promotion. This technology is transforming health promotion and management, and increased access presents opportunities as well as challenges. Covers three broad topics: the current state of disruptive technology in healthcare, empirical methods for establishing requirements for the design of new technologies, and designing innovative personal health technologies. Offers students an opportunity to learn the ways in which technology is transforming self-care and self-management and the skills to identify opportunities for future technological innovation.
• Prerequisite: Junior, senior, or graduate standing; Bouvé students only.
HEALTH SCIENCE, INTERDISCIPLINARY (HLTH)

HLTH 1010 From the Community to the Intensive Care Unit: Approaching Interdisciplinary Research in the Elderly (1 SH)
Exposes students to the current interdisciplinary research activities of Bouvé faculty from several professions (e.g., pharmacy, nursing, physical therapy, and counseling psychology) focused on improving the health of the elderly. The dramatic increase in the proportion of Americans who are elderly provides healthcare professionals with a golden opportunity to improve the health outcome of this population through interdisciplinary research efforts. Uses a seminar-discussion format designed to help increase the awareness among students of the importance of clinical research in the elderly and the unique role that different healthcare professionals can play in leading interdisciplinary research teams across a spectrum of different clinical settings.
• Prerequisite: Bouvé students only.

HLTH 1200 Basic Skills for the Healthcare Professional (2 SH)
Introduces health science students to the basic skills necessary to be successful in entry-level healthcare positions. These skills include: Basic Life Support, safe patient handling, vital signs, oxygen transport and safety, and EKG prep and placement. Also covers basic medical terminology, appropriate professional behaviors, and communication skills.
• Corequisite: HLTH 1201.

HLTH 1201 Lab for HLTH 1200 (1 SH)
Accompanies HLTH 1200. Provides students with hands-on opportunities to learn skills in Basic Life Support, safe patient handling, determining vital signs, oxygen transport and safety, EKG prep and placement, and related clinical skills.
• Corequisite: HLTH 1201.

HLTH 1510 Introduction to Healthcare Ethics (4 SH)
Explores ethical issues in contemporary healthcare. Introduces theories and applies frameworks for analyzing and deciding ethical dilemmas. Considers biomedical, clinical, social, and legal issues related to ethical issues and integrates such considerations into ethical decision making. Offers students an opportunity to explore ethical issues and experiences of individual interest to assist in clarifying professional values and ethics.
• Prerequisite: Restricted to students in Bouvé College of Health Sciences.
• NU Core: Humanities level 1.
• NUpath: Employing ethical reasoning.

HLTH 1555 Special Topics in Healthcare (4 SH)
Offers an introductory-level study of contemporary issues in healthcare. Draws upon a variety of perspectives. Offers students an opportunity to expand their breadth of knowledge and to facilitate their understanding of various themes grounded in a particular area of healthcare.
• Prerequisite: Freshman, sophomore, or junior standing; Bouvé students only.
• Repeatability: May be repeated once.

HLTH 2000 Foundations of Coordinated Patient Care (2 SH)
Introduces the opportunities and challenges of interprofessional collaborative practice in healthcare. Sessions focus on the dynamics of interprofessional teams and teamwork, values and ethics, communication, and roles and responsibilities in influencing patient care. Interprofessional collaborative practice is an important mechanism for improving patient outcomes.
• Corequisite: HLTH 2200.

HLTH 2200 Emergency Medical Technician Training (6 SH)
Offers students an opportunity to learn basic healthcare clinical skills and seeks to prepare students to function as emergency medical technicians (EMTs) at the basic life support level. EMTs are an essential component of prehospital emergency medical service (EMS) systems. This course seeks to establish a solid foundation in EMS, broadly including patient assessments, medical emergencies, trauma emergencies, relevant pharmacology, special populations, and EMS operations.
• Corequisite: HLTH 2000.

HLTH 2240 Human Development (2 SH)
Studies typical development and maturation from intrauterine life through old age (senescence). Considers the interaction of body system development and growth on acquisition of and changes in typical skill development. Students are encouraged to apply developmental concepts to case studies and hypothetical clinical situations. Particular attention is paid to infant, childhood, and early adult development as a foundation to the changes that occur later in adulthood and senescence. Addresses physical assessment of the infant and child.
• Prerequisite: (a) BIOL 1119 and PSYC 1101 or (b) permission of instructor; physical therapy students should have completed PSYC 3404.
HLTH 2302 Alternative Medicine (4 SH)
 Presents an objective assessment and discussion of alternative and complementary medical approaches used in the United States and their significant historical, cultural, and cross-cultural implications. The majority of alternative and complementary medical strategies were developed in a specific historical and cultural context. Some of the therapies have had an impact on human health for thousands of years. Others have become popular only recently. Many methods discussed are fused with different cultural practices, such as the concept of “vitalism,” a force that modern science does not recognize but is an important attribute in certain cultural practices. Some methods have long and successful histories based upon sophisticated ancient medical theories, such as “Chi,” found in Chinese medicine.
  • Prerequisite: Sophomore standing or above.
  • NU Core: Comparative study of cultures.

HLTH 2655 Special Topics in Healthcare (4 SH)
 Offers an intermediate-level study of contemporary issues in healthcare. Draws upon a variety of perspectives. Offers students an opportunity to expand their breadth of knowledge and to facilitate their understanding of various themes grounded in a particular area of healthcare.
  • Prerequisite: Sophomore standing or above.
  • Repeatability: May be repeated once.

HLTH 4525 Community Service Learning (3 SH)
 Addresses topics of public policy, advocacy, and cultural diversity within the context of physical therapy and the populations it serves. Combines class discussion regarding these topics with service to community partners and local underserved populations, such as the urban poor, elderly, children, and minorities. Students perform one to two hours of approved volunteer community service per week. May be taken in place of PT 5227.
  • Prerequisite: HLTH 3450.
  • NU Core: Experiential learning.

HLTH 4526 Community Service Learning 2 (3 SH)
 Students not continuing from HLTH 4525 have the option to join an existing project or begin a project at a new site, selected with the assistance of an instructor. Students continue with the service learning projects developed in HLTH 4525, adding health-promotion material and critically applying information from the previous course to develop a decision memo addressing a public or social issue relevant to their project site. Students perform one to two hours of approved volunteer community service per week.
  • Prerequisite: HLTH 4525.

HLTH 4992 Directed Study (1 to 4 SH)
 Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Repeatability: May be repeated without limit.

HLTH 4993 Independent Study (1 to 4 SH)
 Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Repeatability: May be repeated without limit.

HLTH 5000 Research (4 SH)
 Offers an opportunity to conduct research under faculty supervision.
  • Prerequisite: (a) MATH 2280 and junior or senior standing or (b) graduate standing.
  • Corequisite: HLTH 5001.

HLTH 5001 Recitation for HLTH 5000 (0 SH)
 Provides small-group discussion format to cover material in HLTH 5000.
  • Prerequisite: Junior, senior, or graduate standing.
  • Corequisite: HLTH 5000.

HLTH 5002 Mindfulness: Theory and Practice (3 SH)
 Studies key aspects of theory and practical principles of mindfulness practice. Mindfulness is a particular way of paying attention to experiences that has been scientifically researched and found to decrease habitual and destructive cycles of thought and emotion. This course is highly experiential and daily homework practice consists of at least 20 minutes of mindfulness practice. Instructions for the various practices are provided throughout the course. Each class typically includes a didactic portion, a mindfulness practice, and a group discussion. The benefits of mindfulness practice include reduced stress, improved attention, reduced emotional reactivity, and greater mind-body awareness. Offers students an opportunity to develop practical skills of relational mindfulness in interactions with others and to cultivate positive emotions.
  • Prerequisite: Junior, senior, or graduate standing.

HLTH 5005 Introduction to Health and Aging (3 SH)
 Offers students an opportunity to obtain core knowledge of health and aging from an interprofessional perspective. Using current literature and research, this course integrates the sociological, legal, psychological physical, cognitive-communicative, and sensory (e.g., auditory) aspects of aging in multicultural, political, and economic ecological contexts.
  • Prerequisite: Bouvé students only.
HLTH 5010 Health and Aging: Special Considerations (3 SH)
Uses the World Health Organization’s International Classification of Functioning, Disability, and Health to continue with the themes introduced in HLTH 5005. Focuses in greater depth on health and aging from typical and atypical perspectives. Using current literature and research, this course integrates the sociological, legal, psychological, physical, cognitive-communicative, and sensory aspects of aging in multicultural, political, and economic ecological contexts.
• Prerequisite: HLTH 5005; Bouvé students only.

HLTH 5015 Health Assessment in Older Adults (3 SH)
Offers an overview of health assessment in older adults by encompassing physical, psychosocial, cognitive-communicative, sensory, and emotional health domains. It is important to consider each of these domains and how they contribute to the individual’s overall functioning and quality of life. Geriatric health assessment assists in identifying health-related problems, coordinating care, determining need for long-term care, developing treatment plans, and evaluating optimal use of healthcare resources.
• Prerequisite: HLTH 5010; Bouvé students only.

HLTH 5020 Seminar and Capstone Project: Contemporary Issues in Aging (3 SH)
Offers students an opportunity to integrate the material from HLTH 5005, HLTH 5010, and HLTH 5015 into their areas of particular interest and discipline specialty—to integrate the mental, spiritual, physical, cognitive-communicative, multicultural context, and sensory (e.g., auditory) aspects of aging into current theory, research, and application.
• Prerequisite: HLTH 5015; Bouvé students only.

HLTH 5101 Professional Development for Bouvé Graduate Co-op (1 SH)
Introduces graduate students to the Bouvé Cooperative Education Program and provides them with the opportunity to develop job-search and career-management skills. Offers students an opportunity to perform assessments of their workplace skills, interests, and values and to discuss how they impact personal career decisions. Students also have an opportunity to prepare a professional-style resume, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Seeks to familiarize students with workplace issues relative to their field of study and to teach them to use myNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.
• Prerequisite: Junior, senior, or graduate standing.

HLTH 5105 Introduction to Early Intervention (3 or 4 SH)
Introduces students to the field of early intervention. Covers the principles of early intervention, including the interdisciplinary nature of the services to infants and toddlers with disabilities and their families and the team formats in which services are provided. Students are also introduced to the Massachusetts EI (early intervention) standards, eligibility criteria, and the legislation that underlies EI services. Uses a case-based approach, with role-play, to explore some aspects of the developmental approach to assessment and intervention. Taught by a number of faculty from different disciplines on the early intervention team and open to all students in the Bouvé College of Health Sciences.
• Prerequisite: Junior, senior, or graduate standing.

HLTH 5135 Developing an Interdisciplinary Approach to Health Management for Older Adults (4 SH)
Focuses on health management for older adults, a major issue in contemporary society. Policy, economics, organizational structure, and clinical care are intermingled in responding on societal, institutional, and clinical levels. Challenges the inquisitive and creative student to approach the health of the older adult by addressing these complex issues. Focuses on effective outcomes and understanding the range of roles professionals may adopt. Provides the knowledge base and skill set necessary for interdisciplinary professional practice. Contact the course coordinator at least one month prior to the start of the course for admission.
• Prerequisite: Junior, senior, or graduate standing.

HLTH 5160 Psychosocial Considerations for Healthcare Professionals (3 SH)
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness and disability. Students explore the role and impact of self-awareness on the dynamics of healthcare interactions. Methodologies are utilized to demonstrate the roles of the various health professions and importance of interdisciplinary collaboration to maximize patient/client outcomes in this interdisciplinary course.
• Prerequisite: Junior, senior, or graduate standing.

HLTH 5174 Psychosocial Management (2 SH)
Examines the diverse and cultural variations on patients’/clients’ responses to disability and illness. Offers students the opportunity to reflect on the provider’s behavior in relation to clients’ behaviors.
• Prerequisite: (a) PSYC 3404 or graduate standing and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing and (c) junior or senior standing or graduate standing.
• NU Core: Comparative study of cultures, writing intensive in the major.
HLTH 5280 The (in)Visibility of (dis)Ability in Society (3 or 4 SH)
Addresses the issues of disability relative to culture, public policy, rights, and advocacy. Focuses class discussion on the experiences of people with disabilities living in our current society as well as from a historical perspective. Explores the following topics: who is disabled, social attitudes toward people with disabilities, and images and stigma in the media. Also covers the language of disability, disability culture, and the forgotten minority. Affords students an opportunity to gain a broad understanding of the complex and dynamic issues and themes concerning people with disabilities.
  • Prerequisite: Junior, senior, or graduate standing.
  • NU Core: Comparative study of cultures.
  • NUpath: Engaging difference and diversity.
HLTH 5450 Healthcare Research (4 SH)
Provides an overview of the research process and its application in clinical arenas. Emphasizes the role of the health professional as a consumer of research, with concern for the ethical management and treatment of patients and their families. Elements of research design and their implications in clinical settings provide the framework for the analysis of research and the development of a research proposal. Also emphasizes the use of research findings for evidence-based practice. Encourages interdisciplinary projects.
  • Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students with junior, senior, or graduate standing.
  • NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
  • NUpath: Engaging with the natural and designed world, conducting formal and quantitative reasoning, writing intensive in the major.
  • Equivalent: HLTH 0500 and HLTH 3450.
HLTH 5451 Recitation for HLTH 5450 (0 SH)
Provides small-group discussion format to cover material in HLTH 5450.
  • Prerequisite: Junior, senior, or graduate standing.
  • Equivalent: HLTH 3451.
HLTH 5555 Special Topics in Healthcare (1 to 4 SH)
Offers an advanced-level study of contemporary issues in healthcare. Draws upon a variety of perspectives. Offers students an opportunity to expand their breadth of knowledge and to facilitate their understanding of various themes grounded in a particular area of healthcare.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated up to 5 times for up to 6 total semester hours.
HLTH 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated without limit.
HLTH 6243 Aging and Illness (3 SH)
Focuses on the distinction between normal aging and disease. Covers age-related physiological/pathophysiological changes at the level of the individual, organ system, organ, tissue, and cell. Includes a consideration of the lexicon of aging, major biological theories of aging, as well as alteration of physiological parameters in aging. Emphasis is on disease states commonly encountered in older adults. Also includes psychosocial theories of aging, discussion of “successful aging,” and the physical and psychosocial risks of hospitalization for the elderly. Presents characteristics of the ill older adult including acute confusion. Considers health promotion and levels of disease prevention in the geriatric client. Uses a case-based approach to develop critical-thinking skills related to the pragmatics of care for the elderly who are ill.
HLTH 6335 Health Law (2 SH)
This course examines the legal regulation of the provision of healthcare services. Much of the focus is on the relationship between law and healthcare policy. Topics include access to health insurance and healthcare, healthcare financing, malpractice liability, the organization and responsibility of healthcare institutions, especially hospitals, the regulation of the quality of care and the formulation of health policy. This course is highly recommended for all students enrolled in the JD/MPH dual degree program, but is open to others as well.
  • Equivalent: LAW 7335 and LW 7335.
HLTH 6411 Biotechnology Internship Reflection Seminar (1 SH)
Designed to complement learning during or after graduate co-op placement. Students participate in activities to integrate academic learning and experiential learning, including written reflections and weekly reports that do not have to include company confidential information.
HLTH 6512 Problems in Public Health Law (2 SH)
This course will explore the rationales for using law to protect and preserve the public’s health, the legal tools that may be used to achieve that end, and the conflicts and problems that may result from legal interventions. Topics discussed will include the use of law to reduce the spread of HIV and other infectious diseases, control of tobacco and other hazardous products, bioterrorism, and the threats TO CIVIL LIBERTIES AND MINORITY GROUPS engendered by all such legal efforts. This course is highly recommended for all students enrolled in the J.D./M.P.H. dual degree program, but is open to other students as well.
  • Equivalent: LAW 7512 and LW 7512.
HLTH 6600 Current Issues in Health Law and Policy (2 SH)
This seminar will examine recent debates in health law and policy through discussion of current events, proposed legislation, and scholarly articles in the legal, medical, and public policy literatures. Weekly topics will depend in part on student interest, but will likely include federal healthcare reform, malpractice liability reform, obesity, health disparities, regulation of pharmaceutical promotion, and other issues related to healthcare access, quality, and financing. Requirements include weekly readings, weekly attendance and participation, a brief presentation of one health law-related current event, a research paper of at least 20 pages on any approved health law-related topic, and an oral presentation of the research paper. Previous health-related coursework or work experience is recommended but not required.
* Equivalent: LAW 7600.

HLTH 6606 Drug Law and Policy (2 SH)
The field of Drug Law is vast, spanning the discovery, manufacture, distribution, and consumption of chemical agents designed to alter the human condition. This course focuses on three domains of the broader subject: the evolution and current state of the Federal Food, Drug, and Cosmetic Act; the architecture of the drug regulation system in the U.S., including the distinct space occupied by the Food and Drug Administration, the Department of Agriculture, and the Drug Enforcement Agency; and the role of regulation and tort litigation in harmonizing drug policy with science. Designed around legal and policy case studies, this course is intended for students expecting to become involved in clinical practice involving pharmaceuticals as well those generally interested in the interplay of law and public health.
* Equivalent: LAW 7606.

HLTH 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
* Repeatability: May be repeated without limit.

HEBRW 1102 Elementary Hebrew 2 (4 SH)
Continues HBRW 1101. Includes continued focus on oral expression, listening comprehension, and elementary reading and writing. Expands functional and practical vocabulary base drawn from realistic situations and focuses on grammatical accuracy. Continues to focus on good pronunciation and ease of response.
* Prerequisite: HBRW 1101 or HBRW 1301.

HBRW 1301 Elementary Hebrew Immersion 1 (4 SH)
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Focuses on standard Hebrew. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

HBRW 1302 Elementary Hebrew Immersion 2 (4 SH)
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Focuses on standard Hebrew. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

HBRW 2101 Intermediate Hebrew 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Hebrew materials.
* Prerequisite: HBRW 1102 or HBRW 1302.

HBRW 2301 Intermediate Hebrew Immersion 1 (4 SH)
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Focuses on standard Hebrew. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

HBRW 2302 Intermediate Hebrew Immersion 2 (4 SH)
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Focuses on standard Hebrew. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
**HBRW 2900 Specialized Instruction in Hebrew (1 to 4 SH)**
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
- **Repeatability:** May be repeated without limit.

**HBRW 3101 Advanced Hebrew 1 (4 SH)**
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
- **Prerequisite:** HBRW 2102 or HBRW 2302.

**HBRW 3102 Advanced Hebrew 2 (4 SH)**
Builds on HBRW 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
- **Prerequisite:** HBRW 3101 or HBRW 3301.

**HBRW 3301 Advanced Hebrew Immersion 1 (4 SH)**
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

**HBRW 3302 Advanced Hebrew Immersion 2 (4 SH)**
Designed for students who are in a Hebrew-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

**HBRW 3800 Special Topics in Hebrew (1 to 4 SH)**
Focuses on a unique aspect of the Hebrew language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- **Prerequisite:** At least an intermediate level of skill in the language.
- **Repeatability:** May be repeated up to 3 times.

**HBRW 3900 Specialized Instruction in Hebrew (1 to 4 SH)**
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- **Prerequisite:** At least an advanced level of competence in the language.
- **Repeatability:** May be repeated without limit.

**HBRW 4800 Special Topics in Hebrew (1 to 4 SH)**
Focuses on a unique aspect of the Hebrew language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- **Prerequisite:** At least an advanced level of skill in the language.
- **Repeatability:** May be repeated up to 4 times.

**HBRW 4991 Research (4 SH)**
Offers an opportunity to conduct research under faculty supervision.
- **NUpath:** Integrating knowledge and skills through experience.
- **Repeatability:** May be repeated without limit.

**HBRW 4992 Directed Study (1 to 4 SH)**
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- **Repeatability:** May be repeated without limit.

**HBRW 4993 Independent Study (1 to 4 SH)**
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability:** May be repeated up to 3 times.

**HBRW 5976 Directed Study (1 to 4 SH)**
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

**HBRW 5978 Independent Study (1 to 4 SH)**
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.
HIST 1110 Introduction to World History (4 SH)
Emphasizes large-scale patterns, long-term changes, and interconnections of world history. Provides a different way of looking at the past than national histories, one that is appropriate for the increasing globalization and multiculturalism of today’s world. The course may begin as early as the first settled towns or written documents, the appearance of the first humanoid species, or even the beginning of the universe. Examines the great continuities and changes that have brought us to where we are today. Explores links between global processes and individual experiences through primary documents, autobiographies, and stories.
• NU Core: Social science level 1.

HIST 1120 Public History, Public Memory (4 SH)
Explores the politics surrounding the creation and consumption of history outside the classroom. Draws on contemporary debates over memorials, museum displays, television and film, and other popular sources of historical information to answer the questions: How does memory become history? How, where, and why do people encounter and interpret history outside of the classroom? Why are certain versions of the past so controversial? Through readings, discussion, field trips, and assignments, offers students an opportunity to gain a deeper understanding of public history’s challenges and opportunities and to develop more informed opinions about its philosophical, ethical, and practical aspects.
• NU Core: Humanities level 1.

HIST 1130 Introduction to the History of the United States (4 SH)
Engages with the major issues in U.S. history. Topics include the interaction of native populations with European settlers, the American Revolution and the Constitution, slavery, the Civil War, industrialization and migration, the growth of government and rise of the welfare state, media and mass culture, struggles for civil rights and liberation, and America’s role in the world from independence to the Iraq wars.
• NU Core: Social science level 1.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: HSTY 1130.

HIST 1131 Recitation for HIST 1130 (0 SH)
Provides small-group discussion format to cover material in HIST 1130.

HIST 1140 Introduction to African-American History (4 SH)
Surveys the development of African Americans in the United States from their African background to the present. Covers medieval and early modern societies in West and Central Africa; the transatlantic slave trade; the evolution of slavery from the colonial period through the Civil War; free blacks; Reconstruction; migration; civil rights; and black nationalism. Considers gender relations throughout the entire period and emphasizes how an historical perspective helps to inform discussions of contemporary issues.
• NU Core: Comparative study of cultures, social science level 1.
• Equivalent: AFAM 1140.

HIST 1150 East Asian Studies (4 SH)
Seeks to provide an understanding of the constituent characteristics that originally linked East Asia as a region and the nature of the transformations that have occurred in the region over the last two thousand years. Concentrates on China and Japan, and addresses Korea and Vietnam where possible. Also seeks to provide students with effective interdisciplinary analytical skills as well as historical, ethical, cultural diversity, and aesthetic perspectives.
• Cross-list: ASNS 1150.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ASNS 1150.

HIST 1170 Europe: Empires, Revolutions, Wars, and Their Aftermath (4 SH)
Examines major themes in the history of Europe from 1500 to the present, emphasizing the conceptual tools historians use to think about European history, and drawing on historical documents, literature, and film. Examines the emergence of states and nations as theoretical constructs and political realities; men’s and women’s experience of social conflict-rebellions, revolutions, and wars-and the complex relationships between Europeans and non-Europeans. Attention is given to how race, class, and gender shaped the way people made and understood their history.
• NU Core: Social science level 1.

HIST 1171 Recitation for HIST 1170 (0 SH)
Provides small-group discussion format to cover material in HIST 1170.

HIST 1180 African History (4 SH)
Explores the history of the African continent from 1000 C.E. to the present era. Topics include medieveal kingdoms (Ghana, Mali, Songhai, Zimbabwe, the city-states of East Africa, and the Kongo kingdom); slave trades (Indian Ocean, trans-Saharan, and transatlantic); the partition of Africa and European colonization; and the decolonization process. Emphasizes the interactions of African peoples with the rest of the world, particularly the relations between Africa and Europe after 1500 C.E.
• Equivalent: AFRS 1180.
HIST 1185 Introduction to Middle Eastern History (4 SH)
Relies on historical and literary sources, as well as such other cultural artifacts as architecture and photography, and focuses on interaction and changing relations and perceptions between Europe and the Middle East. Surveys the major political and economic events that have linked the trajectory of both civilizations, as well as broad patterns of human activity, such as migrations, conversions, and, cultural exchange. Emphasizes the commonality of encounters, and analyzes the construction of an "other" and its enduring legacy in modern times.
• NU Core: Comparative study of cultures, social science level 1.

HIST 1187 Introduction to Latin American History (4 SH)
Surveys major themes in Latin American history from the arrival of the first human inhabitants until the present through a diversity of primary and secondary sources. Examines the social, cultural, political, and economic transformations that shaped Latin America during this period. Emphasizes how concepts of race, class, gender, and sexuality informed these changes and the people's experiences of them. Topics include migration, colonialism and postcolonialism, war and revolution, slavery and abolition, nationalism and nation building, democracy and despotism, urbanization, modernization, religion, imperialism and underdevelopment, human rights, drug policy and international relations, labor, the arts, popular culture, and the environment.
• NU Core: Social science level 1.
• NUpath: Interpreting culture, understanding societies and institutions.

HIST 1189 Introduction to South Asian History (4 SH)
Investigates the history of modern India and the debates surrounding the histories of the south Asian subcontinent. Examines topics such as the Mughal dynasties, the British Raj, the Indian nationalist movement, the influence of Mahatma Gandhi, independence, the partition of India into the new states of India and Pakistan, post-1947 India, and the effects of globalization and development initiatives in the Indian subcontinent. Engages themes that include colonialism, resistance, gender, social organization, religion, nationalism, development, and diaspora. Addresses popular conceptions of India as it has been represented in the West over time. Also draws upon Indian popular culture, literature, film, music, and media.
• NU Core: Social science level 1.

HIST 1190 Picturing Modernity: The Photographic Image in Culture and Society (4 SH)
Explores the role of the photographic image in culture and society from the early nineteenth century to the present day. Examines how the photographic image has altered cultural and perceptual patterns across the globe and investigates how cultural and social power have been influenced by photographs. Offers students an opportunity to read a cross-section of criticism, theory, and history and to study images and exhibitions to analyze how culture and history have been affected by and reflected in photographic images.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, engaging difference and diversity.

HIST 1200 Historical Research and Writing (1 SH)
Offered in conjunction with HIST 1201. Introduces incoming history freshmen to the history major in the context of other disciplines within the college and University. Offers students an opportunity to learn and to practice methods and conventions of research and historical writing.
• Prerequisite: History majors only.
• Corequisite: HIST 1201.

HIST 1201 First-Year Seminar (4 SH)
Provides an introduction to historical methods, research, writing, and argument in which all students produce a substantial research project that passes through at least two revisions, and that is presented publicly to other members of the colloquium.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 (any of which may be taken concurrently); history majors and combined majors only.
• Corequisite: HIST 1200.
• NU Core: Social science level 1, writing intensive in the major.
• NUpath: Writing intensive in the major.
HIST 1206 Drug Trade and Drug War: History, Security, Culture (4 SH)
Analyze the role of drugs in world history. From the early use of stimulants such as coca and sugar to the “war on drugs” and narco-terrorism, the course examines drugs as commodities in the world economy. Focuses primarily on opiates, stimulants, and hallucinogens from the nineteenth century to the present, considering how changing social and cultural mores led different drugs to be coded as licit and illicit. Topics include traditional uses, early medical use, trade networks, prohibition, black market, and drug cultures, as well as the role of drugs in the histories of industrialization, imperialism, and cold war geopolitics. Sources include historical scholarship, declassified intelligence reports, documentaries, novels, movies, songs, and art.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Interpreting culture, understanding societies and institutions.

HIST 1212 History of Race (4 SH)
Explores the creation, modification, and clash of racial identities in the modern world. Shows the worldwide patterns of racial discrimination and reform in the past three centuries, and how they are changing today. Discusses development of racial categories and ideas and practices in racial mixing. Explores racial desegregation and persecution, and campaigns against racial discrimination. Includes background on human evolution and debates on the origins and meaning of physical differences among humans.
• NU Core: Comparative study of cultures, social science level 1.
• Equivalent: AFAM 1212.

HIST 1213 History of Violence (4 SH)
Traces the global history of violence since the late Middle Ages. Topics include the Inquisition, the European witch craze, revolution, pornography, violent crime and punishment, media violence, lynch law, racism, genocide, war, torture, gender violence, and terrorism. Explores the modern emergence of a popular culture of violence, approaching themes from the perspectives of perpetrators, victims, and bystanders alike.

HIST 1215 Origins of Today: Historical Roots of Contemporary Issues (4 SH)
Focuses on the historical roots of four pressing contemporary issues with global implications. Our world has grown increasingly complex and interconnected, and the planet’s diverse peoples are facing common problems that have tremendous impact on the immediate future. They are (1) globalization, from its origins in the sixteenth century to the present; (2) the potential for global pandemics to alter the course of history, from bubonic plague in the fifth century to H1N1; (3) racial inequality, from religious interpretations in the early modern period to science in the modern era; and (4) gender inequality, from the agricultural revolution forward. For each issue, studies cases and locations spread across the world, examines the links between past and present, and attempts to identify ways forward.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.

HIST 1218 Pirates, Planters, and Patriots: Making the Americas, 1492-1804 (4 SH)
Seeks to challenge students to understand more than the outlines of American history—Pilgrims, patriots, plantations—in the broader contexts of events that unfolded in and around the Atlantic Ocean in the Americas, Europe, and Africa. Covers Columbus’s first landing in the Caribbean to the Haitian declaration of independence in 1804 and includes the Atlantic trade, piracy, slavery and other forms of labor, cultural and ecological exchange, and independence and emancipation.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: HIST 1210 and HIST 2210.

HIST 1225 Gender, Race, and Medicine (4 SH)
Examines the basic tenets of “scientific objectivity” and foundational scientific ideas about race, sex, and gender and what these have meant for marginalized groups in society, particularly when they seek medical care. Introduces feminist science theories ranging from linguistic metaphors of the immune system, to the medicalization of race, to critiques of the sexual binary. Emphasizes contemporary as well as historical moments to trace the evolution of “scientific truth” and its impact on the U.S. cultural landscape. Offers students an opportunity to develop the skills to critically question what they “know” about science and the scientific process and revisit their disciplinary training as a site for critical analysis.
• Cross-list: AFAM 1225 and WMNS 1225.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Engaging difference and diversity.
• Equivalent: AFAM 1225 and WMNS 1225.
HIST 1228 The Global U.S. (4 SH)
Offers a broad introduction to the history of the United States and the global world. Explores the United States within a larger framework of world historical events and activities, examining connections between local and global histories. Drawing on historical and literary sources as well as print, film, and other media sources, this course surveys the global United States and the political, social, cultural, and economic relationships that shaped its development. Topics include colonialism and imperialism; industrialization and globalization; war, independence, and national movements; and racial and gendered identities and politics.
• NU Core: Social science level 1.

HIST 1229 Military History of the United States (4 SH)
Examines the role of the military in the development of the United States. Begins with the arrival of Europeans and the ensuing conflicts with Native Americans as well as the colonial wars and the American Revolution. Reviews the constitutional foundations for the military and the creation of a regular army, including the establishment of West Point. Focuses on the War of 1812 and the Mexican War followed by an in-depth analysis of the Civil War and its aftermath. Covers America’s rise to world power status and the role of the military in this process. Surveys the twentieth century with particular emphasis on World War II, the Cold War, and the military’s role in nontraditional environments, including peacekeeping and terrorism.

HIST 1230 Contemporary America (4 SH)
Covers the emergence of the politics of dissent; thawing of the Cold War; military adventures in Asia, the Middle East, and the Balkans; decline of the presidency; growth of electronic media; and changes in race, gender, and class.
• NU Core: Social science level 1.

HIST 1233 The United States: Revolution to Reconstruction (4 SH)
Examines patterns of social, cultural, economic, political, and diplomatic history of the United States to 1877.
• NU Core: Social science level 1.

HIST 1234 United States since 1877 (4 SH)
Examines patterns of social, cultural, economic, political, and diplomatic history of the United States from 1877 to the present.
• NU Core: Social science level 1.

HIST 1239 History of American Education in World Perspective (4 SH)
Examines, in a comparative context, the expansion of public education from the passage of compulsory schooling laws to the establishment of the multiversity, the impacts of desegregation, the revival of home schooling, and the problems facing American education today. Gives attention to views that common schooling and land-grant colleges were part of the larger movement to extend democracy. Examines challenges to these propositions.
• NU Core: Social science level 1.

HIST 1246 World War II in the Pacific (4 SH)
Studies World War II, the most devastating war in history, which began in Asia and had a great long-term impact there. Using historical and literary texts, examines the causes, decisive battles, and lingering significance of the conflict on both sides of the Pacific.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

HIST 1252 Japanese Literature and Culture (4 SH)
Explores major works of Japanese fiction and poetry in historical and cultural context. All readings are in English translation.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: HIST 2252.

HIST 1253 History of Vietnam Wars (4 SH)
Presents a history of military conflicts on the Indochinese peninsula from its precolonial settlement, internal developments and divisions, its stormy relationship with China, French colonization and the resistance to it, the rise of the Viet Minh during World War II, the postwar struggle against the French, the impact of the Cold War, and the involvement of the United States after 1950 in the creation of two Vietnams and in the conflict that engulfed it and its neighbors, Laos and Cambodia, in the decades that followed. Emphasizes the roles of nationalism and communism in the twentieth-century conflicts and the motives for American intervention. Films revealing the reactions of Americans to the escalating conflict are shown and evaluated.
• NU Core: Comparative study of cultures, social science level 1.

HIST 1254 Mao’s China and After (4 SH)
Assesses the impact of the Chinese Communist Revolution of 1949 on state-societal relations. Focuses on the efforts during the Mao era to transform Chinese society through social mobilization campaigns, political culture, industrialization, and rural collectivization. Examines the impact of the Economic Reform Era policies, paying close attention to the rise of a consumer culture, the development of a legal system, and the heightened tensions between the dominant Han Chinese population and the minorities, especially in Tibet and Xinjiang.
• NU Core: Comparative study of cultures, social science level 1.
HIST 1256 Chinese Civilization in Her Eyes (4 SH)
Presents an historical analysis of gender dynamics and roles in China from late imperial times to the present. Examines notions of masculinity and femininity in Confucian culture, patriarchal practices including foot binding, chastity arches, and arranged marriages, and the ways in which the Chinese empire becomes feminized in the eyes of its elite as a result of Western intrusions. Explores women’s efforts to acquire “personhood” and the rights of citizens during the period of nation building and to negotiate state regulatory powers over their labor, sexuality, and reproduction in recent times.
- **Prerequisite:** Sophomore standing or above.
- **NU Core:** Comparative study of cultures, social science level 1.
- **Equivalent:** CLTR 1507, HIST 1507, and HIST 3450.

HIST 1259 Women in Jewish Culture (4 SH)
Uses some of the tools of contemporary feminist theory and methodology to focus on questions about the resurgence of ethnic/religious identities in the United States and the meaning of this for contemporary Jewish women. Analyzes the changing relationship of women to Judaism by trying to recover Jewish women’s experiences in America since the turn of the century. Accomplishes this by looking at some key institutions-work, family, religion, the feminist movement, the media, literature, and film.
- **Equivalent:** JWSS 2259, SOCL 1259, and WMNS 2259.

HIST 1260 Modern Latin America (4 SH)
Traces the developments in this region since independence and the inception of nationhood. Topics include state formation and society in the nineteenth century; economic development and underdevelopment in the region; race, class, and ideology; United States/Latin American relations; populism; the roots of revolution and authoritarianism; and the contemporary experiments with neoliberal policies.

HIST 1270 Ancient Greece (4 SH)
Studies the Greek achievement from proto-Indo-European migrations through the Minoan and Mycenaean bronze age, to the evolution of Homeric and Hellenic societies in the iron age, to the rise of the city-states and the age of Alexander. Topics include the coexistence of the rational and the irrational; the paradox of ethical philosophies and exclusionary political systems; the tensions between particularism and cultural unity; and gender ideology and what has been termed “the reign of the phallus.”
- **NU Core:** Humanities level 1.

HIST 1271 Ancient Rome (4 SH)
Studies the establishment and origins of civilization in the Italian peninsula from Etruscan, Latin, and Greek foundations through the rise and institutionalization of the republic, to the achievement of empire, to Rome’s interactions with diverse peoples and its decline and collapse. Themes include diversity, toleration, uses and dangers of power, Rome’s legalistic legacy, and the Latinization of Christianity.

HIST 1279 History of the American Film Industry (4 SH)
Examines and analyzes the artistic, commercial, cultural, and political history of the American film industry from its beginnings around 1900 to the present day. Emphasizes the development of the financial and artistic model of the classic “studio system” at the major Hollywood studios. Readings and lectures focus on economic factors that changed this system over time, such as labor-management relations and the rise and fall of the “star system.” Studies major genres and styles of film and their evolution, as well as their relationship to American historical and political trends: the Depression, World War II, the cold war, and the impact of the cultural revolution of the 1960s. Considers the changing role of the actor and of the director in Hollywood filmmaking.
- **NU Core:** Humanities level 1.

HIST 1282 The Holocaust and Comparative Genocide (4 SH)
Examines the origins of the Holocaust, perpetrators and victims, and changing efforts to come to terms with this genocide. The Holocaust, the murder of six million Jews by Germans in Nazi-occupied Europe during World War II, is one of the crucial events of modern history. Investigates the uniqueness of the Holocaust relative to other acts of ethnic cleansing or genocide, including mass death in the New World and mass murder in Armenia, Bosnia, and Rwanda.
- **NU Core:** Humanities level 1, comparative study of cultures.

HIST 1285 Introduction to Russian Civilization (4 SH)
Examines the origins of Russian culture in Eastern Orthodoxy and relations with the Byzantine Empire, and the subsequent evolution of Kiev, Moscow, and St. Petersburg as cultural/political centers, up to the 1917 Bolshevik Revolution. Includes readings in medieval Russian literature and nineteenth-century fiction, with consideration of the development of music and the visual arts. Conducted in English.
- **NU Core:** Humanities level 1.
- **Equivalent:** CLTR 1285.
HIST 1286 History of the Soviet Union (4 SH)
Surveys social, political, economic, demographic, and cultural developments in the former Soviet Union since 1917: the legacies of war and revolution, the civil war between the communists and the anti-communists, famine, the New Economic Policy, competing perspectives on the new regime, the rise of Stalin, the Cultural Revolution, collectivization and industrialization, the Purges, World War II and its impact, the “two camps” and the origins of the Cold War, the Soviet Union and the new East European system, Khrushchev, destalinization, intellectuals and the “thaw,” the Cuban missile crisis, the demise of Khrushchev, Brezhnev and the period of stagnation, the Gorbachev Revolution, Yeltsin, nationalism, and the dissolution.
• NU Core: Social science level 1.

HIST 1290 Modern Middle East (4 SH)
Studies Middle Eastern politics, culture, and society from the mid-nineteenth century to the present.
• NU Core: Comparative study of cultures, social science level 1.

HIST 1292 Jerusalem: Space and Image (4 SH)
Concentrates on significant moments in the development of Jerusalem from ancient times to the present. Explores the ways people throughout history have imagined the city in texts and images and examines the political context and the characteristics of the contemporary city. The word “Jerusalem” has long piqued the human imagination. The sacred texts of the three major monotheistic religions deal with the “history” and the stories of the city. Based on these descriptions, countless individuals, artists, researchers, and armies have tried to capture the city for their peoples. Many of these figures have caused bloodshed or lost their life or sanity for the city, while others have used its amazing inspiration to enrich the human experience and imagination.
• NU Core: Comparative study of cultures, social science level 1.

HIST 1294 Strangers in a Strange Land? European Jewish History 1750–1945 (4 SH)
Examines cultural, religious, political, and economic developments in European Jewish life between 1750 and 1945. Emphasizes the diversity of Jewish experiences in Europe and the significant changes in Jewish identity that occurred as many Jews became increasingly integrated into their surrounding populations. Includes topics such as “Haskalah,” or “Jewish Enlightenment”; the development of Reform Judaism; political and economic emancipation; changes in gender norms; Zionism; and anti-Semitism and the Holocaust. Includes films, memoirs, and cartoons and graphic novels, as well as important texts in Jewish history.
• Cross-list: JWSS 1294.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: JWSS 1294.

HIST 1304 Topics in History (4 SH)
Covers special topics in history, selected by the instructor. See www.northeastern.edu/history/undergraduate/topics-courses/ for descriptions of material covered in individual class sections.

HIST 1334 History of New England (4 SH)
Examines the history of New England from earliest times to the present. Focuses on native peoples and early European settlement and development. Examines the role of New England in the establishment of the U.S. republic and the region’s influence on U.S. political, economic, and cultural history.
• NU Core: Social science level 1.

HIST 1389 History of Espionage 1: Antiquity to World War II (4 SH)
Explores the history of espionage through a series of case studies from ancient Rome, Greece, and China; the Reformation; the Age of Discovery; the French Revolution; the American Civil War; World War I and the Russian Revolution; and World War II. Commonly referred to as the world’s “second oldest profession,” espionage is an intrinsic part of the relationships between communities, institutions, and states. Draws from a wide variety of published and unpublished primary and secondary sources, supplemented by modern theoretical and social science perspectives, literature, and films.
• NU Core: Comparative study of cultures, social science level 1.

HIST 1390 History of Espionage 2: Cold War Spies (4 SH)
Explores the history of espionage during the Cold War era (1943–1991) through a series of case studies. Draws from a wide variety of published and unpublished primary and secondary sources, supplemented by modern theoretical and social science perspectives, literature, and films. Students work individually and in teams to explore the history of covert operations, including the following subthemes: the origins of the Cold War in World War II, the postwar battle for German scientists, containment and rollback, Venona and code breaking, nuclear spies, defectors, proxy wars, insurgencies and counterinsurgencies, terrorism, and technology.
• NU Core: Comparative study of cultures.

HIST 1500 Modern Chinese History and Culture (4 SH)
Introduces modern Chinese history and culture through literary works, films, and historical texts. Examines political, social, and cultural changes in China since 1800: the decline of empire; the New Culture Movement of the 1920s; the rise of nationalism and rural revolution; the changing roles of women; the Cultural Revolution of the 1960s; and China’s cinematic, literary, and economic engagement with the world since 1978. Taught in English and open to all undergraduates.
• Cross-list: CLTR 1500.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: CLTR 1500 and HIST 2350.
HIST 2000 Native American Histories and Presence (4 SH)
Introduces students to the Indigenous peoples of North America and to the academic field of Native American and Indigenous studies. Combines public history and public art, field trips, and original research in order to focus on the resilience of Indian nations in New England and beyond. Covers particular themes, including the present-day impact of historical treaties and policies including land allotment, relocation, termination, boarding schools, and natural resource extraction.
* NUpath: Interpreting culture.

HIST 2211 The World Since 1945 (4 SH)
Examines the political, economic, social, and cultural relationship between the developed and developing world since the end of World War II. Topics include the Cold War, independence and national movements in developing countries, the globalization of the world economy, scientific and technological innovations, wealth and poverty, the eradication of some diseases and the spread of others, the fall of the Soviet Union, Middle East turmoil, and the enduring conflict between Israel and Palestine.
* NU Core: Comparative study of cultures.
* NUpath: Understanding societies and institutions, engaging difference and diversity.
* Equivalent: HIST 1211.

HIST 2212 Cultural Responses to Catastrophe (4 SH)
Surveys the broad history of natural disasters from ancient times to the present. Readings and discussions explore the diverse array of cultural responses to natural disasters across civilizations and historical epochs, concluding with a focus on cultural, political, and economic responses to major catastrophes in the modern age. Topics include ancient accounts and interpretations of deluges, earthquakes, famines, and volcanic eruptions; notorious disasters of modern history such as the Lisbon earthquake of 1755 and Krakatoa eruption of 1883; and, finally, the often disputed distinction between natural and man-made disasters in contemporary times.
* NU Core: Comparative study of cultures.

HIST 2214 War in the Modern World (4 SH)
Provides an analysis of the political and economic revolutions that produced modern industrial warfare, and explores the causes, prosecutions, and effects of the major wars fought since the mid-nineteenth century. Large portions of the course focus on World Wars I and II, but attention is also paid to the smaller wars of this period, to unconventional and nonmilitary forms of warfare, to the international trade in arms and training, and to terrorism, both state-sponsored and transnational. Using films, simulations, and team projects, students explore the diplomatic, political, economic, social, cultural, and psychological impacts of these wars as well as their military and technological aspects.
* Equivalent: HIST 1214.

HIST 2215 Recitation for HIST 2211 (0 SH)
Provides small-group discussion format to cover material in HIST 2211.

HIST 2222 History of Science and Technology (4 SH)
Offers a global interdisciplinary survey of the separate developments of science and technology, and the complex relationships between them, integrating theories of the philosophy and sociology of science within an historical framework. Emphasizes the environmental and ideological conditions that contribute to the birth and growth of the various sciences and to the relation between these conditions and technological innovation.
* Equivalent: HIST 1222.

HIST 2232 History of Boston (4 SH)
Explores the history of Boston from colonial times to the present, with attention to the topographical growth and the ethnic composition of the city. Includes visits to historical sites and museums in the area.
* Equivalent: HIST 1232.

HIST 2241 History of Media in America (4 SH)
Focuses on mass communications in American history, with attention to the roles of books, newspapers, magazines, films, radio, and television.
* Equivalent: HIST 1241.

HIST 2243 American Images of China (4 SH)
Examines the relationship between Sino-American international relations and changes in American popular perceptions of China as revealed in the media and literature. Focuses on Sino-American relations since the nineteenth century, including the period of the missionaries and opium traders; the era of special privileges; the Open Door policy; the first half of the twentieth century, when China became America’s favorite protégé; and the years of strain, warfare, and finally accommodation after the Chinese communists came to power in 1949.
* Equivalent: CINE 1243 and HIST 1243.

HIST 2280 Hitler, Germany, and the Holocaust (4 SH)
Studies historical developments from Germany’s defeat in World War I to the end of World War II. Topics include the failure of Weimar democracy; Weimar culture; the rise to power of Hitler and National Socialism; Nazi culture and racial wars against alleged “degenerates”; the roles of party leaders, business and cultural elites, and ordinary Germans in supporting and legitimizing the Nazi dictatorship.
* Equivalent: HIST 1280.
HIST 2285 America and the Holocaust (4 SH)
Examines the American response to the Holocaust, in terms of both contemporaneous knowledge and actions and the lasting impact on policy and culture. Starts with early twentieth-century events, such as the Armenian genocide, that shaped later attitudes. Explores the prewar period, particularly U.S. immigration and isolationist policies. Assesses Americans’ knowledge of European events as the extermination campaign unfolded and fights ensued over rescue possibilities. Examines changing depictions of the Holocaust that emerged in the postwar period as a result of critical events such as the Eichmann trial and popular television and film portrayals. Finally, considers how perceptions of the Holocaust have shaped subsequent U.S. responses to genocide.
• Cross-list: JWSS 2285.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: JWSS 2285.

HIST 2300 Race, Religion, Ethnicity: The Example of Jewishness (4 SH)
Explores the relationship between Judaism and race from ancient times, through the birth of modern anti-Semitism in the nineteenth century and the Holocaust in the twentieth, to the resurgence of biologically based ideas of Jewish identity in recent decades. Seeks to answer the questions of what Jewishness is—race, religion, or ethnicity—and how and why Jews, along with other groups such as Italians, Irish, and Slavs, moved from being seen as racially “other” in nineteenth-century America to being considered “white” in the twentieth century. Through the lens of the Jewish experience, offers students an opportunity to acquire a deeper understanding of the historically changing meanings of such important concepts as race, ethnicity, and peoplehood.
• Cross-list: JWSS 2300.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: JWSS 2300.

HIST 2301 The History Seminar (4 SH)
Introduces history majors to advanced techniques of historical practice in research and writing. Offers students an opportunity to conduct original research and write an original research paper. Seminar themes vary; students should check with the Department of History for a list of each year’s seminar offerings.
• Prerequisite: HIST 1201; history majors and combined majors only.
• Corequisite: HIST 2302.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

HIST 2302 Historical Writing (1 SH)
Covers learning and practicing methods and conventions of historical writing for publication. Adjuncted to a Seminar in History, which fulfills the Advanced Writing in the Disciplines requirement.
• Prerequisite: HIST 1201; history majors and combined majors only.
• Corequisite: HIST 2301.
• NU Core: Advanced writing in the disciplines.
• NUpath: Advanced writing in the disciplines.

HIST 2303 Gender and Reproductive Justice (4 SH)
Effective Spring 2017
Introduces the social, legal, and economic barriers to accessing reproductive healthcare domestically and internationally. Draws on various theoretical and analytic tools including critical race theory, critical legal theory, sociology of science, human rights, feminist theory, and a range of public health methods. Access to reproductive health services, including abortion, is one of the most contested political, social, cultural, and religious issues today. Covers domestic, regional, and international legal and regulatory frameworks on sexual reproductive health.
• Cross-list: WMNS 2303.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: WMNS 2303.

HIST 2304 Topics in History (4 SH)
Covers special topics in history, selected by the instructor. See www.northeastern.edu/history/undergraduate/topics-courses/ for descriptions of material covered in individual class sections.
• Repeatability: May be repeated up to 3 times.

HIST 2308 Law, Justice, and Society in Modern China (4 SH)
Offers an overview of the historical development and function of law in Chinese society from the late imperial era to today and in comparison with other bodies of jurisprudence. Reading a wide range of scholarly articles and monographs, the course looks at “law” beyond jurisprudence and legal codes to examine its changing relationship with social customs, political institutions, religious traditions, popular culture, family and gender relations, and economic exchanges.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Understanding societies and institutions, employing ethical reasoning, writing intensive in the major.
HIST 2310 Spread of Buddhism (4 SH)
Focuses on Buddhism both as a set of spiritual ideas and as a living practice. From its origins in northern India more than 2,500 years ago to its current status as the fastest-growing religion in North America, Buddhism has had a lasting influence over much of world history. Examines the historical context in which Buddhism first developed, and how it adapted to different social and political situations throughout the world. Also engages in “practice-oriented” activities with contemporary Boston-area Buddhism in order to understand Buddhism’s continued relevance in today’s world.

HIST 2311 Colonialism/Imperialism (4 SH)
Examines the military, economic, political, and cultural expansion of world powers since the fifteenth century, and the ways in which colonized peoples were ruled. Why did colonialist countries feel the need to conquer and dominate, how did they do it, and why did they retreat on some fronts? How did people resist and cooperate with colonialism? How did colonialism affect national and cultural identities? Colonialism is examined as a global phenomenon and from a comparative perspective that looks at particular case studies. Also examines decolonization in the twentieth century.

HIST 2312 Global Migration (4 SH)
Examines human mobility from the early modern period to the present. Challenging popular assumptions about who migrates and why, the course explores mobility as a fundamental element of how empires, states, and societies function. Emphasizes cross-cultural connections made possible by migrant populations, questioning whether “globalization” is only a twentieth-century phenomenon. Looking at historical sources and firsthand accounts, offers students an opportunity to obtain a basic knowledge of major global migration movements from the Mongols and the Silk Road to the Atlantic slave trade; twentieth-century labor migrations; and contemporary issues such as trafficking, statelessness, and diaspora politics.

HIST 2315 Approaches to World History (4 SH)
Focuses on interpreting major patterns and connections in world history through discussion and assignments.

HIST 2317 Comparative Urban Histories (4 SH)
Focuses on a number of cities in Europe and the Middle East from the mid-nineteenth century until present times, and examines such themes as urban identity and citizenship, mechanisms of exclusion and inclusion within the city, as well as typologies of cities, such as colonial, global, and port cities.

HIST 2327 The Civil Rights Movement in United States History (4 SH)
Explores the origins, ideologies, path, and legacy of the long civil rights movement in U.S. history. Examines primary and secondary sources to trace the origins of the civil rights movement from the post-Reconstruction era in the United States through the triumphs and defeats of the struggle to end racial segregation and the culmination of civil rights legislation in the 1960s. Investigates how the legacies and memory of the movement shape our current understanding of civil rights. While this is a lecture-based course, students’ participation in weekly discussions based on the readings and in-class lectures determines a part of the overall course grade.

- Prerequisite: Sophomore standing or above.
- NU Core: Comparative study of cultures.

HIST 2330 Colonial and Revolutionary America (4 SH)
Covers the discovery and exploration of the New World, the settlement of the English, French, Dutch, Swedish, Spanish, and Russian colonies on the North American mainland, their development to 1763, the origins of their clashes with England, and the American Revolution.

HIST 2331 The Civil War and Reconstruction (4 SH)
Examines the causes and conduct of the U.S. Civil War, and the nature and effects of Reconstruction in the South. Topics include abolitionism and other reform efforts in the four decades before the war, constitutional and other political issues in the sectional crisis, territorial expansion as a sectional issue, the nature and economics of slavery and early capitalist formation in the North and South, the centrality of Abraham Lincoln in national politics, the military conduct of the war, technological innovation and its impact on the war, Reconstruction and the rights and plight of freed men and women, the rise of the Ku Klux Klan and other terrorist organizations, and the power of the Civil War, Reconstruction, and the ideals of equal rights in national memory.

HIST 2332 The United States, 1900–1945: Politics, Culture, and Globalism (4 SH)
Explores the history of the United States during the first half of the 20th century, during which the country was transformed from an agrarian to an industrial economy and from a secondary power to global dominance. Central themes include the national government’s multiple attempts to create policies, laws, and regulations consistent with maintaining social order, economic stability, and widely shared prosperity under the new economic conditions; the efforts of the United States to establish a world economic and political order in which a capitalist democracy could flourish; and the social, cultural, and political dimensions of the changing experiences of the American people. Topics include the Progressive Era (1900–1919); the 1920s; the Great Depression and the New Deal; and World War II.

- NUpath: Understanding societies and institutions, engaging difference and diversity.
HIST 2340 Cultural History of the U.S. (4 SH)
Identifies, explains, and traces the evolution of some of the most important ideas and issues that have shaped American history and culture. Explores the tension between community and individualism in the context of debates and conflicts about religious belief and toleration; the nature of liberty, civic responsibility, and the state; immigration and ethnicity; race and gender relationships; and class distinctions. Considers the impact of advertising and the growing consciousness of the power of a consumer-driven culture in the early twentieth century, and explores the simultaneous enthusiasm for and concern about technological innovation. Helps students understand the ways in which popular and elite literature, film, and other electronic media, advertising, leisure pursuits, and religion are mined for information about a culture.

HIST 2341 History of the Western U.S. (4 SH)
Examines the history of the western areas of North America that eventually became the United States. Topics include the history and culture of the indigenous peoples of the trans-Mississippi and far western United States; the political, economic, social, and cultural expansion of European settlers; cultural and military encounters of European and indigenous peoples; technological innovation and agriculture in the Great Plains, the Intermountain West, and the West Coast; cattle and sheep ranching; water and the West; ecology, conservation, and the politics of the “Sagebrush Rebellion”; Asian Americans in the West; mining; the Civil War in the West; African Americans and the Western experience; the cowboy and the importance of rodeo; and the West and the Native American in American popular culture (film, radio, television, literature, and advertising).

HIST 2342 Environmental History of North America (4 SH)
Introduces students to the study of environmental history in North America. American history has unfolded as an ongoing dialogue between diverse peoples and their equally diverse surroundings. Environmental history has sought to place this dialogue at the center of our understanding of the past. Including the place of plants, animals, geographic features, and climate has nuanced our understanding of the role of these actors in our histories. Surveys the varied roles that the natural world has played in American history. Focuses on understanding how these stories are told and examines the close connections between the fields of environmental history and historical ecology.

HIST 2343 History of Business in America (4 SH)
Traces the development of business from the colonial era to the present, with an emphasis on the industrial era (1840-1920s) and the modern period. Examines the factors that shaped commercialism and consumerism in the United States.

HIST 2344 U.S. Urban History (4 SH)
Examines the development of urban society in the United States in the nineteenth and twentieth centuries, with emphasis on the effects of immigration and industrialization upon the politics, thought, and society of American cities.

HIST 2346 The American Empire (4 SH)
Examines American expansionism from the Monroe Doctrine and manifest destiny to recent neo-imperialism and “globalization,” with an emphasis on early twentieth-century expansion into Cuba, Hawaii, the Panama Canal Zone, the Philippines, Puerto Rico, Samoa, and other Pacific islands. Focuses on cultural encounters, political debates, the economic impact of imperialism, and the perspectives of colonized peoples.

HIST 2348 America and the Sea (4 SH)
Studies the importance of the oceanic environment in its cultural, economic, political, and naval aspects to U.S. history. Investigates the impact of the oceans on native peoples in the period before the European encounter, followed by an examination of the motives driving Europeans seaward and their methods and technology for oceanic exploration and navigation. Follows the development of the Atlantic maritime world in the postcolonial period, including the rise of the United States as a maritime power and the extension of U.S. maritime influence across the Pacific. Focuses on the evolution of maritime communities in which fishing, trading, and shipbuilding played a role in crafting a cultural environment, including the influence of the sea on literature and art. Examines the role in diplomacy and war of the United States Navy.

HIST 2351 Modern Japan (4 SH)
Examines state formation, economic growth, imperialism and colonialism, war and defeat, and contemporary culture.

HIST 2352 Dictators and Democracy in Asia (4 SH)
Covers Asia since 1945, including military occupation, the Korean War, economic growth, social change, and international relations.

HIST 2370 Renaissance to Enlightenment (4 SH)
Covers the social, economic, political, and cultural transformations of Europe from the Renaissance to the French Revolution. Traces the rebirth of Catholic Europe from 1300; the Reformation; the religious wars; struggles over religious and scientific beliefs; advances in technology, science, and warfare; overseas expansion; the scientific revolution; and the Enlightenment.
HIST 2371 Europe 1870–1921 (4 SH)
Focuses on Europe from the Franco-Prussian War to the post-World War I settlement: the growing tensions and rivalries and the declining certainties of the end of the nineteenth century, the origins of World War I, the war itself, the Russian Revolution, and the Peace of Paris.

HIST 2372 Gender and Society in Modern Europe (4 SH)
Examines the importance of gender difference in European societies from 1700 to the present. Explores the historical development of masculinity and femininity in European societies, with attention to social class and national differences. Looks at the importance of gender in the emergence of nation-states, in major democratic and socialist revolutions, in economic change, in claims for and the exercise of citizenship rights, and in the policies of welfare states. Explores how gender and race shaped women’s agency, their engagement with imperialism and contacts with non-Europeans, women’s participation in war and totalitarian regimes, their private lives and sexuality, and the significance of European Union policies for gender equality today.
* NU Core: Comparative study of cultures.

HIST 2373 Gender and Sexuality in World History (4 SH)
Introduces key concepts in the fields of gender and identity studies as they apply to world history since about 1800. Offers students an opportunity to understand the critical significance of gender, sex, sexuality, and identity to world events and how these contentious subjects influence the contemporary world. Surveys a series of major movements in geopolitics, labor, economics, culture, and society in order to analyze how individual and group identities, as well as mass assumptions about behavior and performance, have shaped these events. Gender, sex, and sexuality are integral to class discussions of work, welfare, art, culture, violence, war, and activism.
* Cross-list: WMNS 2373.
* NU Core: Comparative study of cultures.
* NU Path: Interpreting culture, engaging difference and diversity.
* Equivalent: WMNS 2373.

HIST 2375 The Tudors, the Stuarts, and the Birth of Modern Britain (4 SH)
Examines the history of early modern England as well as Ireland, Wales, and Scotland. Follows the development of England from a small backwater to one of the most powerful European nations by the end of the seventeenth century. Analyzes the constantly shifting relationships between the various cultural identities within Britain. Concentrates on British history not only from the perspective of the elites but also the ordinary people whose names have often been lost to history. Key themes include the growth of the British Empire, issues of gender, the interactions between England and the Celtic fringes, and participation in the political franchise.

HIST 2376 The British Empire (4 SH)
Studies the history of the empire in which the sun never set, from its earliest beginnings in the seventeenth century to its full growth in the nineteenth century. Traces the rise of Britain as a major world power. Topics include nationalism, the growth of capitalism and the international economy, and the role of women, education, and native resistance movements.

HIST 2378 History of Soviet Cinema (4 SH)
Surveys the emergence and development of the film industry in the USSR. Examines the political, economic, ideological, and artistic sources of Soviet cinema and their relationship to Russian culture and history. Directors include Eisenstein, Vertov, Pudovkin, Dovzhenko, Kozintsev, Kalatozov, and Tarkovsky.
* Equivalent: CINE 2386 and CLTR 2386.

HIST 2387 Soviet Secret Police (4 SH)
Explores a vast array of primary and secondary sources, supplemented by literature and film, and traces the roles of the domestic and international branches of the Soviet secret police throughout its seventy-year history. Explores the role of ideology in Soviet clandestine organizations; the foundations of Soviet policing; political terror and denunciations; informants’ networks; recruitment of agents at home and abroad; the British spy scandals of the 1930s-1950s; Soviet intelligence successes and failures in World War II; the origins of the Cold War; the atom spy networks; the popular culture of “spy mania” in the McCarthy era; the Cuban missile crisis; the Brezhnev era; the KGB and the Soviet collapse; and spies and spying in the post-Soviet era.

HIST 2388 Borderlands: World War II in Eastern Europe (4 SH)
Devoted to the study of Russia’s western borderlands before, during, and immediately following the Second World War, 1939-1948. Drawing from a variety of original documents, films, and recent scholarly studies, evaluates the impact of World War II on the Soviet Union and Eastern Europe. Examines the basic history of World War II in the East, followed by several weeks of readings on special themes: Soviet occupation policy (1939-1941); Ostpolitik; German occupation policy in Soviet territory, 1941-1945; genocide and the Holocaust; partisans and collaborators; nationalism; ethnic reprisals after the Soviet liberation of occupied zones; and the origins of the Cold War.
HIST 2390 Africa and the World in Early Times (4 SH)
Examines the place of Africa in the world from 1000 C.E. to the mid-19th century. Investigates the histories of ancient Egypt, the savannah and forest regions of West Africa, coastal and interior East Africa, and southern Africa. Explores the rise of medieval city-states and empires, the activities of the Atlantic slave trade and the trans-Saharan and Indian Ocean slave trades, debates over mass migration and the spread of language groups, the rise of agriculture, the development of nonstate political structures, the growth of trading societies, and the development of new cultural forms. Links Africa’s early histories to current debates about the role of history in contemporary politics and to present understandings of Africa’s historical place in world affairs.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: AFRS 2390.

HIST 2391 Modern African Civilization (4 SH)
Explores African history and culture from the early 1500s to the present era. Emphasizes the relationship between Europe and Africa, the circumstances surrounding the imperialist partition of Africa, and the decolonization process.
• Equivalent: AFRS 2391.

HIST 2394 Islamic Nationalism (4 SH)
Traces the historical antecedents to contemporary resurgent Islamic nationalism.

HIST 2397 Modern Africa (4 SH)
Covers the history of modern Africa. From the late-19th century to the present day, Africans have shaped, and have been shaped by, transformative events. By the early 20th century, European powers had colonized most of the African continent. By the mid-1960s, most Africans were free from colonial rule; colonialism on the continent did not conclude until the 1990s with the fall of the apartheid state in South Africa. Africans have aimed to achieve political and economic stability, to negotiate cold war politics, harness international development support, and thrive in a globalized world. They have experienced brutal wars, devastating epidemics, and grave natural disasters but have also inspired the world with their rich cultures, profound histories, creative emerging economies, and vibrant democratic movements.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.

HIST 2398 Radicals, Terrorists, and Insurgents (4 SH)
Analyzes various movements that have turned to violence as a means of achieving political ends. Traces the history of political violence from the eighteenth century to the present, focusing on the ideologies and tactics employed by anti-colonial, anti-imperial, and other movements. The terms “radical,” “terrorist,” and “insurgent” have become catchphrases almost devoid of meaning. We attempt to understand what rationales lead people to political violence as well as what commonalities are shared by diverse movements.

HIST 2431 Immigration and Identity in the American Jewish Experience (4 SH)
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes include immigration, adaptation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.
• Prerequisite: Sophomore standing or above.
• Cross-list: JWSS 2431.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 3431 and JWSS 2431.

HIST 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

HIST 3304 Topics in History (4 SH)
Covers special topics in history, selected by the instructor.
• Repeatability: May be repeated up to 3 times.
HIST 3330 The Global Cold War (4 SH)
Examines the Cold War, emphasizing how the Soviet-American struggle for global preeminence intersected with decolonization and the rise of the “Third World.” Uses primary sources, monographs, and scholarly articles to trace the major events and developments of the Cold War—ideological differences between the capitalist and socialist systems, the Cuban Missile Crisis, the construction of the Berlin Wall, the Vietnam War—while also exploring how and why the Cold War came to pervade economic, cultural, and social relations globally. Examines how unexpected actors—Cuban doctors and Peace Corps volunteers—responded to and shaped superpower rivalry. Considers how the Cold War continues to shape the world today.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
- **NU Core:** Comparative study of cultures, writing intensive in the major.
- **NUpath:** Understanding societies and institutions, engaging difference and diversity, writing intensive in the major.

HIST 3412 Global Environmental History (4 SH)
Examines the impact of four significant human transitions on the environment of the planet Earth. They include the transition from hunter/gathering to settlement and the invention of agriculture about 10,000 years ago. The agricultural or neolithic revolution was followed thousands of years later by the urban revolution and ultimately the Industrial Revolution. These three important developments in world environmental history happened within specific millennia and simultaneously in different parts of the world. In the beginning, they were not the product of physical or cultural diffusion. Urbanization and industrialization, however, promoted worldwide migration that disrupted and changed the world’s ecology and environment in significant ways. Also explores the electronic revolution of the past centuries, which has had its own set of environmental impacts.
- **Prerequisite:** HIST 1110.

HIST 3421 History through Film (4 SH)
Explores various historical issues as seen through the eyes of historians and filmmakers. Presents both acted and documentary films in combination with readings from a variety of sources and interpretive materials. Through a series of case studies, the first half of the course looks at the ways in which filmmakers use (and abuse) history as a source of dramatic “stories,” while the second uses the same approach to understand the ways that historians use visual media to understand the politics and culture of the times they were made and as historical evidence.
- **Prerequisite:** (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
- **Equivalent:** CINE 3421.

HIST 3422 Recitation for HIST 3421 (0 SH)
Provides small-group discussion format to cover material in HIST 3421.
- **Equivalent:** CINE 3422.

HIST 3452 Global Chinese Migration (4 SH)
Explores how the Chinese have been moving and creating communities around the world for centuries. What, if anything, makes them “Chinese” despite such a large variety of historical experiences? Attempts to understand this migration both in terms of large-scale trends and the unique experiences of local communities and cultural change. Also examines Chinese business networks, which are sometimes thought to present a powerful challenge to Western forms of capitalism. Is Chinese capitalism different from other capitalist business, and does Chinese culture play a role in shaping it?
- **Prerequisite:** Sophomore standing or above.

HIST 3485 Vienna, Prague, Budapest (4 SH)
Examines the intellectual and cultural history of these three closely linked capitals of Central Europe, their relationship to empires, multinationalism, and the development of modernism before and after World War I.
- **Equivalent:** CLTR 3485.

HIST 3486 Commissars and Managers: Soviet Economic History (4 SH)
Provides an economic history of the Soviet Union from 1917 to the present. Working in lectures and the computer lab, students use tactics and methods of modern business, economics, and management strategy as a means to understand, interpret, and evaluate Soviet economic policies and the history of Soviet economic development. Special themes include discussions of the purge of industrial managers as “wreckers,” the labor incentives of Stakhanovism—the Stalinist star system for extraordinary labor productivity, the economics of forced labor and the Gulag, the Second World War, financing the Cold War, the black market, corruption, and the central role played by former communists in the transition to capitalism (nomenklatura privatization).
- **Prerequisite:** Sophomore standing or above.

HIST 3487 Central European Capitals on the Eve of World War I (4 SH)
Examines the intellectual and cultural history of three closely linked capitals of central Europe—Vienna, Prague, and Budapest—and their relationship to empires, multinationalism, and the development of modernism before and after World War I.
- **Prerequisite:** Sophomore standing or above.

HIST 4600 Topics in Women’s History (4 SH)
Covers special topics in the history of women and gender.
- **Prerequisite:** Junior or senior standing.
- **Repeatability:** May be repeated without limit.
HIST 4610 Topics in World History (4 SH)
Covers special topics in world history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4620 Topics in Historical Geography (4 SH)
Covers special topics in the ways in which geographic, climatic, environmental, and demographic factors have affected the course of history. Tools such as GIS (geographic information systems) are introduced and explored to enhance understanding of these complex interrelationships.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4630 Topics in American History (4 SH)
Covers special topics in the history of America in the nineteenth and twentieth centuries.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4631 Topics in Public History (4 SH)
Covers special topics in public history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4640 Topics in African-American History (4 SH)
Covers special topics in African-American history.
• Prerequisite: Junior or senior standing.
• NU Core: Comparative study of cultures.
• Repeatability: May be repeated without limit.
• Equivalent: AFAM 4640.

HIST 4650 Topics in Asian History (4 SH)
Covers special topics in Asian history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4660 Topics in Latin American History (4 SH)
Covers special topics in the history of the Caribbean and Latin America.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4670 Topics in European History (4 SH)
Covers topics in European history from antiquity to the present.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4680 Topics in Russian History (4 SH)
Covers special topics in Russian history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4681 Topics in Soviet History (4 SH)
Covers special topics in Soviet history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4682 Topics in East European History (4 SH)
Covers special topics in East European history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4690 Topics in African History (4 SH)
Covers special topics in African history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.
• Equivalent: AFRS 4690.

HIST 4691 Topics in Middle Eastern History (4 SH)
Covers special topics in Middle Eastern history.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

HIST 4701 Capstone Seminar (4 SH)
Offers students an opportunity to make use of advanced techniques of historical methodology to conduct original research and write a major, original research paper as the culmination of their work toward the history degree. This is a capstone research and writing seminar for history majors.
• Prerequisite: HIST 2301 and junior or senior standing; not open to students who are receiving credit for HIST 4911, HIST 4912, HIST 4970, or HIST 4971.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

HIST 4903 Fieldwork in History 1 (4 SH)
Offers directed work in historical societies, archives, museums, and other historical agencies. Please consult the department for details.
• Prerequisite: History majors with junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience, demonstrating thought and action in a capstone.
HIST 4904 Fieldwork in History 2 (4 SH)
Offers directed work in historical societies, archives, museums, and other historical agencies. Please consult the department for details.
- Prerequisite: HIST 4903; history majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, integrating knowledge and skills through experience, demonstrating thought and action in a capstone.

HIST 4911 Senior Project 1 (4 SH)
Offers advanced directed research under the guidance of history faculty.
- Prerequisite: HIST 2301 and junior or senior standing.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

HIST 4912 Senior Project 2 (4 SH)
Offers advanced directed research under the guidance of history faculty.
- Prerequisite: HIST 4911 and junior or senior standing.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

HIST 4929 Directed Study in Media and History (4 SH)
Permits students who have completed course work on this subject to undertake advanced individual applications projects in media and history.
- Repeatability: May be repeated without limit.

HIST 4930 Directed Study in Managing Nonprofit Organizations (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4931 Directed Study in Historical Societies and Archives (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4932 Directed Study in Historical Exhibits and Museums (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4933 Directed Study in Historical Editing (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4934 Directed Study in Historical Consulting (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4936 Directed Study in Historic Preservation (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4937 Directed Study in Material Culture (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4938 Directed Study in Historical Analysis of Public Policy (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4939 Directed Study in Publishing for Nonprofits (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4940 Directed Study in Oral History (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4941 Directed Study in Genealogical Research (4 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Repeatability: May be repeated without limit.

HIST 4942 East Asian Cultural History Abroad (4 SH)
Designed to provide students with an in-depth understanding of the cultural history of East Asia through a total-immersion learning experience. Coupled with a Dialogue of Civilizations course, introduces students to East Asian cultural history through guest lectures, films, on-site visits, and the study of a broad array of written materials. Offers students many opportunities to participate in dialogues with university students and faculty in the region of study. Facilitates student independent research through faculty mentoring, reading, and field trips. Emphasizes independent work on a research project.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.
- Repeatability: May be repeated without limit.
HIST 4944 Middle Eastern History and Culture Independent Field Research Abroad (4 SH)
Designed to provide students with an in-depth understanding of Middle Eastern history, culture, society, and politics. Includes lectures, talks, discussions, and visits to historic and cultural sites in the country of study. Examines both historical and modern-day issues, attitudes, and ideologies. Offers an opportunity for students to engage in sustained dialogue with university students, professors, and politicians in the country of study. Emphasizes independent work on a research project.
• Repeatability: May be repeated without limit.

HIST 4945 North African History Abroad (4 SH)
Seeks to provide students with an in-depth understanding of the history, culture, and political economy of Morocco. Combines exposure to both urban and rural settings to analyze current issues facing the Kingdom of Morocco in the twenty-first century in the context of its rich history. Investigates a number of key historical and cultural sites as well as providing a variety of lectures. Offers students an opportunity to dialogue with people from various sectors of Moroccan society as well as experience the ethnic, religious, and cultural diversity of the region. Emphasizes student engagement in independent research projects.

HIST 4946 Independent Field Research Abroad: Central Europe (4 SH)
Provides an introduction to the political, cultural, and intellectual history of major central European cities. Issues discussed include the influence of geography on historical and political destiny, development of each city as a major center within a multinational empire, the flowering of culture in each city at the fin de siècle, and the relationship of political to intellectual and cultural history. Includes visits to major historical and cultural sites in the cities of study.
• Repeatability: May be repeated without limit.

HIST 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.

HIST 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: HIST 4970.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.

HIST 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

HIST 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HIST 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HIST 4994 Internship in World History (4 SH)
Offers a formal internship at the World History Resource Center for preservice teachers of history during the fall semester of the fourth year. Students read curriculum units prepared by other teachers and develop at least one substantial, multilesson unit of world history curriculum, under supervision of a history faculty member and in consultation with a practicing teacher. Fulfills experiential education requirement.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

HIST 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated once.
HIST 5101 Theory and Methodology 1 (3 SH)
Examines the following questions in the context of major issues in current historical research and debate. Where do historical questions come from, and how do we answer them? How do we produce knowledge about historical events and processes? What theoretical models guide historians’ work? Emphasizes interdisciplinary approaches as well as concrete techniques in historical research. Required of all first-year graduate students.
* Prerequisite: Junior, senior, or graduate standing; history majors only.

HIST 5102 Theory and Methodology 2 (3 SH)
Continues HIST 5101. Offers an advanced exploration of the theories and methods used by historians to develop students’ ability to understand and critique the work of other historians. Emphasis is on theories and methods in world history, such as comparative models, systemic approaches, and focus on interconnections. Explores what it means to have a local, national, or global perspective, and how world history fits in with other fields of historical scholarship. Required of all PhD students.
* Prerequisite: HIST 5101 and junior, senior, or graduate standing.

HIST 5111 Money, Markets, Commodities: Global Economic History (3 SH)
Studies money, markets, and commodities in world history. Focuses on the questions that historians have asked about economic phenomena and relations and the different strategies they have developed to address those questions. Broadly, the works analyzed fall into the historiographical categories of social history, political economy, history from below, economic history, and cultural history. These boundaries, however, are challenged as quickly as they are defined. Topics include debt and credit; market economies and consumer societies; formal, informal, legal, and illegal trade networks; and the transformation of the global economy by specific commodities.

HIST 5237 Issues and Methods in Public History (3 SH)
Examines and analyzes major issues and methods in public history in the United States and the world. Topics include the nature and meaning of national memory and myth, the theory and practice of historic preservation, rural and land preservation and the organizational structures and activities associated with those efforts, the interrelationship of historical museums and popular culture, the history and organization of historic house museums, historical documentary filmmaking, historical archaeology in world perspective, interpreting “ordinary” landscapes, and the impact of politics on public history.
* Prerequisite: Junior, senior, or graduate standing.

HIST 5238 Managing Nonprofit Organizations (3 SH)
Examines the management of nonprofit organizations, which include historical agencies, museums, archives, historic houses, and various special historical collections. The literature on historical administration is lacking in sufficient conceptual rigor to generalize about the inner and outer workings of a complex management organization. Since historical agencies and museums are complex organizations with missions and goals, and with policies and procedures for involving various “publics” in their activities, explores them as part of the changing and evolving organizational structure of a modern society. Covers public management with all of its institutional components and human complexities. Studies planning in the public sector, budgeting, fundraising, conflict resolution, and the human relations literature as it relates to becoming a functional and successful manager.
* Prerequisite: Junior, senior, or graduate standing.

HIST 5239 Media and History (3 SH)
Introduces students to the variety of chemical and electronic media, and the appropriate uses of these media for teaching, preservation, outreach, and primary research documents. Each student engages in research related to the selection and evaluation of existing media, and on the deconstruction, analysis, evaluation, and assembly of documentary presentations. Students then form research and production teams for the creation of actuality media production, which takes place during the semester. Topics include media preservation, production budgeting, marketing, and intellectual property.
* Prerequisite: Junior, senior, or graduate standing.
* Equivalent: CINE 5239.

HIST 5240 Historical Societies and Archives (3 SH)
Examines the management of nonprofit organizations, which include historical agencies, museums, archives, historic houses, and various special historical collections. The literature on historical administration is lacking in sufficient conceptual rigor to generalize about the inner and outer workings of a complex management organization. Since historical agencies and museums are complex organizations with missions and goals, and with policies and procedures for involving various “publics” in their activities, explores them as part of the changing and evolving organizational structure of a modern society. Covers public management with all of its institutional components and human complexities. Studies planning in the public sector, budgeting, fundraising, conflict resolution, and the human relations literature as it relates to becoming a functional and successful manager.
* Prerequisite: Junior, senior, or graduate standing.

HIST 5241 Exhibits and Museums (3 SH)
Considers the history of museums and exhibitions from a transnational perspective in order to examine the various roles museums have played in historical and contemporary global culture. Explores museums as cultural institutions and institutional cultures through historical and theoretical readings, museum visits, and the development of students’ own readings. Currently among the world’s most popular sites of education and leisure, museums have held a wide range of social, political, and cultural roles over the past 500 years. Offers students an opportunity to develop more acute insight into the ways museums and their exhibitions have made and reflected ideas about history, science, art, identity, and culture.
HIST 5242 Historical Editing (3 SH)
Introduces the practice and skills of historical editing. Emphasis is on identification and explication of documents within their historical context in preparation for publication. Presents a laboratory for the study and practice of historical editing. Introduces the major collections of edited papers and instructs students in editing historical documents. Gives each student a historical document to prepare for publication. Also covers the editing of history books and journals.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5243 Industrial Archaeology (3 SH)
Introduces the history, practice, and place of industrial archaeology. Plans examination of techniques and procedures used to unearth the industrial past and offers field trips to local industrial sites.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5244 Historic Preservation (3 SH)
Introduces historic preservation, with attention to the history, the philosophy, and the practical problems of preservation.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5245 Historical Analysis of Public Policy (3 SH)
Introduces the historical study of public policy, concentrating on the theoretical and methodological issues. Substantive illustrations focus mainly on the United States.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5246 Oral History (3 SH)
Discusses the theory and practice of creating, processing, and using primary source material obtained by taping interviews with people whose role in history would otherwise go unrecorded.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5247 Historical Reenactment (3 SH)
Explores the methodologies and approaches involved in historic reenactment. Introduces students to live representation of a historic individual within the context of the correlating historical time period. Historical reenactment synthesizes the tools of historical research with those of live performance and audience interaction.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5248 Historical Administration (3 SH)
Examines complex, formal organizations, with emphasis on historical agencies. Topics include personnel relationships, the characteristics of successful managers, and strategic planning. Issues of finance, budgeting, and proposal writing are priorities in this professional course for public history majors.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5295 Population in History (3 SH)
Examines through population studies and historical demography the causes and consequences of changes in human marriage, birth, death, and migration rates from the Stone Age to the present on a global scale. Focuses on the role of the environment, relative economic growth, differential nutritional status, epidemic disease, family systems, and public administration in tracing the modern population explosion, highlighting the process through which human agency brought contagious diseases under better control and extended human life expectancies, before medicine could cure disease.
• Prerequisite: Junior, senior, or graduate standing.

HIST 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

HIST 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

HIST 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

HIST 6870 Directed Study in Chinese History (3 SH)
Offers graduate students an opportunity to undertake advanced study in Chinese history.
• Repeatability: May be repeated up to 2 times.

HIST 6871 Directed Study in World History (3 SH)
Offers graduate students an opportunity to undertake advanced study in topics in world history.
• Repeatability: May be repeated up to 2 times.

HIST 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

HIST 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

HIST 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.
HIST 7201 European Social History 1650–1850 (3 SH)
Designed to help history graduate students develop a research/teaching subfield in European social history, 1650-1850. The goal is to work as a collective to inform fellow students about the special problems, sources, and themes in European social history.

HIST 7202 Topics in Russian History (3 SH)
Offers reading and discussion on the historiography of special themes in Russian history. Student papers and presentations are based on reading in selected subfields.
• Repeatability: May be repeated without limit.

HIST 7203 Topics in Soviet History (3 SH)
Offers reading and discussion on the historiography of special themes in Soviet history. Student papers and presentations are based on reading in selected subfields.
• Repeatability: May be repeated without limit.

HIST 7204 Topics in East European History (3 SH)
Offers reading and discussion on the historiography of special themes in East European history. Student papers and presentations are based on reading in selected subfields.
• Repeatability: May be repeated without limit.

HIST 7205 Nations and Nationalism (3 SH)
Reviews a selection of the current literature on state building and nationalism from roughly 1789 to 1950. Considers Europe as its primary field of inquiry, but also ventures outside of Europe to examine the relationship between European state building, nationalism, imperialism, and colonialism. Examines nationalism and the processes of state building both as discourses and as political practices, looking at foundational texts on the nation, nationalism, and state policy. Emphasis is on the intersections of gender, class, and race in creating and maintaining national identities.

HIST 7206 Gender, Colonialism, and Postcolonialism (3 SH)
Examines how gender, race, and class influenced the experience of colonialism (for both colonial subjects and European colonizers); how colonialism operated with respect to gender, race, and sexuality; and how gender and race differences shaped postcolonial societies and individuals’ experiences. Topics include theoretical frameworks for study of the intersections of gender, race, sexuality, and colonialism; sexuality and empire; race, feminism, and colonialism; and the feminization of the labor force in global capitalism. Students gain experience reading primary sources including the reports of missionaries, diaries and journals of travelers, legal texts, and newspapers that attempted to represent and regulate the relations between Europeans and non-Europeans.

HIST 7207 The Renaissance (3 SH)
Discusses European political and cultural life from the thirteenth to the seventeenth centuries, with emphasis on humanism and to the rebirth of classicism in literature and the arts.

HIST 7208 Topics in Early Modern Europe (3 SH)
Examines recent interpretations of and approaches to such topics as the Renaissance and Reformation; the “crisis” in Europe, 1540-1660; gender roles; the French Revolution; and popular culture. Emphasizes recent monographs and journal literature. Requires oral presentations and short critical essays.
• Repeatability: May be repeated without limit.

HIST 7209 World War I (3 SH)
Provides a global analysis of the causes, prosecution, and outcomes of the twentieth century’s pivotal conflict, focusing on historiographic frameworks and controversies and on current research on the subject. Explores strategic and military, diplomatic and domestic political, economic and financial, social and psychological, cultural, intellectual, and religious aspects of the war, and their mutual impacts on one another.

HIST 7210 Atlantic Revolutions (3 SH)
Studies the earliest revolutions of the seventeenth and eighteenth centuries in order to understand better how revolution became an integral part of modern consciousness and ideology. Beginning in England, the early revolutions flared on both sides of the Atlantic, moving from England to the thirteen colonies, to France, and to Haiti. Examines the way in which these early revolutions influenced and cross-fertilized one another, extending their implications to the political, social, and cultural spheres. Like ships, goods, diseases, and human beings, ideologies flowed across the ocean, changing human consciousness in the process. With the development of revolutionary philosophies, radical participatory politics had become an integral part of modernity. Students read selections from a number of works that discuss these early revolutions and their implications and write a research paper.

HIST 7211 Anthropology and History (3 SH)
Studies a number of works by anthropologists who have been particularly influential upon historiography, such as Douglass, Geertz, Sahlin, Bordieu, and others. Discusses the application of this body of works to historical writing, and also questions the applicability of the anthropological approach. Students write a research paper illustrating the use of anthropological history to address a particular historical problem.

HIST 7212 Comparative State Building (3 SH)
Examines the development of nation-states, emphasizing the period between 1760 and 1940. Emphasis is on militarism, economic growth and its consequences, the rise of classes, nationalism, the evolution of welfare states, and administrative government.
HIST 7213 Political Reform in America (3 SH)
Examines movements to reform government in the United States and their results since the late nineteenth century. Emphasis is on responses to industrialism during the Gilded Age, Populism, Progressive Era, the New Deal, the Great Society, and the Reagan Revolution. Analyzes transnational influences on political change.

HIST 7214 Wealth and Poverty in the Modern World (3 SH)
Traces the history of industrialization and analyzes the impact of economic growth on individual standards of living in the affluent and lesser developed nations between 1815 and the present.

HIST 7215 Colonial American: Eighteenth Century (3 SH)
Studies expansion of European colonies in North America, conflicts among European nations and with indigenous people, development of social, economic, and political institutions, and resulting development of an American awareness.

HIST 7216 American Education in World Perspective (3 SH)
Examines the expansion of public education from the passage of compulsory schooling laws to the establishment of the multiuniversity and the problems facing American education in the 1990s. Gives attention to views that common schooling and land-grant colleges were part of the larger movement to extend democracy. Examines challenges to these propositions in detail.

HIST 7217 Modern American Social History (3 SH)
Examines recent historical literature on changes in American society over the last hundred years. Possible topics include race, ethnicity, class, gender, migration, demography, deviance, and social policy.

HIST 7218 Cultural History of the U.S. (3 SH)
Analyzes recent major works in the cultural history of the United States. Readings include examples of the various methodological components in the practice of what has been termed “the new cultural history.” These include works that draw upon folklore and folk life studies, material culture studies, literary theory, cultural anthropology, architectural history, art history, and social and intellectual history. Sources include both popular and elite cultural forms.

HIST 7219 Topics in Cultural History (3 SH)
Offers special topics in cultural history.
• Repeatability: May be repeated without limit.
• Equivalent: CINE 6219.

HIST 7220 North American Environmental History (3 SH)
Analyzes recent major works in the environmental history of North America. Readings include the works of historians that transcend nation boundaries and focus on the effects of human activities on changing the land, forests, wildlife and wildlife habitat, and water and air quality. Many of these works are multidisciplinary and include the writings of natural scientists and social scientists.

HIST 7221 Topics in World History (3 SH)
Offers readings on selected themes and issues in world history.
• Repeatability: May be repeated without limit.

HIST 7222 Approaches to World History (3 SH)
Offers a graduate-level survey of world history, intended for prospective teachers of world history at secondary and introductory college levels. Reviews the subject matter and teaching materials for world history and emphasizes narrative, major themes, analytical approaches, debates, texts, collateral readings, and multimedia resources.

HIST 7223 Global Environmental History (3 SH)
Designed for students committed to studying the broad sweep of global history from an environmental perspective. Focuses on the dynamic relationship between human communities, civilizations, and the earth itself. Addresses the history of climate change, agriculture, industrialization, globalization, and the evolution of new energy technologies in an environmental context that cuts across both national boundaries and broad historical time periods from ancient times to the present.

HIST 7224 Global Japan (3 SH)
Examines the history of Japan in regional and global context from prehistory to recent times. Topics include the archaeological record of archaic East Asia, the incorporation of Japan into the cultural zone in the sixth to eighth centuries C.E., Japan as a center of Buddhism, early contacts with Europe in the sixteenth century, Japan as an early-modern East Asian empire, state formation under European influence in the late nineteenth century, imperialism, colonialism, war and defeat, and the rise of Japan as a global economy in the twentieth century. Readings in primary and secondary sources are in English translation.

HIST 7225 Contemporary Japan (3 SH)
Examines Japanese society, economics, and politics from the institution of the American Occupation until the end of the century. Emphasis is on the rebuilding of Japan after the war, the rise of a thriving consumer culture in the 1970s, Japan’s emergence as an economic superpower in the 1980s, urban culture, the LDP, Japanese-American relations, and the status of Koreans and other minorities.

HIST 7226 Engendering China (3 SH)
Explores gender dynamics and roles in China from the sixteenth century to the present. Pays particular attention to social constructions of masculinity and femininity in Confucian culture, the operations of patriarchy, marriage practices, female agency, and the male critique of women’s subordination in late imperial times. Examines how these cultural and social practices were transformed or inscribed during the turbulent twentieth century.
HIST 7227 Twentieth-Century China: Revolutionary Change in a Global Context (3 SH)
Assesses the impact of the Chinese Communist Revolution of 1949 on state-societal relations. Focuses initially on the Mao era, particularly state-sponsored efforts to transform Chinese society through social mobilization campaigns, political culture, industrialization, and rural collectivization. Explores the impact of the economic reform policies initiated after 1978, emphasizing the social impact of globalizing economic forces, the rise of a consumer culture, the development of a legal system, and the ethnic relations between Han Chinese and minority populations, especially in Tibet and Xinjiang.

HIST 7228 Atlantic Connections (3 SH)
Explores the interactions of Europe, the Americas, and Africa from the fifteenth through the seventeenth centuries. With background on societies in each region, the course proceeds through study of the developing concepts and practices of power, race, and gender as these emerged out of the initial encounters and early colonization, and as they led to reshaping of life in each region.

HIST 7229 History of Exploration (3 SH)
Offers a comprehensive survey of planetary exploration from ancient times to the present, with emphasis on the ways in which historians have reconstructed the motives of the explorers and the institutions that supported them, the technologies developed and utilized in the process, the impacts of the contacts made on both the regions discovered and on the explorers’ home societies, and on the cultural and environmental impacts of the contacts on the world in general.

HIST 7230 Life at Sea (3 SH)
Examines the role of the individual at sea through history and literature. Emphasizes the concepts of shipboard law and authority as well as observations on the notion of the “voyage” and the maturation process. Requires an all-day Saturday field trip.

HIST 7231 African-American History 1 (3 SH)
Covers the history of African-Americans to 1900, with emphasis on the role of black people in slavery and freedom.

HIST 7232 African-American History 2 (3 SH)
Considers African-American history since 1900.

HIST 7233 Latino/a History in the U.S. (3 SH)
Explores the Latino/a population, the fastest-growing ethnic population in the United States. Despite all the recent media attention given to these groups, their history remains largely obscure. Furthermore, the diversity within the Latino/a population is seldom studied. Explores the historiography about Latinos/as in the United States and compares it with that of other immigrant and ethnic communities. Discusses the question of Latino/a ethnic identity.

HIST 7234 The African Diaspora (3 SH)
Provides an exploration of Africa and the African diaspora in the modern period. Focuses on two sets of themes, each within a distinct time frame. Addresses the peopling of the African diaspora through the slave trade and other movements, for the period from the sixteenth to the nineteenth centuries, as well as the cultural patterns and changes of various diaspora communities, and the relationship of culture in the diaspora to that on the African continent. Also addresses pan-African politics and identity in the nineteenth and twentieth centuries including nationalism and nation-building in Africa and abroad, as well as other elements of pan-African identity as reflected in music, dress, and speech.

HIST 7235 Third World Women (3 SH)
Offers a critical examination of the complex gender dynamics shaping the lives of women in nonwestern societies from colonial times until the present. Deconstructs the term “Third World” and sees how it can be read against the context of imperialism. Examines gender constructs in relationship to racial and class hierarchies. Other topics include patterns of gender domination and female resistance, the interplay of imperialist and patriarchal forms of domination under colonial rule, the western gaze and representations of Third World “primitive” women, and the feminization of labor and the global economy.

HIST 7236 Caribbean History (3 SH)
Studies the history of the Caribbean region in the modern period. Focuses on political, social, and cultural history. Develops and compares the historical experiences of Spanish-, English-, and French-speaking territories. Topics include colonial rule, comparative slave societies, abolition and emancipation, cultural life, social movements, twentieth-century authoritarian politics and economic development models, industrialization and urbanization, and immigration.

HIST 7237 Legal History around the World (3 SH)
Offers an overview of major topics and approaches in the field of legal history. Draws from readings examining the many uses, purposes, and meanings of law in different contexts around the world from the early modern period into the twentieth century. Explores the dynamics and tensions between law as centered in the state (top-down) and law as practiced in society (bottom-up) to seek to understand law’s many manifestations. Surveys the diverse methodologies of legal history—the ways scholars have used legal codes, cases, and events to understand and chart social, cultural, economic, and historical change.
HIST 7238 Colonialism in Contemporary Africa (3 SH)
Introduces the various sources, methodologies, and theories employed by Africanist scholars. Traces the development of African studies and of key frameworks within the discipline. Focuses on what kinds of sources Africanists mobilize and how this source base has changed over time; the change in issues that Africanists focus on; how Africanist scholarship fits within history overall; recommendations Africanist scholars make about “doing” history; how Africanist scholarship engages with theory and other “areas” or disciplines; and what sorts of problems theory helps Africanists address.

HIST 7239 Space and Place (3 SH)
Examines the role of space and place in the constitution of society and culture through a set of key readings. Themes include the geographical production of class, gender, and race/ethnicity in modernity and postmodernity as well as the role of space and place in debates around postcolonialism. The ways in which space and place are implicated in the practice of power and resistance are key to the course.

HIST 7240 Visual and Material Culture (3 SH)
Effective Spring 2017
Explores approaches to and issues in the history of material and visual culture from 1700 to the present. Through formal analysis of objects and images; readings in criticism, theory, and history; and site visits, considers questions of cultural and social reproduction, capitalism and consumption, materiality, intermediation, technology, spectatorship, and media specificity. Offers students an opportunity to obtain a more sophisticated understanding of the ways that visual and material culture have altered cultural, social, and perceptual customs; have more confidence interpreting such sources as historical evidence; and be able to employ such sources in the practice of public history.

HIST 7249 Publishing: History and Practice (3 SH)
Designed to instill a healthy skepticism for the printed word and to help students become better producers and consumers of historical materials. In the course’s “History of the Book” component, students have an opportunity to examine the evolution of publishing in the United States as it involved relationships among writers, publishers, editors, printers, booksellers, readers, and librarians. Throughout the course, students have opportunities to develop and practice publishing skills. After having the opportunity to achieve a basic competency in the history and practice of publishing, students then weigh in on current problems in the trade: electronic distribution and its impact on traditional publishing; open access and editorial gate keeping; copyright infringement and plagiarism; for-profit versus nonprofit publishing; and the shifting role of libraries.

HIST 7250 Topics in Public History (3 SH)
Offers readings, class work, and projects on selected themes and issues in public history.

HIST 7251 Topics in American History (3 SH)
Focuses on one or more topics in the history of the United States.
• Repeatability: May be repeated up to 2 times.

HIST 7252 Topics in Middle Eastern History (3 SH)
Offers students an opportunity to read and discuss the historiography of special themes in Middle Eastern history. Student papers and presentations are based on reading in selected subfields.
• Repeatability: May be repeated once.

HIST 7255 American Urban History (3 SH)
Explores the history of U.S. cities from 1630 to the present with an emphasis on more recent history. While the topics covered include race, class, gender, violence, globalization, and disasters, the major themes are physical planning and urban infrastructure.

HIST 7257 Race and Gender Encounters: U.S. Encounters with Empire (3 SH)
Examines the influence of race and gender identities and ideologies in the U.S.’s encounter with empire from the mid-nineteenth century through the twentieth century. Uses course-directed readings to examine how race, gender, class, and other factors help promote a U.S. national identity in the international world. Also explores how these factors shape and influence U.S. foreign policy as well as intimate, everyday interactions between men, women, and children.

HIST 7259 Topics in American History (3 SH)
Focuses on one or more topics in the history of the United States.

HIST 7260 The Mediterranean World: Historiographic Approaches (3 SH)
Begins with Fernand Braudel’s landmark work on the Mediterranean in the sixteenth century and goes on to explore the historiography surrounding Mediterranean studies. Themes include the Mediterranean as a continuous space for exchange, interaction, and synthesis in the ancient, medieval, and modern periods; migrational patterns and labor movements across the Mediterranean; the Mediterranean as a site for colonial encounters; the discourse about the Mediterranean during the fascist period; the postcolonial construct of a “North/South” divide; and the issues of a common Mediterranean culture, environment, and heritage.

HIST 7270 Race and Gender Frontiers: U.S. Encounters with Empire (3 SH)
Examines the influence of race and gender identities and ideologies in the United States’ encounter with empire from the mid-nineteenth century through the twentieth century. Uses course-directed readings to examine how race, gender, class, and other factors help promote a U.S. national identity in the international world. Offers students an opportunity to explore how these factors shaped and influenced not only U.S. foreign policy but also intimate, everyday interactions between men, women, and children.
HIST 7296 The Ocean: Trans-Regional Histories, Routes, and Discourses (3 SH)
Addresses the communicative, transactional, and transitional aspects of oceanic space. The sea gives shape to and is shaped by cultural, economic, and political processes. Surveys the ways in which the ocean has been a medium for sustenance and transformation; a plane of integration and a route for human interaction; a place of contemplation, confrontation, pleasure, and subjection. Considers the discursive and legal divisions of the sea but keeps in mind that the ocean has been a critical means of global integration precisely because it is a single body.

HIST 7297 The British Atlantic (3 SH)
Examines the context of British encounters in the Atlantic during the seventeenth through the nineteenth centuries, focusing on an analysis of developments in society and culture, politics, economics, race, gender, and class. Considers contacts and connections between cultures, and the consequences of those interactions, and investigates how Britons experienced their empire both in the metropole and in the peripheries. Also studies the movement of peoples and ideas across the Atlantic and compares the British imperial project to the colonizing endeavors of the Spanish, French, and Dutch.

HIST 7301 Research Seminar in Russian History (3 SH)
Offers a seminar on selected themes of Russian history.

HIST 7302 Research Seminar in Soviet History (3 SH)
Offers a seminar on selected themes of Soviet history.

HIST 7303 Research Seminar in East European History (3 SH)
Offers a seminar on selected themes of East European history.

HIST 7304 Research Seminar in Gender and Society in the Modern World (3 SH)
Studies feminists’ claims-making; the meanings of masculinity at work and in arguments for citizenship; sexuality and rights; masculinity and femininity; and examines how gender, as a system of cultural practices and power relations, intersected with class and race to influence the meanings of citizenship, work, state policy, and sexuality. Discusses the social practices and political consequences of those meanings. Considers topics such as gender and the “democratic” European revolutions of the eighteenth and nineteenth centuries; the ways in which gender shaped the meanings of work, skill, and the body; the importance of race in European war; and the emergence of modern welfare states. Although this course takes Europe as its point of departure, it also explores how Europeans operated as part of a transnational, if not global, economic and political system from the late eighteenth century to the 1950s.

HIST 7305 Research Seminar in Society and Culture in Modern Europe (3 SH)
Explores a variety of themes and debates in the social and cultural history of Europe in the nineteenth and twentieth centuries. Discusses new thinking about the emergence of industrial societies, middle-class and working-class culture, consumption and consumer culture, the development of national identities, and debates about the notion of class in European history. Examines the impact of imperialism on European culture and society, the broad cultural and social consequences of war on the home front, and commemoration of war. Students conduct research using primary sources, such as newspapers, government documents (such as Parliamentary papers), and other published documentary collections, diaries, and visual materials.

HIST 7306 Research Seminar in Twentieth-Century Europe (3 SH)
Offers a seminar in which the faculty selects a single topic in contemporary history on which the course is focused. The classes themselves analyze and evaluate the history, historiography, issues, and current research agendas of the subject, while individual class members undertake and complete research papers on particular aspects of the topic of interest to them. Past topics have included the Great Depression, the rise of Fascism, the Holocaust, and the Cold War in Europe.

HIST 7307 Research Seminar in Travel Literature (3 SH)
Studies some of the major theoretical works on travel literature and on encounters with the “other” in general. Travel literature is a crucial source that historians can utilize to examine a number of topics extending from national identity to the development of ethnography to perceptions of gender. Examines some of the sources available to graduate students in a variety of fields in preparation for writing papers, and discusses a variety of methodological approaches for analyzing primary source material. Then concentrates on a research paper to be turned in at the end of the semester, with students presenting their research sequentially through the course of the term.

HIST 7308 Research Seminar in Autobiographies and Life Statements (3 SH)
Examines how cultural or political historians often find that autobiographies, diaries, letters, and various other life statements provide one of their richest sources because of their comprehensiveness and detail. Yet these sources also present difficulties because of problems of veracity and because they present a narrative that may in the end run counter to that of the historian. Explores some of the attempts to overcome these problems and to use such sources in a historical narrative. In the second part of the course, students write a research paper, presenting their research sequentially through the course of the term.
HIST 7309 Research Seminar in Colonial and Revolutionary America (3 SH)
Offers an in-depth examination of particular topics of the period, with an emphasis on bibliographic development and the use of archival materials.

HIST 7310 Research Seminar in North American History (3 SH)
Offers individual projects on an aspect of North American history, leading to a documented research paper.

HIST 7311 Research Seminar in Urban History (3 SH)
Examines the history of the modern city, with a focus on America and on Boston, and discusses local history sources and their analysis.

HIST 7312 Research Seminar in American History (3 SH)
Offers research and writing on selected aspects of American history.

HIST 7313 Research Seminar in Recent American History (3 SH)
Studies special topics from the period 1896 to the present in detail. Requires presenting a research paper on a major person, action, or movement.

HIST 7314 Research Seminar in World History (3 SH)
Gives students the opportunity to do research and write a paper that addresses historical issues and processes significant at a global scale. Discussions focus on what it means to be environmental on a global scale, how to find and utilize relevant source material, and on previous scholarship relevant in helping shape questions and issues in our own work. Students also read and critique one another’s work.
* Repeatability: May be repeated up to 4 times.

HIST 7315 Research Seminar in Global Social History (3 SH)
Offers a research seminar addressing major issues in social history at the global level. Topics include family, demography, community, ethnicity, gender, class, race, and nation. Research papers link a selection of these issues across national and continental boundaries. Recently, the seminar focused on issues of gender, colonialism, and postcolonialism. It examined how gender influenced the experience of colonialism (for both colonial subjects and white colonizers), how colonialism operated with respect to gender and sexuality, and how gender differences were manifested within postcolonial contexts. Considers theoretical frameworks for the study of gender, race, class, and colonialism; notions of masculinity and “machismo”; colonial women subjects; sexuality and empire; the position of white European women as colonizers and as feminists; the postcolonial state as a regulator of sexuality and marriage; and the feminization of the labor force in global capitalism.

HIST 7316 Research Seminar in Global Environmental History (3 SH)
Gives students the opportunity to do research and write a paper that addresses historical environmental issues and processes significant at a global scale. Discussions focus on what it means to be environmental on a global scale, how to find and utilize relevant source material, and on how previous scholarship is relevant in helping shape questions and issues in our own work. Students also read and critique one another’s work.

HIST 7317 Research Seminar in Western Perceptions of China (3 SH)
Offers a research seminar on the production and uses of a vast array of Western cultural myths and stereotypes about China from the sixteenth century until the present. These images are identified and analyzed in a wide range of primary sources including travelers’ literature, missionary records and letters, fiction, journalistic accounts, visual representations, and scholarly studies.

HIST 7318 Research Seminar in Issues of Teaching Social Issues (3 SH)
Using a specific “real world” issue as a case study, the seminar explores the problem from a variety of social science disciplines, each bringing its own methodologies and approaches to bear on the issue. Students from participating departments work on interdisciplinary research teams to produce coherent analyses of the problem and (where appropriate) action plans. Required of all students for Standard Certification in Social Studies.

HIST 7319 Research Seminar in African-American History (3 SH)
Offers research and writing on an aspect of African-American history.

HIST 7320 Research Seminar in Cultural History of the United States (3 SH)
Requires students to conduct research and write an original paper that addresses historical issues in the cultural history—in particular the material culture—of North America.

HIST 7321 Sail and Steam: The Atlantic 1815–1914 (3 SH)
Focuses on the interconnections of the Atlantic world from 1450–1900. Examines the consequences of exploration, conquest, and colonization in the New World as well as in the old. During this period ships, goods, diseases, human beings, and ideas flowed across the ocean, tying together the Atlantic basin in a complex web of relationships. We read a number of secondary works discussing the theoretical and comparative analysis of the Atlantic world, focusing upon central cultural themes such as gender, colonialism, social developments, the economy, and the growth and spread of ideologies. Requires students to research and write an original paper about connections in the Atlantic world.
HIST 7322 Seminar: 1968 in Global Perspective (3 SH)
Examines the significance of 1968, when a worldwide wave of largely student-driven unrest signaled that “something happened” during that year. From London to Tokyo, from Chicago to Prague, from Mexico City to Paris, the young generation of the late sixties challenged the old order. But why? Engages students with the growing interdisciplinary theoretical literature on international protest movements, before going on to examine a number of national “1968s.” Uses primary and secondary sources to seek to understand what these events meant locally, how they were connected globally, and to what extent they can fit into a larger pattern of a world event known as “1968.” Requires a significant research paper dealing with one of these or another question determined in consultation with the instructor.
• Prerequisite: HIST 5101.

HIST 7323 Seminar: Modern Colonialism (3 SH)
Focuses on modern colonialism from the seventeenth to the mid-twentieth century, concentrating primarily on European colonialism. Students have an opportunity in this research seminar to investigate many aspects of the colonial project, such as the techniques and practices of empire, the production of knowledge, orientalism and othering, the construction of race and gender, environmental impacts, the growth of nationalism and other forms of resistance, and decolonization. Students are expected to use the methodological and theoretical approaches explored in the course to produce an independent research paper based on primary sources.

HIST 7324 Seminar in Transnational Animal-Human Relations (3 SH)
Includes topics such as hunting, the origins of domestication, myth and religion, benign and companion animals (pets), animals as threats, ecosystem modifications (such as the Columbian Exchange), real and imagined cyborgs, biological modification by humans, and animals as food.

HIST 7325 Research Seminar: Modern Africa (3 SH)
Examines major issues in African history from 1500 to the present. Explores a variety of topics relating to the African continent’s engagement with the world, including labor, religion, sexuality, and violence. Addresses theoretical and methodological frameworks for understanding colonialism and postcolonialism. Concentrates on the development of Africanist historiography from the 1950s onward. Offers students an opportunity for training in the theories and methods of primary source research using archival documents, literature, oral histories, and media. Requires students to write research papers that examine issues in African history across national and regional boundaries, incorporating the theories and methods considered in class.

HIST 7370 Texts, Maps, and Networks: Readings and Methods for Digital History (3 SH)
Introduces the methods and practice of history in a digital age. Offers students an opportunity to see the wide variety of work being done computationally by historians and other humanists today and to obtain the background to be creative producers of new work and critical consumers of existing projects. The rise of computing technology and the Internet has the potential to reshape all parts of historical practice, from curation to research to dissemination. Examines the historian’s craft in three primary domains: the creation of digital sources, the algorithmic transformations that computers can enact on cultural materials like texts, and the new ecologies of publishing and scholarly communication made possible by new media.

HIST 7370 Professionalization and Pedagogy for Historians (1 SH)
Offers students an opportunity to attend lectures and workshops organized by faculty members on the topics of professionalization and pedagogy. Topics covered include publishing, conference presentation, CV preparation, grant application, archival research, undergraduate course design, lecture preparation, grading, and discussion leading.
• Repeatability: May be repeated up to 2 times.

HIST 7701 Advanced Research Seminar in World History (3 SH)
Entails research and preparation of a world history paper intended to be part of a larger dissertation. Includes intensive historiographical reading related to the research topic.

HIST 7702 Advanced Seminar in Global Environmental History (3 SH)
Entails research and preparation of a global environmental history paper intended to be part of a larger dissertation. Includes intensive historiographical reading related to the research topic.

HIST 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

HIST 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HIST 7990 Thesis (1 to 4 SH)
Offers thesis supervision by members of the department.
• Repeatability: May be repeated without limit.

HIST 7996 Thesis Continuation (0 SH)
Offers continuing thesis supervision by members of the department.
HIST 8400 Assigned Readings in Historical Geography (3 SH)
Offers directed study in geography’s impact on history. This course may be used to help satisfy teacher certification demands for history, political science and political philosophy, and social studies that has course work in geography.
- Repeatability: May be repeated without limit.

HIST 8405 Directed Study (3 SH)
Offers assigned reading under the supervision of a faculty member.
- Repeatability: May be repeated without limit.

HIST 8406 Directed Study (3 SH)
Offers assigned reading under the supervision of a faculty member.
- Repeatability: May be repeated without limit.

HIST 8407 Directed Study in Women's History (3 SH)
Offers assigned reading in women’s history under the supervision of a faculty member.
- Repeatability: May be repeated without limit.

HIST 8408 Teaching Methodology Adjunct (3 SH)
Offers a M.A.T. program course adjunct connected to any graduate history course to permit students to consider the curricular and teaching implications of the history course content.

HIST 8409 Practicum in Teaching (1 SH)
Offers students the opportunity to teach individual college-level courses within the Department of History under the general supervision of a senior faculty member. Open to doctoral students.

HIST 8410 Fieldwork in History 1 (3 SH)
Offers students the opportunity to get practical experience in historical agencies including historical societies, archives, museums, exhibits, restorations, preservation projects, and the like. Requires students to work in the agency ten hours a week for one semester under the direction of an agency supervisor and departmental adviser.

HIST 8411 Fieldwork in History 2 (3 SH)
Gives students a second opportunity to acquire practical experience in an historical agency. Requires ten hours a week for one semester under the direction of an agency supervisor and a departmental adviser.

HIST 8412 Fieldwork in History 3 (3 SH)
Gives students a third opportunity to acquire practical experience in an historical agency. Requires ten hours a week for one semester under the direction of an agency supervisor and a departmental adviser.

HIST 8416 Directed Study in Managing Nonprofit Organizations (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5238.
- Repeatability: May be repeated without limit.

HIST 8417 Directed Study in Historical Societies and Archives (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5240.
- Repeatability: May be repeated without limit.

HIST 8418 Directed Study in Historical Exhibits and Museums (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 7214.
- Repeatability: May be repeated without limit.

HIST 8419 Directed Study in Historical Editing (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5242.
- Repeatability: May be repeated without limit.

HIST 8420 Directed Study in Historical Consulting (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5243, HIST 5244, or HIST 5245.
- Repeatability: May be repeated without limit.

HIST 8421 Directed Study in Industrial Archaeology (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5243.
- Repeatability: May be repeated without limit.

HIST 8422 Directed Study in Historic Preservation (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5244.
- Repeatability: May be repeated without limit.

HIST 8423 Directed Study in Material Culture (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 7218.
- Repeatability: May be repeated without limit.

HIST 8424 Directed Study in Historical Analysis of Public Policy (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
- Prerequisite: HIST 5245.
- Repeatability: May be repeated without limit.
HIST 8425 Directed Study in Publishing for Nonprofits (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
• Prerequisite: HIST 5242.
• Repeatability: May be repeated without limit.

HIST 8426 Directed Study in Oral History (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
• Prerequisite: HIST 5246.
• Repeatability: May be repeated without limit.

HIST 8427 Directed Study in Genealogical Research (3 SH)
Permits students who have completed course work on this subject to undertake advanced applications of study.
• Prerequisite: HIST 5244.
• Repeatability: May be repeated without limit.

HIST 8428 Directed Study in Media and History (3 SH)
Permits students who have completed course work on this subject to undertake advanced individual applications projects in media and history.
• Prerequisite: HIST 5239.
• Repeatability: May be repeated without limit.

HIST 8674 Master’s Project in Public History (3 SH)
Offers research, development, and completion of a significant project, usually in conjunction with a public history agency, that can be utilized as part of the ongoing programs of such agencies.

HIST 8960 Exam Preparation—Doctoral (0 SH)
Intended to show full-time status during the semester of the PhD qualifying exam. Students are expected to carry a full load of research and/or teaching responsibilities in addition to this course.

HIST 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

HIST 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

HIST 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

HIST 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

HIST 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

HIST 9984 Research (1 to 4 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

HIST 9986 Research (0 SH)
Offers the student the opportunity to conduct full-time research.
• Repeatability: May be repeated without limit.

HIST 9990 Dissertation (0 SH)
Offers dissertation supervision by members of the department.
• Repeatability: May be repeated once.

HIST 9996 Dissertation Continuation (0 SH)
Offers dissertation supervision by members of the department.
• Repeatability: May be repeated without limit.

HONORS PROGRAM (HONR)

HONR 1101 Enhancing Honors (0 SH)
Offers a team-taught course required for all first-year honors students. Designed to help students prepare for their campus honors years and create a sense of community within the first-year honors experience. During the semester, students have an opportunity to explore the goals of the University Honors Program: taking part in a living learning community, learning through an interdisciplinary perspective, establishing a research focus, participating in experiential learning, experiencing global awareness, and contributing to civic engagement. Upperclass students in honors are class mentors.
• Prerequisite: Freshman standing and Honors Program participation.

HONR 1102 Enhancing Honors (1 SH)
Offers a team-taught course required for all first-year honors students. Designed to help students prepare for their campus honors years and create a sense of community within the first-year honors experience. During the semester, students have an opportunity to explore the goals of the University Honors Program: taking part in a living learning community, learning through an interdisciplinary perspective, establishing a research focus, participating in experiential learning, experiencing global awareness, and contributing to civic engagement. Upperclass students in honors are class mentors.
• Prerequisite: Freshman standing and Honors Program participation.
HONR 1200 Comparative Study of Cultures (4 SH)
Designed to provide an honors introduction to the issues surrounding specific diversity concerns. Grounded in a discipline focus, the course may use a historical and/or contemporary perspective to analyze diversity as it relates to one or more of the following issues: religion, race, class, gender, ethnicity, age, sexual orientation, or disability. These diversity themes are designed to facilitate and challenge our understanding of an increasingly pluralistic and diverse world. Course may include non-Western, European, and/or American examples.
• Prerequisite: Honors Program participation.
• NU Core: Comparative study of cultures.
• Repeatability: May be repeated once.
• Equivalent: HONR 2200.

HONR 1201 Recitation for HONR 1200 (0 SH)
Provides small-group discussion format to cover material in HONR 1200.
• Prerequisite: Honors Program participation.
• Repeatability: May be repeated once.
• Equivalent: HONR 2201.

HONR 1205 Inquiries in Social Science (4 SH)
Designed to provide an honors introductory-level study in the social sciences. Draws upon perspectives in anthropology, sociology, psychology, political science, history, economics, education, interdisciplinary studies, African-American studies, international affairs, or criminal justice to expand individual breadth of knowledge and facilitate our understanding of various themes grounded in a particular discipline.
• Prerequisite: Freshman standing and Honors Program participation.
• NU Core: Social science level 1.
• Repeatability: May be repeated once.
• Equivalent: HONR 2205.

HONR 1206 Inquiries in Science and Technology (4 SH)
Designed to provide an honors introductory-level study in science and technology. Draws upon perspectives in math; sciences including biology, chemistry, physics, and earth and environmental studies; computer and information sciences; engineering; or various health science fields to expand individual breadth of knowledge and facilitate our understanding of various themes grounded in a particular discipline.
• Prerequisite: Freshman standing and Honors Program participation.
• NU Core: Science/technology level 1.
• Repeatability: May be repeated once.
• Equivalent: HONR 2206.

HONR 1207 Inquiries in Mathematical/Analytical Thinking (4 SH)
Focuses on a particular way in which mathematical and analytical thinking manifests itself, physically and intellectually, in the arts, sciences, or humanities. Topics are chosen that have both a rich mathematical/analytical thinking component and an impact on our lives and experiences.
• Prerequisite: Freshman standing and Honors Program participation; no further prerequisites, but students should be confident in their mathematical/analytical skills and prepared to engage in mathematical/analytical thinking and activity.
• NU Core: Mathematical/analytical thinking level 1.
• Repeatability: May be repeated once.

HONR 1208 Inquiries in Arts (4 SH)
Designed to provide an honors introductory-level study in the arts. Draws upon perspectives in music, architecture, interdisciplinary studies, or the performing and visual arts to expand individual breadth of knowledge and facilitate our understanding of various themes grounded in a particular discipline.
• Prerequisite: Freshman standing and Honors Program participation.
• NU Core: Arts level 1.
• Repeatability: May be repeated up to 2 times.

HONR 1209 Inquiries in Humanities (4 SH)
Designed to provide an honors introductory-level study in the humanities. Draws upon perspectives in literature, philosophy and religion, language, or interdisciplinary studies to expand individual breadth of knowledge and facilitate our understanding of various themes grounded in a particular discipline.
• Prerequisite: Freshman standing and Honors Program participation.
• NU Core: Humanities level 1.
• Repeatability: May be repeated up to 2 times.

HONR 1310 Honors Inquiry (4 SH)
Designed to provide an honors introductory-level experience. Draws upon an interdisciplinary perspective to expand individual knowledge and facilitate a deeper understanding of issues. Similar to a topics course, each section of the course offers a new and unique academic experience.
• Repeatability: May be repeated without limit.

HONR 3309 Honors Seminar Abroad (4 SH)
Seeks to promote knowledge, understanding, and global engagement through course work, language acquisition, travel, and participation in a Northeastern University designed and delivered international academic experience. Targeted toward honors students who may not have the opportunity to complete international work later on in their academic career or who want to have an early international experience prior to a more traditional study abroad or international co-op experience.
• Prerequisite: Honors Program participation.
• Repeatability: May be repeated without limit.
HONR 3310 Honors Seminar (4 SH)
Designed to provide an honors intermediate-level experience.
Draws upon an interdisciplinary perspective to expand individual
knowledge and facilitate a more advanced understanding of issues.
Emphasizes research and inquiry of urban, historical, or
contemporary themes.
  • Prerequisite: Sophomore standing or above and Honors
    Program participation.
  • Repeatability: May be repeated up to 9 times.

HONR 4915 Honors Teaching Experience (4 SH)
Offers advanced honors students pedagogical experience in course
design and implementation of honors classes. Teaching assistants
are attached to particular courses where they are mentored by
senior faculty. Includes ongoing discussions with the faculty
mentor, observation and participation in an undergraduate course,
leading discussion groups, and additional classroom
responsibilities as defined by the faculty mentor.
  • Prerequisite: Honors Program participation.

HONR 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of the department on
a chosen topic. Course content depends on instructor.
  • Prerequisite: Honors Program participation.
  • Repeatability: May be repeated without limit.

HONR 4997 Honors Interdisciplinary Thesis (4 SH)
Represents a culmination of the diverse topics students encounter
while enrolled in the University Honors Program. Offers students
an opportunity to work closely with a faculty mentor to conduct
intensive original research that includes an interdisciplinary
perspective and produces a significant body of work. The thesis
should utilize a cross-discipline perspective that includes at least
two disciplines, allowing students to express their academic
creativity, to discover new ways of synthesizing information, and
to test the traditional boundaries between disciplines.
  • Prerequisite: Junior or senior standing; honors students only.

HRMG 5976 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake
independent study in lieu of any course required in the various
concentrations. Students present proposals to an Independent
Studies Committee for evaluation and approval. Every proposal
requires a detailed outline of the objectives and plan of study and
must be accompanied by a supporting statement from the
supervising faculty member under whose direction the study takes
place. A copy of the final report prepared by the student is
presented to the appropriate Independent Studies Committee.
Further information about the Independent Studies Program can be
obtained from concentration coordinators.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated without limit.

HRMG 6200 Managing People and Organizations (3 SH)
Examines today’s evolving environment, in which effective
utilization of human resources is a source of competitive
advantage. To maximize the contribution of organizational
members, managers must be able to understand, diagnose, and
influence workplace behavior in the context of change. Topics
include management of cross-functional teams and boundaryless
organizations. Emphasis is on the role of corporate culture and
distributed leadership.
  • Equivalent: HRMG 6208.

HRMG 6208 Effective Organizational and Human Behavior (3 SH)
Introduces theories and concepts designed to help students
diagnose, understand, and predict behavior in organizations.
Managing the “people” side of organizations has always been one
of the greatest challenges for organizations. With today’s
knowledge workers; flatter, decentralized structures; and rapidly
changing competitive conditions, the “human behavior” issues are
of even greater strategic importance to organizational success.
Among the topics addressed are interpersonal communication,
groups and teams, motivation, leadership, organizational culture,
and change. In conjunction with BUSN 6201 and other first-year
activities, students focus not only on the concepts as applied to
others but also on their personal skills and how these can be
developed for more productive behavior in organizations.
  • Equivalent: HRMG 6200.
HRMG 6210 Managing Professionals and High Performance Teams (3 SH)
Designed to improve the managerial and leadership effectiveness of individuals who have increasing responsibility over the performance of creative individual contributors and project teams working for them. Covers both micro concerns (individuals and groups) and macro issues (organizational structure and interfunctional relationships). Topics include creating and sustaining the motivational commitment and performance of professional employees, dealing with complacency and routine performance, managing organizational reward systems and career paths of professionals, overseeing effective conflict management and leadership of decision-making processes, managing pressures between product development and schedule, staffing and managing the critical roles and cross-functional relationships in the innovation process, managing the communication and transfer of information and technology effectively across organizational structures, and effecting organizational diagnosis for systemic change.
• Prerequisite: HRMG 6200 or HRMG 6208.

HRMG 6212 Creating an Innovative Organization (3 SH)
Examines the actions that managers must take to stimulate innovation and direct it in ways that allow the organization to accomplish its goals. Topics include what organization forms are most conducive to innovation, what factors hinder innovativeness and how can they be overcome, and what role managers play in bringing about innovation. Focuses on the actions that companies and their managers can take to design their organizations and systems effectively in order to foster innovativeness. Elements of an organization’s infrastructure include design, reward mechanisms, communication patterns, boundary spanning, control systems, leadership at all levels, and the organization’s culture.
• Prerequisite: HRMG 6200 or HRMG 6208; business students only.

HRMG 6213 Leadership (3 SH)
Built on the premise that everyone is capable of leadership. Exposes students to a series of alternative perspectives of leadership, including some contemporary collaborative models. From careful consideration of these perspectives, as well as from practicing them using the course’s experiential methods, students have an opportunity to build a personal model of leadership upon which they can expand as they continue to develop as leaders.
• Prerequisite: HRMG 6200 or HRMG 6208; business students only.

HRMG 6214 A Management Perspective of Human Resource Management (3 SH)
Takes a general manager’s perspective on human resource management. Global competitive challenges are forcing organizations to become increasingly flexible. Workplace trends such as telecommuting, increased information technology, contingent workers, and diversity hiring designed to address this flexibility are fundamentally altering the realm of human resource management in the United States. Explores how these issues affect the management of people in organizations through case analyses, small-group exercises, videos, and lectures. Examines topics traditionally related to the human resources management function, such as planning, staffing, evaluating, and rewarding. Also examines employee rights, labor relations, and international human resources management.
• Prerequisite: HRMG 6200 or HRMG 6208.

HRMG 6216 Leading Global Organizations (3 SH)
Addresses design and diagnosis, training, human resource flows, structure, and reward systems as tools to achieve effective behavior in global organizations. Effective global organizations require leadership to resolve the challenges inherent in dynamically complex contexts.
• Prerequisite: HRMG 6200 or HRMG 6208.

HRMG 6217 Virtual, Vicious Teams: Building and Leading High-Performance Teams (3 SH)
Offers an opportunity to learn how to build and lead different types of teams, including co-located, virtual, global, and top management teams. Asks students to identify the roles and responsibilities of team members and leaders and to develop effective communication, collaboration, and commitment among team members and other constituencies. Also examines how to effectively facilitate coordination across functionally distinct teams.
• Prerequisite: HRMG 6200 or HRMG 6208.

HRMG 6218 Great Companies (3 SH)
Studies and debates the criteria for a great company. As suppliers, customers, employees, or students, everyone has experience with a range of organizations. Some are admired, some are mediocre, and some are dreadful. This course focuses on companies with management practices that produce and sustain extraordinary outcomes such as low cost, amazing service, fast growth, and exceptional quality. Often, these companies are great because they dare to be different and the key question is: “How do they do it?” Explores such topics as organizational culture, organizational design, empowerment, business process improvement, reward systems, and employee and organizational learning. Uses a variety of learning approaches, including case studies, articles, lecture/discussion, videos, and exercises.
• Prerequisite: HRMG 6200 or HRMG 6208.
HRMG 6219 Leadership for Environmental Sustainability (3 SH)
Explores how organizational leaders use scientific knowledge to develop effective sustainability strategies around such global issues as climate change and energy depletion. Also explores how key stakeholders—businesses, governments, gray sector organizations, and communities—interact on issues of global sustainability. The course objective is to develop leaders who can research and communicate effectively about global environmental sustainability.

HRMG 6220 Health Organization Management (3 SH)
Covers key issues and introduces management principles in health organization management. Offers students an opportunity to apply important theoretical ideas, such as systems thinking and organizational learning, to meet challenges effectively, to learn how the healthcare workplace functions, and how to manage in these workplaces. Emphasizes case-based learning, critical thinking, and evidence-based management using individual and group projects. Introduces cutting-edge tools in areas such as work redesign, performance management, brand enhancement, and quality improvement. Addresses the management imperatives of today’s healthcare organizations and how to implement strategies and programs to meet those imperatives effectively. Intended for anyone interested in working or managing within the healthcare industry, including the field of public health.

HRMG 6221 Power and Influence (3 SH)
Introduces students to the uses of power and influence in the surroundings in which they work, working with and managing people, and achieving the goals they set for themselves. Offers students an opportunity to make sense of their own on-the-job learning experiences and to explore basic diagnostic and action-planning skills that they can later use on the job. Exposes students to a variety of cases that demonstrate the effective and ineffective uses of power in different types of organizational contexts and at different points in a manager’s career and how to consider difficult ethical questions as well.

HRMG 6260 Advanced Topics in Human Resource Management (3 SH)
Offers an in-depth examination of selected issues and problems in human resource management that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.

- Prerequisite: HRMG 6200 or HRMG 6208.

HRMG 6280 The Human Side of Innovation (3 SH)
Examines the leadership and managerial skills required for effectively managing multifunctional teams engaged in product, service, and business process innovation. Incorporates fieldwork, corporate visits, and other experiential learning opportunities. Explores strategies for recruiting, motivating, and retaining high-performance people. Introduces models for leading systematic innovative change within established corporate cultures, including understanding senior management attitudes toward innovation and how to create executive sponsors and mentors.

- Prerequisite: MS-in-innovation students only.

HRMG 6281 Leading and Implementing Innovation in Organizations (3 SH)
Offers a framework for understanding the organizational impact of adopting a new business model as well as an analytic guide to planning and implementing required changes. Examines the role of organizational diagnosis and visioning and the role of top management as an agent and advocate for change. Offers students an opportunity to approach piloting organizational innovations before scaling them across the enterprise.

- Prerequisite: MS-in-innovation students only.

HRMG 6290 Building High Performance Teams (2 SH)
Explores the elements necessary to build, manage, and maintain effective teams. Also explores how teams function and the elements that foster optimal interactions. Classroom exercises introduce class members to one another and assist in forming study groups.

- Prerequisite: Executive MBA students only.

HRMG 6291 Leveraging Organizational Development, Motivation, and Leadership for Organizational Effectiveness (2 SH)
Focuses on both the entire organizational system (organizational design and organizational culture) and individual behavior/interpersonal issues. Offers students an opportunity to increase their understanding of the elements of organizational design and organizational culture and the ways they impact human behavior and organizational effectiveness; to improve their ability to diagnose situations in organizations; to increase their understanding of principles of motivation and leadership styles, providing insight into their own approach to leadership; and to improve their own interpersonal skills in giving feedback.

- Prerequisite: Executive MBA students only.
HRMG 6292 Using Human Resource Management for Competitive Advantage (2 SH)
Focuses on the strategic, rather than administrative, side of human resource management (HRM). Although many companies view HRM as primarily administrative, there are others that recognize that effective HRM is a key to their competitiveness. Emphasizes and illustrates the ways in which different HRM practices support and enable different business strategies. Studies key components and principles of talent management, including recruitment and selection, reward systems, training and development, and retention.
• Prerequisite: Executive MBA students only.

HRMG 6293 Developing and Applying Personal Leadership Skills (2 or 3 SH)
Offers students an opportunity to identify the real challenges in their professional lives, to assess their own leadership skills, and to identify strengths and areas needing further development. Facilitated by faculty and supported by the student’s learning team, students have an opportunity to capture the everyday challenges of the workplace and plan effective responses in the form of increased leadership skills and behaviors. Students work individually and together to accomplish their development goals. After workplace application, offers students an opportunity to reflect on how successful their efforts were, identifying additional strategies to further improve their leadership skills, and to learn to deal with their own and other’s emotional reactions to stresses presented by leadership challenges.
• Prerequisite: Executive MBA students only.

HRMG 6294 Hallmarks of Effective Leadership (2 SH)
Offers students an opportunity to examine and critique behavior in established firms and entrepreneurial ventures so they can better predict performance outcomes, define leader-related problems, and provide solutions. Examines the middle as well as the top of the organization, suggesting how aspiring leaders can expedite career ascension by developing and deploying power through a perception of competency and a propensity for collaboration. Offers students an opportunity to increase their understanding of leadership theory, skills, and practice. Introduces factors that influence the decision-making process, such as followers, gender/cultural diversity, and the organizational environment.
• Prerequisite: Executive MBA students only.

HRMG 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

HRMG 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

HRMG 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

HUMAN SERVICES (HUSV)

HUSV 1000 Human Services at Northeastern (1 SH)
Intended for first-year students in the College of Social Sciences and Humanities. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, INSH 1000, INTL 1000, LANG 1000, PHIL 1000, POLS 1000, and SOCL 1000.

HUSV 1101 Human Services Professions (4 SH)
Explores the attitudes, values, skills, and knowledge of the human services worker and the reasons why people in modern society require human services assistance. Views the human services agency from the eyes of clients as well as society as a whole. Introduces the range of skills used in working with clients in a variety of helping roles such as counseling and interviewing, advocacy, and group work. Required for HS majors as a prerequisite to more specialized courses.
• NU Core: Experiential learning.

HUSV 2300 Counseling in Human Services (4 SH)
Presents an overview of the major theoretical approaches to counseling and therapeutic interventions. Focuses on developing clinical skills and competency in intentional interviewing. Combines systemic group exercises and experiential activities to practice interviewing techniques. Cross-cultural issues in counseling are integrated throughout the course.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

HUSV 2320 Techniques in Individual and Group Counseling in Human Services (4 SH)
Provides in-depth understanding of clinical practice with individuals, groups, and families. Focuses on developing practice skills through presentations, case studies, and self-reflection journals. Examines the role of spirituality within one’s clinical practice. Explores theoretical techniques and their applications in a variety of settings, with particular attention to populations at risk.
• Prerequisite: HUSV 2300.
HUSV 2350 Ethnic Relations, Cultural Identity, and Human Services (4 SH)
Introduces and sensitizes students to the forms, practices, and effects of racism and discrimination on the various populations in the United States and presents frameworks for understanding and working with people with histories of discrimination and different cultural identities. Pays special attention to human services with diverse populations in schools, prisons, and employment assistance programs.
- Prerequisite: Sophomore standing or above.
- NU Core: Comparative study of cultures.
- Equivalent: SOCL 2350.

HUSV 2700 Exploring Adoption: Family, Kinship, and Identity in Contemporary America (4 SH)
Explores the phenomenon of adoption in the United States today from the perspective of all members of the adoption triad (adoptive parents, birth parents). Over the past several decades, the institution and experience of adoption have changed dramatically. Examines topics relating to domestic and international adoption, transracial adoption, open adoption and birth family contact, special needs adoption, adoption from foster care, adoption by gay parents, and the role of social class in adoption. Encourages students to think critically about the meaning of family, kinship, and identity in contemporary society.
- Prerequisite: Sophomore standing or above.
- NU Core: Experiential learning.

HUSV 2800 Sexual Orientation and Gender Expression in Practice and Policy (4 SH)
Introduces students to efforts among social and nonprofit organizations working to reduce heterosexism, homophobia, and transphobia in institutions, communities, and the society as a whole. Discusses practice across the life span for social professionals (social workers, counselors, advocates, and educators) in varied settings such as criminal justice, mental health, adoption, adult day health, and residential programs. Applying theories and current scholarship on LGBTQ identity development, social movements, media, and advocacy, offers students an opportunity to evaluate contemporary issues of controversy for institutions, social practitioners, and policy.
- Prerequisite: Sophomore standing or above.
- Cross-list: WMNS 2800.
- Equivalent: WMNS 2800.

HUSV 2900 Gender Violence: Bystander Education Theory and Practice (4 SH)
Offers participants an opportunity to learn about the theoretical and practice models used to understand and respond to gender-based violence. Focuses on bystander models of prevention. This interactive course is designed for students who are interested in research and practice directed at youth. Explores topics such as battery, gender roles, teen dating violence, sexual harassment, sexual assault/rape, and homophobia as facets of men’s violence against women. Emphasizes trainer skill development for public health and social professionals. Studies how to effectively convene and facilitate public discourse about gender-based violence utilizing the Mentors in Violence Prevention curriculum with high school and college populations. Offers students an opportunity to apply these concepts in service-learning settings.
- Prerequisite: Sophomore standing or above.
- NU Core: Experiential learning.

HUSV 3510 Special Topics in HS (4 SH)
Reviews and discusses selected human services topics.
- Prerequisite: Junior or senior standing.
- Repeatability: May be repeated without limit.

HUSV 3520 Child Intervention and Treatment (4 SH)
Compares and contrasts primary, secondary, and tertiary levels of intervention as they pertain to child welfare systems. Examines specifically the effectiveness and efficiency of home-visiting-based interventions, school-based interventions, child welfare interventions, and programs and practices targeted to reduce and eliminate juvenile delinquency. Considers the availability, distribution, and effectiveness of these prevention, intervention, and treatment programs as they apply to children and their families. Hands-on service learning in the field of child intervention is designed to link the course work on research and theory to human service practice.
- Prerequisite: Junior or senior standing.
- NUpath: Understanding societies and institutions, engaging difference and diversity.

HUSV 3540 Services and Treatments for Chemical Dependencies (4 SH)
Explores students’ personal and cultural perspectives about substance use, abuse, and addiction through the use of readings, films, and case studies. Students evaluate the causes of chemical dependence, and methods of recognition, intervention, and treatment. Offers students the opportunity to investigate the effects of chemical dependency on the family. Meets HS elective requirement.
- Prerequisite: Junior or senior standing; human services majors and combined majors only.
HUSV 3550 Social Policy, Advocacy, and Activism (4 SH)
Covers the fundamentals of advocacy and activism while developing a knowledge base in the areas of housing law and domestic violence. Lectures give an overview of the legal system while exploring its relationship to the social service system. Discusses the history of advocacy and activism, basic legal strategies, lobbying, court procedures, housing code violations, tenant/landlord laws, and restraining orders.
• Prerequisite: HUSV 1101.
• NU Core: Experiential learning.

HUSV 3570 Strategic Philanthropy and Nonprofit Management (4 SH)
Explores the multifaceted role of the nonprofit sector and philanthropy in the United States by examining the practices of and relationship between nonprofit organizations and funders. Topics include community needs assessment, strategy, program design and evaluation, organizational structure and capacity, governance and ethics, and sustainability. Offers students an opportunity to acquire practical skills on both sides of the grantee/grant-maker relationship by engaging in real-dollar grant making and nonprofit program management projects.
• Prerequisite: Sophomore standing or above.
• NU Core: Experiential learning.

HUSV 3700 Research Methods for Human Services (4 SH)
Offers an introduction to social science research that examines the theoretical and ethical foundations of social research methods. Highlights foundation knowledge and skills in hypothesis testing, research design, sampling strategies, measurement techniques, and basic data analysis and interpretation. Focuses on program evaluation to provide an opportunity for students to link social science research methods to direct human service practice.
• Prerequisite: HUSV 1101 and sophomore standing or above; human services majors and combined majors only.
• NUpath: Analyzing and using data.

HUSV 3900 Introduction to Social Policy (4 SH)
Examines how social policy influences child, family, and community development. Provides a historical overview and a contemporary examination of many social problems, including poverty, health and mental health issues, child welfare, educational inequality, and consequences of juvenile and adult crime. Examines the policies and programs that help or hinder positive individual, family, and community development and considers the role of human service values and ethics on the American response to social policy. Offers students an opportunity to examine and critique the implementation or lack of implementation of formal social policies at the local, state, and federal level and to suggest initiatives to meet the needs of intergenerational families.
• Prerequisite: HUSV 1101 and junior standing or above; human services majors and combined majors only.
• NUpath: Understanding societies and institutions.

HUSV 3720 Introduction to Social Science (4 SH)
Examines emerging roles and career options within the human services field. Focuses on self-examination of attitudes and values affecting delivery of services, exploration of ethical issues and dilemmas relevant to human services, grant and funding issues, staff supervision and development within human services agencies, and refinement of group leadership skills.
• Prerequisite: Senior standing; human services majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

HUSV 4686 Intercultural Studies through Human Services (4 SH)
Focuses on students developing an understanding of the social, political, historical, and economic conditions in settings abroad and the corresponding social service and educational interventions. Uses an intensive, integrated study program that includes lectures, visits to cultural sites and government institutions, and a service-learning experience in a human-services or educational setting.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

HUSV 4919 Program Preparation: International Human Services (1 SH)
Introduces students to the fundamentals of budgeting and program preparation in the field of human services. Intended to be taken prior to HUSV 4920.
• Prerequisite: HUSV 1101.

HUSV 4920 International Human Services (4 SH)
Examines human service organizations from an international perspective. Through classroom lectures, guest speakers, and field experience, students are exposed to how culturally relevant human service programming is developed/administered. Students participate in lectures, small-group work, and field experience. Field experience consists of a one-week intensive learning experience in an international setting or an equivalent intercultural experience.
• Prerequisite: HUSV 1101 and HUSV 4919.
• NU Core: Experiential learning.

HUSV 4945 Leadership and International Program Development (4 SH)
Introduces event-planning, program-planning/development, and management skills that are essential to the implementation of domestic and international programs. Critiques leadership models and practices in these settings using theory and case studies. Offers students an opportunity to apply planning theories/models and evaluation techniques in service-learning settings. Considers the elements of successful partnerships and collaborations through the execution of a final project.
• Repeatability: May be repeated without limit.
HUSV 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

HUSV 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: HUSV 4970.
• Repeatability: May be repeated without limit.

HUSV 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

HUSV 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HUSV 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

HUSV 4994 Human Services Internship (6 SH)
Requires students to fulfill one internship placement during the last two years of the program. Consists of required field site hours and varies according to the students’ interests. Examples of placement sites include community centers, nursing homes, vocational workshops, state and federal agencies for children, and recreational facilities. Experiences are supervised by internship supervisor to maximize the student’s learning opportunities. Fulfills the Arts and Sciences experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

HUSV 5100 Sexual Violence: Counseling, Programs, and Policy (3 SH)
Offers an in-depth examination of sexual violence, its effects, and the resources available to assist survivors. Presents an overview of the criminal justice, medical, legal, and counseling systems and the impact these interweaving systems have on survivors. Offers students an opportunity to develop crisis counseling competency through group exercises and experiential activities.
• Prerequisite: Junior, senior, or graduate standing.

HUSV 5200 Strategic Communications for Nonprofit Organizations (3 SH)
Seeks to provide an understanding of the role of strategic communications in the nonprofit sector and to bridge theory with practice to develop communications strategies that support organizational goals and effectively move targeted audiences to action through appropriate and measured tactics. Examines case studies and engages in group work and individual papers that connect mission and goal setting with audience identification and segmentation, issue framing, message development, and communication. Offers students an opportunity to apply the course concepts in a service-learning partnership with an area nonprofit organization.
• Prerequisite: Junior, senior, or graduate standing.
• NU Core: Experiential learning.

INDUSTRIAL ENGINEERING (IE)

IE 2310 Introduction to Industrial Engineering (4 SH)
Provides an overview of the history of industrial engineering and of the most common methods that industrial engineers use to solve problems and design efficient processes. The emphasis is on how these methods are used to study, improve, and/or optimize a product or process. Topics include work design, ergonomic design, engineering statistics, quality engineering, engineering economics, project management, and process optimization. Also discusses the design of the production processes, facilities, and material handling systems. Studies applications in manufacturing, product design, and service industries. Laboratory experiments and written reports are required.
• Prerequisite: MATH 1341.
• Corequisite: IE 2311.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

IE 2311 Recitation for IE 2310 (0 SH)
 Provides small group demonstration and hands-on labs for IE 2310.
• Corequisite: IE 2310.

IE 3412 Engineering Probability and Statistics (4 SH)
Presents probability theory axiomatically, with emphasis on sample space presentation of continuous and discrete random variables. Covers descriptive statistics, expected value of random variables, covariance and correlation, sampling distribution, and point and interval estimations. Introduces hypothesis testing including tests for means, variances, and proportions.
• Prerequisite: MATH 2321.
• NUpath: Analyzing and using data.
IE 3420 Computers and Information Systems (4 SH)
Examines the design and implementation of computer-based information systems. Presents the techniques of the development life cycle of these systems. Introduces the students to available Web tools that are relevant to the use, design, development, and implementation of information systems in the context of the Internet and World Wide Web. Emphasizes the use and applications of information systems in engineering including design and manufacturing. Topics include the value of information, information and decision making, tools of system analysis and design, basic and advanced HTML, and JavaScript.
  • Prerequisite: GE 1111.

IE 3425 Engineering Database Systems (4 SH)
Examines the representation of data and its creation and management in engineering enterprises. Discusses the client/server model of database access. Presents the fundamentals of data modeling and management, data mining and warehousing, multitier applications, and the use of the SQL query language. Emphasizes the use and applications of database systems in engineering including design and manufacturing. Topics include design schema of tables, records and fields of databases, SQL statements, security issues, and the use of a scripting language such as Perl or Visual Basic.
  • Prerequisite: GE 1111.
  • Corequisite: IE 3426.

IE 3426 Recitation for IE 3425 (0 SH)
Provides small group demonstration and problem solving for IE 3425.
  • Corequisite: IE 3425.

IE 3430 Object Oriented Engineering Applications (4 SH)
Examines the object-oriented programming (OOP) paradigm and its use in engineering applications, computations, and problem solving. Presents object-oriented concepts that are used to build these applications. Covers the basics of Java and how to use it in object-oriented engineering programming. Topics include objects, Java programs, GUIs, client/server engineering applications, database access, and problem solving.
  • Prerequisite: GE 1111.

IE 4510 Simulation Modeling and Analysis (4 SH)
Covers process model design and development, validation, and experimentation for discrete-event simulation models. Topics include problem formulation, data collection and analysis, random-variable generation, model development, scenario experimentation, statistical analysis of output, and resultant decision management. Utilizes a major industry-standard simulation software application with animation capabilities.
  • Prerequisite: (a) GE 1111 and (b) IE 3412, MATH 3081, or equivalent.

IE 4512 Engineering Economy (4 SH)
Introduces students to economic modeling and analysis techniques for selecting alternatives from potential solutions to an engineering problem. Presents basic methods of economic comparison such as present worth, annual worth, rate of return, and benefit/cost techniques. Studies effects of taxes on investment analysis. Also covers decision tree analysis and statistical decision techniques.
  • Prerequisite: Sophomore standing or above.

IE 4515 Operations Research (4 SH)
Introduces deterministic models including linear programming; duality and postoptimality analysis; transportation and assignment problems; and network flow problems such as the shortest path, minimum spanning tree, and maximum flow.
  • Prerequisite: MATH 2341.

IE 4516 Quality Assurance (4 SH)
Reviews the distributions and statistical approximations commonly applied in statistical quality control methods. Introduces analysis of variance and simple linear regression. Covers basic principles to state-of-the-art concepts and application of statistical process control and design. Applies principles to a variety of products. Topics include product quality measures and controls, Shewhart control charts, quality cost, Pareto analysis, discrete and variable sampling, and military standards in quality control.
  • Prerequisite: IE 3412 or MATH 3081.

IE 4520 Stochastic Modeling (4 SH)
Covers the analytical development and solution to stochastic models in operations research. Topics include Markov chains, queuing theory, and dynamic programming.
  • Prerequisite: IE 3412 or MATH 3081.

IE 4522 Human Machine Systems (4 SH)
Emphasizes human sensory/motor performance, information processing capabilities, learning, memory, and skilled-task performance. Topics include an introduction to the experiment as a source of knowledge of human performance characteristics; vision, visual performance, visual display design; audition, noise, hearing damage, auditory signals; principles of somesthesia; information processing; signal detection; aging effects; and system development. Environments and equipment are subjected to usability tests that take into account principles of human-computer interaction and human anthropometric characteristics. Laboratory experiences include experimental design, data collection and analysis, and laboratory reports generation.
  • Prerequisite: (a) IE 3412 or MATH 3081 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  • Corequisite: IE 4523.
  • NU Core: Writing intensive in the major.
IE 4523 Lab for IE 4522 (1 SH)
 Accompanies IE 4522. Covers topics from the course through various activities.
 * Corequisite: IE 4522.

IE 4525 Logistics and Supply Chain Management (4 SH)
 Introduces the analysis, design, control, and operation of logistics and supply chain management systems. Includes the integration of supply chain components, logistics information systems, forecasting, production scheduling, inventory management, transportation and warehousing, and facility location planning.
 * Prerequisite: (a) IE 3412 or MATH 3081 and (b) IE 4515.

IE 4530 Manufacturing Systems and Techniques (4 SH)
 Focuses on manufacturing and design and their impact on each other. Covers the basics of design-manufacturing integration, manufacturing systems, manufacturing processes and techniques, manufacturing automation, and production planning and control. Topics include concurrent engineering, design for assembly, design for manufacturability, rapid prototyping, mechanical tolerancing, bill of materials, group technology, computer-aided process planning, NC part programming, programmable logic controllers, flexible manufacturing systems, computer-integrated manufacturing, and just-in-time philosophy. Topics also include traditional manufacturing processes such as casting, forming, machining, welding, molding, and particulate processing, and nontraditional manufacturing processes such as electrical discharge machining, laser machining, and water-jet machining. Students are required to conduct manufacturing-related experiments in the manufacturing lab to gain hands-on experience.
 * Prerequisite: Sophomore standing or above.
 * Corequisite: IE 4531.

IE 4531 Lab for IE 4530 (1 SH)
 Accompanies IE 4530. Covers topics from the course through various activities.
 * Prerequisite: Sophomore standing or above.
 * Corequisite: IE 4530.

IE 4525 Facilities Planning and Material Handling (4 SH)
 Explores engineering tools, techniques, and concepts for the design of facilities. The term facility is defined broadly. Industrial plants, schools, hospitals, or places in which things are produced or services are provided to a customer are all considered facilities. Provide students with a broad but practical understanding of the facilities planning and design process. The critical nature of material handling is discussed and approaches to designing optimal handling systems are examined. The tools of operations, research, statistical methods, and software applications are the focus of the problem-solving activities.
 * Prerequisite: IE 3412 or MATH 3081.
IE 4699 Special Topics in Industrial Engineering (4 SH)
Focuses on advanced industrial engineering project agreed upon between the student and instructor.
- **Repeatability**: May be repeated without limit.

IE 4710 Industrial Engineering Research 1 (4 SH)
Focuses on scientific research in industrial engineering agreed upon between the student and instructor.
- **Repeatability**: May be repeated without limit.

IE 4711 Industrial Engineering Research 2 (4 SH)
Focuses on in-depth scientific research in industrial engineering agreed upon between the student and instructor.
- **Prerequisite**: IE 4710.
- **Repeatability**: May be repeated without limit.

IE 4790 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
- **Repeatability**: May be repeated without limit.

IE 4791 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- **Prerequisite**: IE 4790.
- **Repeatability**: May be repeated without limit.

IE 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- **NUpath**: Integrating knowledge and skills through experience.

IE 4992 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability**: May be repeated without limit.

IE 4993 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
- **Repeatability**: May be repeated without limit.

IE 4994 Internship (4 SH)
Offers students an opportunity for internship work.
- **NUpath**: Integrating knowledge and skills through experience.
- **Repeatability**: May be repeated without limit.

IE 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
- **NU Core**: Experiential learning.
- **NUpath**: Integrating knowledge and skills through experience.
- **Repeatability**: May be repeated without limit.

IE 5374 Special Topics in Industrial Engineering (4 SH)
Offers topics of current interest in industrial engineering.
- **Prerequisite**: Junior, senior, or graduate standing; engineering students only.
- **Repeatability**: May be repeated up to 2 times.

IE 5400 Healthcare Systems Modeling and Analysis (4 SH)
Discusses the key functions of healthcare operations management, such as patient and process flow, process improvement, facility layout, staffing and scheduling, capacity planning, and resource allocation. Focuses on analysis, design, management, and control of health systems and processes that are necessary to provide clinical care. The applications of systems engineering methods, such as optimization, simulation, and queuing models, are discussed through papers and case studies in different care settings (e.g., hospitals, emergency departments, surgery departments, and outpatient clinics) for different diseases (e.g., diabetes, cancer, mental health, cardiovascular disease). Uses spreadsheet tools to model and solve simulation and optimization problems.
- **Prerequisite**: IE 4515, OR 6205, or equivalent and junior, senior, or graduate standing.

IE 5500 Systems Engineering in Public Programs (4 SH)
Introduces the design, development, analysis, and application of mathematical modeling for addressing public programs and societal needs. Systems engineering and mathematical models form the basis for decision making in both public and private applications. Focusing on societal applications, offers students an opportunity to discover how to incorporate public objectives and characteristics of large systems in the development of models and policies. Examines applications in the operation of public programs (e.g., public health systems, government programs) and public safety (e.g., security, emergency preparedness, and disaster response). Modeling techniques include game theory, data envelopment analysis, cost-benefit analysis, simulation, differential equations, and stochastic optimization.
- **Prerequisite**: (a) IE 4515, OR 6205, or equivalent and (b) IE 3412, IE 6200, or equivalent and (c) junior, senior, or graduate standing.
IE 5617 Lean Concepts and Applications (4 SH)
Designed to give students an understanding of the fundamentals of lean thinking and train them in applying this knowledge to practical problems. Uses case studies from different disciplines to help students learn lean principles and develop skills to implement them in practice. Covers theory and applications of lean six sigma, in which lean focuses on waste reduction while six sigma strives to eliminate defects. A knowledge-driven and customer-focused approach to creating value, lean thinking calls for process changes to eliminate waste, shorten product delivery time, improve product quality, and curtail costs. Key tenants of lean thinking are value, value stream, flow, pull, and perfection. Lean thinking is imperative for organizations aspiring to stay competitive by creating and delivering products in less time while improving customer satisfaction.
• Prerequisite: Junior, senior, or graduate standing.

IE 5620 Mass Customization (4 SH)
Provides students with conceptual understanding and implementation strategies of mass customization (MC). MC is both a business and production paradigm where a company provides the customers with goods and services that suit their individual needs but does so with the efficiency and costs of mass production. MC is important in many sectors including computers, automotive, healthcare, banking, insurance, and tourism. It is based on principles of industrial engineering, mechanical engineering, management science, and marketing. Topics include typology of mass-customized production systems, manufacturing processes for MC, information needs of MC, customer focus, marketing issues, technology enablers, implementation methods, and case studies. Methodology includes lectures, case discussions, plant visits, guest lectures, and a term project. Cross-disciplinary activities, particularly between engineering and business students, are encouraged wherever possible.
• Prerequisite: Junior, senior, or graduate standing.

IE 5630 Biosensor and Human Behavior Measurement (4 SH)
Emphasizes the measurement of human behavior in complex human-machine interaction. Topics include introduction of complex human-machine interactions; research methods in complex human-machine interactions; various kinds of human psychophysiological signals/cues, including physiological cues, facial expressions, eye-gaze movement, head movement, contextual cues; human cues and behavior relationship; transducers and measurement for these human cues/signals; basic principles of biosensors; general classification of biosensors; current technologies for building biosensors; conventional transducers and new technologies including micro-/nanotechnology; general systematic design process for biosensors; application of biosensors to understand human behavior in human-machine interactions. Also introduces the latest relevant research advancements in sensor fusion, affective computing, and emotion recognition.
• Prerequisite: Junior standing or above; engineering students only.

IE 5640 Data Mining for Engineering Applications (4 SH)
Introduces data mining concepts and statistics/machine learning techniques for analyzing and discovering knowledge from large data sets that occur in engineering domains such as manufacturing, healthcare, sustainability, and energy. Topics include data reduction, data exploration, data visualization, concept description, mining association rules, classification, prediction, and clustering. Discusses data mining case studies that are drawn from manufacturing, retail, healthcare, biomedical, telecommunication, and other sectors.
• Prerequisite: (a) IE 3412, MATH 3081, or IE 6200 and (b) junior, senior, or graduate standing.
• Equivalent: IE 4570.

IE 5976 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

IE 5978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

IE 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
IE 6200 Engineering Probability and Statistics (4 SH)
Studies fundamental concepts of probability. Topics include events, sample space, and discrete and continuous random variables; density functions, mass functions, cumulative probability distributions, and moment generating functions; expectation of random variables; common discrete and continuous probability distributions including binomial, Poisson, geometric, uniform, exponential, and normal; multivariate probability distributions, covariance, and independence of random variables; sampling and descriptive statistics; and parameter estimation, confidence intervals, and hypothesis testing. Also introduces analysis of variance.
• Prerequisite: Knowledge of multivariate calculus; engineering students only.

IE 6300 Manufacturing Methods and Processes (4 SH)
Focuses on manufacturing and its relationship to design and computers. Examines the relationship between design and various aspects of manufacturing. Covers manufacturing systems, manufacturing processes, bill of materials, group technology, mechanical tolerancing, QC, SPC, QPC, TQM, process planning and CAPP, NC part programming, supply chain management, production scheduling, JIT, lean manufacturing, flexible manufacturing systems, CIM cells, and manufacturing control via, say, programmable logic controllers.
• Prerequisite: Engineering students only.
• Equivalent: CSYE 7260.

IE 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

IE 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

IE 7200 Supply Chain Engineering (4 SH)
Presents modern quantitative techniques for designing, analyzing, managing, and improving supply chains using deterministic and probabilistic models. Topics include a macro view of supply chains, demand forecasting, aggregate planning, sequencing and scheduling, inventory analysis and control, materials requirement planning, pricing and revenue management, contracts decisions, transportation decisions, location and distribution decisions, supplier selection methods, and global supply chains.
• Prerequisite: (a) IE 6200 with a grade of C or MATH 7241 with a grade of C and (b) OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.
• Equivalent: IE 7210.

IE 7215 Simulation Analysis (4 SH)
Covers elementary queueing models, simulation and modeling, simulation model design, a survey of simulation languages with one language covered in detail, input data analysis and distribution fitting, model verification and validation, output analysis and transient/steady-state response, terminating/nonterminating systems, model experimentation and optimization, random number/random variate generation, and variance reduction techniques.
• Prerequisite: IE 6200 with a grade of C or MATH 7241 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

IE 7255 Manufacturing Processes (4 SH)
Covers the structures of metals, polymers, and ceramics and their manufacturing processes. Manufacturing processes include casting, forming, machining, welding, molding, and particulate processing. Discusses nontraditional manufacturing processes including electrical discharge machining, laser machining, and water jet machining. Also covers manufacturing processes for the electronics industry, such as processing integrated circuits, and electronic assembly and packaging.
• Prerequisite: Engineering students only.

IE 7270 Intelligent Manufacturing (4 SH)
Covers several advanced and contemporary topics in manufacturing. Includes applications of computational methods including experts systems, neural networks, and multiagents in manufacturing. Discusses the methods related to distributed and Web-enabled manufacturing.
• Prerequisite: Restricted to students in the College of Engineering and in the College of Science.

IE 7275 Data Mining in Engineering (4 SH)
Covers the theory and applications of data mining in engineering. Reviews fundamentals and key concepts of data mining, discusses important data mining techniques, and presents algorithms for implementing these techniques. Specifically covers data mining techniques for data preprocessing, association rule extraction, classification, prediction, clustering, and complex data exploration. Discusses data mining applications in several areas, including manufacturing, healthcare, medicine, business, and other service sectors.
• Prerequisite: IE 6200 with a grade of C, MATH 7241 with a grade of C, or permission of instructor; restricted to students in the College of Engineering and in the College of Science.
IE 7280 Statistical Methods in Engineering (4 SH)
Discuss statistical models for analysis and prediction of random phenomena. Topics include review of descriptive statistics and hypothesis testing, linear models, both regression and ANOVA. Introduces design of experiments. Covers experiments with single and multiple factors of interest, and considers experiments with high-order experimental restrictions.
• Prerequisite: IE 6200 with a grade of C or MATH 7241 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

IE 7285 Statistical Quality Control (4 SH)
Designed to study the fundamental concepts of quality planning and improvements. Studies analysis and application of modern statistical process control methods including cusum, EWMA, multivariate, and modified control charts. Covers inspection error and design of sampling plans. Topics include software quality assurance, and study of the concepts of Deming, Ishikawa, Feigenbaum, and Taguchi’s approach in quality planning, organization, and improvement.
• Prerequisite: IE 6200 with a grade of C or MATH 7241 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

IE 7290 Reliability Analysis and Risk Assessment (4 SH)
Studies principles of the methods of risk assessment and reliability analysis including fault trees, decision trees, and reliability block diagrams. Discusses classical, Bayesian, and median rank methods for analysis of components and systems reliability. Presents various factors that determine the stress and strength of components and their impact on system reliability. Uses practical applications, examples, and problems to cover a broad range of engineering fields, such as mechanical, electrical, industrial, computer, structures, and automatic control systems.
• Prerequisite: IE 6200 with a grade of C or MATH 7241 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

IE 7315 Human Factors Engineering (4 SH)
Offers students an opportunity to acquire the necessary knowledge and skills to recognize and analyze existing or potential human factors problems and to identify, design, and possibly implement feasible solutions. Includes introduction to human factors and ergonomics; engineering anthropometry and biomechanics; physiology related to human factors and workstation design; cognition and information processing; decision making, attention, and workload; human error and accidents; human-machine interface design; controls and displays; and human factors applications in transportation, aerospace, consumer product design, and so forth.
• Prerequisite: Restricted to students in the College of Engineering and in the College of Science.

IE 7374 Special Topics in Industrial Engineering (4 SH)
Offers topics of interest to the staff member conducting this class for advanced study.
• Repeatability: May be repeated without limit.

IE 7440 Industrial Engineering Leadership Challenge Project 1 (4 SH)
Offers students an opportunity to develop and present a plan for the demonstration of a marketable technology product or prototype with an industrial-engineering focus. Constitutes the first half of a thesis-scale project in technology commercialization. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: Industrial engineering/engineering leadership students only.

IE 7442 Industrial Engineering Leadership Challenge Project 2 (4 SH)
Continues IE 7440, further developing a thesis-scale project in technology commercialization. Offers students an opportunity to demonstrate their development of a marketable technology product or prototype with an industrial engineering focus and produce a written documentary report on the project to the satisfaction of an advising committee. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: IE 7440; industrial engineering/engineering leadership students only.

IE 7615 Neural Networks in Engineering (4 SH)
Covers the theory and applications of neural networks in engineering. Reviews basics of machine learning, discusses important neural network architectures, and presents neural network training methods and algorithms. The specific neural network models covered in this course include feedforward neural networks, radial basis function networks, support vector machines, self-organizing feature maps, and recurrent networks. Discusses neural network applications in several areas including manufacturing, healthcare, medicine, business, and diagnostics and prognostics.
• Prerequisite: Restricted to students in the College of Engineering and in the College of Science.
• Equivalent: IE 4615.

IE 7945 Master’s Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.
IE 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision. An independent study must be petitioned and approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of goals; as well as the expected outcomes, deliverables, and grading scheme. Master’s degree students in thesis or project options are not eligible to take independent study.

IE 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
* Repeatability: May be repeated without limit.

IE 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
* Repeatability: May be repeated without limit.

IE 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.

IE 8960 Candidacy Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
* Prerequisite: Industrial engineering students only; intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
* Repeatability: May be repeated once.

IE 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
* Repeatability: May be repeated without limit.

IE 8986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
* Repeatability: May be repeated without limit.

IE 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of program requirements for PhD candidacy.

IE 9990 Dissertation (0 SH)
Offers dissertation supervision under individual faculty supervision. May be taken twice for course credit.
* Prerequisite: PhD candidacy in industrial engineering.
* Repeatability: May be repeated once.

IE 9996 Dissertation Continuation (0 SH)
Offers continuing dissertation supervision under individual faculty supervision.
* Prerequisite: IE 9990 completed twice; industrial engineering students only.
* Repeatability: May be repeated without limit.

INFORMATION ASSURANCE (IA)

IA 5001 Cyberspace Technology and Applications (3 SH)
Seeks to provide a systematic understanding of cyberspace technology and applications deployed in the global digital infrastructure. Covers topics in PC hardware architectures, server architectures, and operating systems. Designed to provide an understanding of computer and networking standards, such as Open Systems Interconnection Model and wireless family of IEEE standards dealing with local area networks and metropolitan area networks. Discusses relational database technology and storage systems. Gives an overview of virtualization technologies and cloud computing models. Students not in the information assurance ALIGN program may require instructor permission to enroll.

IA 5010 Foundations of Information Assurance (4 SH)
Builds a common cross-disciplinary understanding in the foundations of information assurance. Presents an overview of basic principles and security concepts related to information systems, including workstation security, system security, and communications security. Introduces information security via database technology. Discusses legal infrastructure such as DMCA, Telecommunications Act, wire fraud, and other ethical issues. Covers security methods, controls, procedures, economics of cybercrime, criminal procedure, and forensics. Describes the use of cryptography as a tool, software development processes, and protection. Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.
IA 5040 Introduction to Cyberspace Programming (4 SH)
Seeks to provide a systematic understanding of cyberspace programming languages and methods. Trains students in Python and C using command-line interface-based editors and compilers, as well as integrated development environments, with industry-standard operating systems running on virtual machines. Offers students an opportunity to implement programming principles and methods, spanning the evolution of computer systems. Lectures are combined with multiple computer-based exercises. **Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.**

IA 5050 Data Mining in Cyberspace (4 SH)
Focuses on the basics of the technical, legal, social, and ethical issues implicit in commercial data mining ventures. Introduces the key concepts of data science with specific emphasis on applications in information assurance and the ethical treatment of privacy in data mining. Centers on principles and methods covering the process from envisioning the problem to applying data science techniques to deploying the results to improve information assurance. Topics include an introduction of canonical data mining tasks, spam and fraud detection, Sybil attacks, privacy in data mining, privacy in social networks, and management of information assurance in data science projects. **Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.**

IA 5100 Computer Systems and Networks (4 SH)
Introduces the basic concepts underlying computer operating systems and computer networks. Covers the basic structure of an operating system such as application interfaces, processes, threads, synchronization, interprocess communication, processor allocation, deadlocks, memory management, file systems, and input/output control. Introduces network architectures, network topologies, network protocols, layering concepts (for example, ISO/OSI, TCP/IP reference models), communication paradigms (point-to-point vs. multicast/broadcast, connectionless vs. connection oriented), and networking APIs (sockets). Uses examples from real operating systems and networks (UNIX, MS-DOS, Windows, TCP/IP, Ethernet) to reinforce concepts.

IA 5120 Applied Cryptography (4 SH)
Surveys the principles and the practices of cryptography. Overviews the core cryptographic algorithms: symmetric encryption schemes (e.g., DES and AES); public key cryptosystems (e.g., RSA and discrete logarithm); and hash functions (e.g., the SHA family). Discusses core information assurance building blocks, such as authentication, digital signatures, key management, and digital certificates. Finally, applies these concepts to important security architectures, including the IP network stack (e.g., IPsec and SSL/TLS), the cellular system, and broadcast media. **Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.**

IA 5130 Computer System Security (4 SH)
Explores issues involved in the security of computer systems. Topics include security models, authentication issues, access control, intrusion detection, and damage control. Includes case studies and laboratory exercises. **Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.**

IA 5131 Lab for IA 5130 (0 SH)
Offers small-group laboratory format to cover lab requirements in IA 5130. **Corequisite: IA 5130.**

IA 5150 Network Security Practices (4 SH)
Explores issues involved in the security of computer networks. Topics include firewalls, viruses, virtual private networks, Internet security, and wireless security. Includes case studies and laboratory exercises. **Preq. Restricted to students in the College of Computer and Information Science or by permission of instructor.**

IA 5151 Lab for IA 5150 (0 SH)
Offers a small-group laboratory format to cover lab requirements for IA 5150. **Corequisite: IA 5150.**

IA 5200 Security Risk Management and Assessment (4 SH)
Creates the opportunity for competency in the development of information security policies and plans including controls for physical, software, and networks. Discusses different malicious attacks, such as viruses and Trojan horses, detection strategies, countermeasures, damage assessment, and control. Covers information system risk analysis and management, audits, and log files. Uses case studies, site visits, and works with commercial products. **Preq. Restricted to students in the College of Computer and Information Science or by permission of instructor.**
IA 5210 Information System Forensics (4 SH)
Designed to allow students to explore the techniques used in computer forensic examinations. Examines computer hardware, physical and logical disk structure, and computer forensic techniques. Conducts hands-on experiences on DOS, Windows operating systems, Macintosh, Novell, and Unix/Linux platforms. Builds on basic computer skills and affords hands-on experience with the tools and techniques to investigate, seize, and analyze computer-based evidence using a variety of specialized forensic software in an IBM-PC environment. Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.

IA 5211 Lab for IA 5210 (0 SH)
Offers a small-group laboratory format to cover lab requirements for IA 5210.
   • Corequisite: IA 5210.

IA 5240 Cyberlaw: Privacy, Ethics, and Digital Rights (4 SH)
Describes the legal and ethical issues associated with information security including access, use, and dissemination. Emphasizes legal infrastructure relating to information assurance, such as the Digital Millenium Copyright Act and Telecommunications Decency Act, and emerging technologies for management of digital rights. Examines the role of information security in various domains such as healthcare, scientific research, and personal communications such as email. Examines criminal activities such as computer fraud and abuse, desktop forgery, embezzlement, child pornography, computer trespass, and computer piracy. Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.

IA 5241 Information Assurance Readings in Cyber Law (1 SH)
Involves conducting research on a number of cyber law topics with a focus on how these topics specifically apply to the information assurance professional. Topics include banking/financial services, healthcare, cyber crime, copyright, and information security. Includes weekly summaries of topical readings with posted comments. Offers students an opportunity to present at least one completed topic/paper for class discussion and to research and post blog submissions to the professor’s blog on relevant and newsworthy cyber law topics.

IA 5250 Decision Making for Critical Infrastructure (4 SH)
Focuses on the art and science of security program management leadership in the context of critical infrastructure protection programs. Includes selected readings, review of decision-making models in crisis, lectures and insights from accomplished leaders in infrastructure protection, and examination of the students’ own unique background and experiences. Trains students on the interaction of vulnerabilities, threats, and countermeasures and how to apply this knowledge to the protection of critical infrastructure using research and analysis of national and global strategies, historical and current legislation, and policies. Also seeks to give students a working knowledge of federal, state, and private-sector critical infrastructure protection resources and programs. Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.

IA 5976 Directed Study (1 to 4 SH)
Seeks to provide information assurance (IA) students with the training experience of working on a specific IA project under the direction of an IA instructor. The instructor provides students with a plan of seminar sessions, including lectures, research, and development of project deliverables and with direction to complete the course.
   • Repeatability: May be repeated without limit.

IA 5978 Independent Study (2 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
   • Repeatability: May be repeated without limit.

IA 5984 Research (2 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
   • Repeatability: May be repeated without limit.

IA 6120 Software Security Practices (4 SH)
Explores the principles and methodologies for addressing software security risk issues in organizations. Offers students an opportunity to learn software security vulnerabilities and to create software solutions to address software security issues in accordance with information assurance requirements and in compliance with U.S. and international laws, federal systems guidelines, standards, directives, and industry best practices. Preq. Restricted to students in the College of Computer and Information Science and in the College of Engineering or by permission of instructor.

IA 6121 Lab for IA 6120 (0 SH)
Offers a small-group laboratory format to cover lab requirements for IA 6120.
   • Corequisite: IA 6120.
IA 6960 Exam Preparation—Master's (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

IA 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

IA 6966 Practicum (2 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

IA 7900 Capstone Project/Seminar (4 SH)
Draws together candidates from diverse backgrounds (technical, legal, and/or law enforcement) in a collaborative activity to address one or more security issues from an integrated perspective. Requires a project proposal, generally industrially oriented, to be submitted and accepted prior to the semester in which the project is to be undertaken. Preq. Restricted to students in the College of Computer and Information Science or by permission of instructor.

IA 7976 Directed Study (2 to 4 SH)
Focuses on student examining standard information assurance material in fresh ways or new information science material that is not covered in formal courses.
• Repeatability: May be repeated without limit.

IA 7978 Independent Study (2 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

IA 7990 Thesis (2 to 4 SH)
Offers selected work with the agreement of a project supervisor.
• Repeatability: May be repeated without limit.

IA 7994 Thesis Continuation—Part Time (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: IA 7990.
• Repeatability: May be repeated without limit.

IA 7996 Thesis Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: IA 7990.

IA 8660 Research Project in National Information Security (4 SH)
Engages students in national cybersecurity/information systems security problems. Offers students an opportunity to learn how to apply research techniques, think clearly about these issues, formulate and analyze potential solutions, and communicate their results. Working in small groups under the mentorship of technical clients from government and industry, each student has an opportunity to formulate, carry out, and present original research on current cybersecurity/information assurance problems of interest to the nation. Requires permission of instructor.
• Repeatability: May be repeated once.

IA 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

IA 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

IA 9990 Dissertation (4 SH)
Offers selected work with the agreement of a thesis supervisor.
• Prerequisite: Information assurance students only.
• Repeatability: May be repeated once.

IA 9996 Dissertation Continuation (0 SH)
Continues work with the agreement of a thesis supervisor.
• Prerequisite: IA 9990; information assurance students only.
• Repeatability: May be repeated without limit.

IS 1500 Introduction to Web Development (4 SH)
Introduces Web development and networks. Discusses HTML5, CSS, and client-side scripting with JavaScript and jQuery; embedding of media: images, video, and sound; the use of back-end data (either from databases or XML) to create dynamic Web sites; Web hosting, operating systems, and network infrastructure; and the automation of website construction using content management systems. Considers the construction of Web forms and the underlying protocols for information exchange: HTTP and HTTPS. Emphasizes the need for testing both correctness and usability. Offers a brief introduction to server-side scripting. Surveys the security problems faced by dynamic websites. Hands-on laboratory work is built into the course. May be taken as a general elective by CCIS students but does not count as a CS or IS elective.
• NU Core: Science/technology level 1.
• NUpath: Analyzing and using data.
IS 2000 Principles of Information Science (4 SH)
Introduces information science. Examines how information is used to solve problems both for individuals and organizations and how information systems interface with their users. Considers the technical, economic, social, and ethical issues that arise when working with information. Discusses how to collect, manage, classify, store, encode, transmit, retrieve, and evaluate data and information with appropriate security and privacy. Storage models include lists, tables, and trees (hierarchies). Examines applications of information: visualization, presentation, categorization, decision making, and predictive modeling. Introduces key concepts in probability. Explains Bayesian analysis for information classification and modeling. Teaches intensive programming in Excel, including VBA macro development. Introduces programming in R.
• NUpath: Analyzing and using data.

IS 3500 Information System Design and Development (4 SH)
Discusses the planning, analysis, design, and implementation of computer-based information systems, focusing on the methodologies and procedures used in organizational problem solving and systems development. Topics include the systems development life cycle; project management; requirements analysis and specification; feasibility and cost-benefit analysis; logical and physical design; prototyping; and system validation, deployment, and postimplementation review. Additional topics may include platform and database selection and integration issues; CASE tools; end-user training; maintenance; and object-oriented analysis and design.
• Prerequisite: (a) IS 2000 and (b) CS 3500 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

IS 4200 Information Retrieval (4 SH)
Introduces information retrieval (IR) systems and different approaches to IR. Topics covered include evaluation of IR systems; retrieval, language, and indexing models; file organization; compression; relevance feedback; clustering; distributed retrieval and metasearch; probabilistic approaches to IR; Web retrieval; filtering, collaborative filtering, and recommendation systems; cross-language IR; multimedia IR; and machine learning for IR.
• Prerequisite: (a) CS 3500 and (b) ECON 2350, MATH 2280, MATH 3081, MGSC 2301, or PSYC 2320.

IS 4300 Human Computer Interaction (4 SH)
Studies the principles of human-computer interaction and the practice of user interface design. Discusses the major human information processing subsystems (perception, memory, attention, and problem solving), and how the properties of these systems influence the design of interactive systems. Reviews guidelines and specification languages for designing user interfaces, with an emphasis on tool kits of standard graphical user interface (GUI) objects. Introduces usability metrics and evaluation methods. Additional topics may include World Wide Web design principles and tools; wireless/mobile device interfaces; computer-supported cooperative work; information visualization; and virtual reality. Course work includes designing user interfaces, creating working prototypes using a GUI tool kit, and evaluating existing interfaces using the methods studied.
• Prerequisite: CS 3500.

IS 4500 Software Quality Assurance (4 SH)
Introduces the main concepts and techniques of software quality assurance (SQA). Quality assurance and control are integral elements of the software development life cycle. Examines the difference between quality assurance and quality control and explores techniques used for both. Focuses on practical approaches framed within industry standards. Presents processes and techniques that ensure the delivery of reliable software to end users. Covers quality factors, testing strategies, writing of test cases and test plans, SQA standards, defect tracking, and automated testing platforms. Discusses quality control practices for verification and validation, including reviews, inspections, audits, and metrics. While the course concentrates on black-box testing, white-box testing and defensive coding strategies are addressed as well.
• Prerequisite: CS 3500.

IS 4600 Software Project Management (4 SH)
Covers both technical and managerial aspects of software project management, which is critical to the success of software projects. Emphasizes the differences between traditional software life-cycle models and modern iterative and agile practices. Includes project manager responsibilities, stakeholder management, staffing, resource allocation, estimation, activity scheduling, budget control, quality management, risk assessment, communication, scope control, and project metrics. Introduces standard project management tools combined with control mechanisms including PERT, burndown, and Gantt charts. Examines these methods in the context of standard frameworks, including the Project Management Body of Knowledge (PMBOK), applicable IEEE Standards, ISO 9001, CMMI, Unified Process, Scrum, and Kanban-driven continuous delivery models.
• Prerequisite: CS 3500.
IS 4700 Social Information Systems (4 SH)
Analyzes popular social information systems, including online social networks, blogging platforms, recommendation engines, and content sharing sites. Studies the objectives, user interaction modes, policies, and design issues for social information systems. Introduces relevant theories, both computational and sociological, that model the behavior of social networks and their users. Offers students an opportunity to learn to apply such models, both theoretically and by analyzing real-world interaction data from social information systems, to answer questions such as: What causes users to form links? What mechanisms work best for encouraging collaboration? How does information spread through cyberspace? How can security and privacy goals be achieved?
• Prerequisite: (a) CS 3200 and (b) ECON 2350, MATH 2280, MATH 3081, MGSC 2301, or PSYC 2320.

IS 4800 Empirical Research Methods (4 SH)
Evaluates and conducts empirical research, focusing on students’ use of empirical methods to study the effectiveness and organizational/social impact of information systems and technologies. Empirical research involves a number of broad steps including identifying problems; developing specific hypotheses; collecting data relevant to the hypotheses; analyzing the data; and considering alternative explanations for the empirical findings. Some of the most commonly used research techniques, such as surveys, experiments, and ethnographic methods, are discussed. Additional topics include the ethics of data collection and experimentation in behavioral science. Although the course focuses primarily on the relationship between formulating research questions and implementing the appropriate methods to answer them, students can expect to apply the statistical techniques learned in the course prerequisites.
• Prerequisite: (a) IS 3500 and (b) ECON 2350, MATH 2280, MATH 3081, MGSC 2301, or PSYC 2320.

IS 4900 Information Science Senior Project (5 SH)
Helps students develop a sophisticated understanding of the interaction between technology and its context. Students write an in-depth research paper that reflects upon and analyzes the observations and experiences of the field study using the information science literature to interpret and better understand those experiences. Students then participate in a seminar in which they present the results of their research.
• Prerequisite: IS 4800 or CS 6350 (either course may be taken concurrently).
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

IS 4910 Information Science Topics (4 SH)
Offers a lecture course in information science on a topic not regularly taught in a formal course. Topics may vary from offering to offering.
• Prerequisite: IS 3500.
• Repeatability: May be repeated up to 3 times.

IS 4920 Information Science Project (4 SH)
Focuses on student working on a substantial project in information science under faculty supervision.
• Prerequisite: IS 3500.
• Repeatability: May be repeated up to 3 times.

IS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

IS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: IS 4970.
• Repeatability: May be repeated without limit.

IS 4991 Research (4 or 8 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: IS 4800 or CS 5350.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience, demonstrating thought and action in a capstone.
• Repeatability: May be repeated up to 3 times.

IS 4992 Directed Study (1 to 6 SH)
Focuses on student examining standard information science material in fresh ways or new information science material that is not covered in formal courses.
• Prerequisite: IS 3500.
• Repeatability: May be repeated up to 3 times.

IS 4993 Independent Study (1 to 6 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: IS 3500.
• Repeatability: May be repeated up to 3 times.

IS 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
IS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.

IS 4997 Information Science Thesis (4 SH)
Focuses on student preparing an undergraduate thesis under faculty supervision.
• Prerequisite: Junior or senior standing.

IS 4998 Information Science Thesis Continuation (4 SH)
Focuses on student continuing to prepare an undergraduate thesis under faculty supervision.
• Prerequisite: IS 4997.

INFO 5000 C Programming and Development (4 SH)
Serves as an introduction to the C programming language and the Unix operating system. Basic C programming language topics include data types, basic I/O, selection-control structures, loop structures, subroutines and modular design, arrays, strings, structures, advanced I/O, and Unix system calls. Discusses pointers in the context of parameter passing, array manipulation, and dynamic memory allocation. Unix topics include the file system, basic commands and utilities, utilities useful for program development, and shell scripting. Covers recursion and basic list structures.
• Prerequisite: Engineering students only.
• Equivalent: INFO 0900.

INFO 5100 Application Engineering and Development (4 SH)
Covers the basics of Java programming such as arrays, control structures, class definitions, class hierarchies, inheritance, objects, streams, constructors, collections, and GUI components. Describes how to develop and execute Java applications and incorporates several programming projects, which strengthen the understanding of object-based and event-driven programming. Provides the student with the opportunity to achieve a strong working competency in object-oriented programming using the Java programming language.
• Prerequisite: Junior, senior, or graduate standing; engineering students only.
• Corequisite: INFO 5101.

INFO 5101 Lab for INFO 5100 (0 SH)
Accompanies INFO 5100. Provides additional instruction in Java programming.
• Corequisite: INFO 5100.

INFO 5976 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

INFO 5978 Independent Study (1 to 4 SH)
Offers work performed under individual faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

INFO 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

INFO 6150 Web Design and User Experience Engineering (4 SH)
Exposes students to both conceptual and technical aspects of Web design. User experience design is the discipline of creating a useful and usable website or application that is easily navigated and meets the needs of both the site owner and its users. Covers Web standards and best practices. Studies the fundamental concepts, techniques, practices, work flows, and tools associated with the practice of user-experience design in Web interfaces. Offers students an opportunity to learn the core principles of information architecture, usability, marketing hierarchy, and user experience for contextual, value-driven websites. Additional areas of focus include typography, color theory and composition, responsive design, CSS3 concepts, basic scripting, and JavaScript libraries to create functional, effective, and visually appealing websites.
• Prerequisite: INFO 5100 or CSYE 6200 (either may be taken concurrently).

INFO 6205 Program Structure and Algorithms (4 SH)
Presents data structures and related algorithms, beginning with a brief review of dynamic memory allocation. Discusses the fundamental data structures in detail, including the abstract representation, supporting algorithms, and implementation methods. Focuses on understanding the application of the abstract data structure and the circumstances that affect implementation decisions. Covers lists, stacks, queues, trees, hash tables, and graphs. Covers recursion and searching and sorting algorithms in detail. Emphasizes data abstraction and encapsulation in code design. Explores external storage structures, time permitting.
• Prerequisite: INFO 5100 or CSYE 6200; engineering students only.
INFO 6210 Data Management and Database Design (4 SH)
Studies design of information systems from a data perspective for engineering and business applications; data modeling, including entity-relationship (E-R) and object approaches; user-centric information requirements and data sharing; fundamental concepts of database management systems (DBMS) and their applications; alternative data models, with emphasis on relational design; SQL; data normalization; data-driven application design for personal computer, server-based, enterprise-wide, and Internet databases; and distributed data applications.
• Prerequisite: Engineering students only.

INFO 6215 Business Analysis and Information Engineering (4 SH)
Covers computer information systems and the decision-making process, determination of information requirements, system development life cycle, and system modeling and analysis. Uses a hands-on approach to introduce the student to software engineering methodologies and practices, business requirements specification, business process design, model-driven object-oriented design, software development, and maintenance. Emphasizes the effective leverage of the Unified Modeling Language (UML) to transform business issues and objectives to concrete software solutions that meet business needs and usability and user interface design as critical elements of a successful software engineering engagement.
• Prerequisite: Engineering students only.

INFO 6240 C++ Object-Oriented Design (4 SH)
Introduces the basic concepts of C++ and object-oriented design for engineering software design and information systems. Topics include data abstraction, constructors and destructors, inheritance, the C++ I/O library, overloaded operators, virtual functions and polymorphism, and the reference data type. Applications of C++ programming are shown in order to emphasize the use of classes in problem solving with computers.
• Prerequisite: INFO 6205.

INFO 6245 Planning and Managing Information Systems Development (4 SH)
Provides an overview of the most popular information systems needs’ assessment methodologies including portfolio analysis, stage assessment, business systems planning, and the Alloway survey technique. Topics include utilities IS strategic plan prioritization techniques of business goal alignment, architectural compatibility, and cost/benefit and risk analysis to demonstrate how businesses match needs to budgetary constraints. Describes and evaluates options for the placement of the IS function within the organization and a variety of methods to manage the function. Introduces a generic application development and project planning methodology used as a model to facilitate the development of a four-stage project plan for a prototype project. Uses the Project Management Institute’s PMBOK and Harvard Business School case studies extensively.
• Prerequisite: Engineering students only.

INFO 6250 Web Development Tools and Methods (4 SH)
Explores the tools necessary to construct and maintain World Wide Web pages for use in e-commerce. Offers students the opportunity to learn the basics of the hypertext markup language (HTML, a scripting language for formatting Web pages), DHTML (dynamic HTML), JavaScript (an object-based language for client-side processing), PHP scripting, XML, Flash, and Java applets. Students are asked to complete several assignments culminating in an extensive WWW project that uses all the tools discussed in class.
• Prerequisite: INFO 5100 or CSYE 6200.
• Corequisite: INFO 6251.

INFO 6251 Lab for INFO 6250 (0 SH)
Accompanies INFO 6250. Offers additional instruction in Web tools discussed in class.
• Corequisite: INFO 6250.

INFO 6255 Software Quality Control and Management (4 SH)
Examines techniques for the management and evolution of software systems. Topics include managing software as an asset; life cycle development and rapid development technologies; maintainability; quality assurance of software systems including testing strategies and problem analysis; software risk analysis; analysis of software project failures; process models, such as CMM and ISO 9001; configuration management; and the impact of new development technologies on software management.

INFO 6260 Business Process Engineering and Management (4 SH)
Provides a practical laboratory class, applying what students have learned in database design, Web programming, and software development to a series of real projects for real users. Students are asked to work in teams to carry through the implementation of Web-based database applications from analysis of existing systems or prototypes, consideration of alternative designs and implementation, through comprehensive software and database development, to testing and deployment. Teams present their designs, implementation plans, and progress for peer review by the class and others. The objective is to have these real projects fully functional and deployed on the Web by the end of the semester.
• Prerequisite: Engineering students only.

INFO 6350 Smartphones-Based Web Development (4 SH)
Covers application development for mobile devices using advanced development platforms. Focuses on how to write mobile applications using cross-platform development tools and processes. Topics include user interfaces, the software life cycle, persistent storage, networking using HTTP and other REST interfaces, and mobile/handheld data applications. Requires a final project.
• Prerequisite: INFO 5100 or CSYE 6200.
• Equivalent: CSYE 7225.
INFO 6640 People, Processes, and Products: Ethics for Engineers (2 SH)
Addresses the topic of ethical engineering and the various contexts in which ethical situations present themselves. Analyzes the three major normative ethical theories—virtue ethics, deontology, and utilitarianism—and discusses various cases in which a moral dilemma is created. Applies these moral conflicts directly to the practice of engineering, covering issues such as professional liability to consumers, employees, and employers; workplace safety; environmental issues; cross-cultural legal obligations; and social issues. Applying critical thought to difficult situations may prepare students to react thoughtfully in cross-cultural, morally ambiguous workplace situations. Also seeks to develop students’ verbal and written communication skills.
• Prerequisite: Engineering students only.

INFO 6650 People, Problems, and Patents: Basics of Intellectual Property (2 SH)
Addresses subjects that support successful engineering careers by offering students an applied understanding of the fundamentals of intellectual property and the American legal system. Topics include an introduction to types of intellectual property (patents, trade secrets, trademarks, copyrights) and fundamentals of the American legal system (sources of American law, contracts, torts, intellectual property, antitrust). Covers at minimum the difference between “freedom to operate” patent analysis and patentability analysis, best practices for obtaining valuable patent coverage, and the role of patents in developing successful business planning. Also seeks to develop students’ applied critical thinking, communication, and presentation skills.
• Prerequisite: Engineering students only.

INFO 6660 People, Problems, and Patents: Ethical Principles and Basics of Intellectual Property (4 SH)
Seeks to support successful engineering careers by offering students an applied understanding of ethical principles in the workplace and fundamentals of intellectual property and the American legal system. Seeks to increase students’ awareness of the ethical implications of their work and to influence colleagues to think and act in a socially cognizant manner. Introduces ethical principles and codes of professional ethics; types of intellectual property (patents, trade secrets, trademarks, copyrights); and fundamentals of the American legal system (sources of American law, contracts, torts, intellectual property, antitrust). Offers students an opportunity to practice verbal communication and presentation skills; develop an applied understanding of the relationship and differences between legal liability and ethical behavior; and develop applied critical thinking, communication, and presentation skills.
• Prerequisite: Engineering students only.

INFO 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

INFO 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

INFO 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

INFO 7205 Advanced Application Engineering and Development (4 SH)
Offers students an opportunity to master advanced software design and programming techniques for building complex software applications quickly. The engineering issues addressed assume the business problems are difficult to understand and manage in a practical manner—the system capacity must support thousands or even millions of users in a multitude of roles. Addresses high-performance computing requirements, such as concurrency and control, scalability, replication, and failover.
• Prerequisite: INFO 5100 or CSYE 6200; engineering students only.

INFO 7225 Accounting and Budgetary Systems for Engineers (4 SH)
Covers the latest engineering principles necessary for building complex software systems that comply with recognized standards in the financial industry. With automated business processes today, risk and responsibility are shifting to information technology (IT) systems. Offers students an opportunity to learn how to incorporate information-based controls related to the financial industry that signal trouble, detect violations, and provide accountability, as well as a working approval process. Emphasizes software design. Seeks to help engineers construct complex software from a sophisticated engineering perspective. Examines how to put together cutting-edge organizational systems that people in the financial world can put to good use. Designed to prepare students for jobs in the building, maintaining, and employment of such information systems.
• Prerequisite: Engineering students only.
INFO 7245 Agile Software Development (4 SH)
Offers students an opportunity to achieve a high level of practical understanding of software development life cycle (SDLC) with emphasis on agile and adaptive incremental methodologies. Examines techniques for the management and evolution of software systems, including project planning from requirements gathering, analysis, estimation, and releasing using a hands-on approach to implement agile methodologies. Also covers maintainability, including software risk analysis, project retrospectives, and process models such as capability maturity model, configuration management, and their practical implementation.
• Prerequisite: INFO 5100 or CSYE 6200; engineering students only.

INFO 7250 Engineering of Big-Data Systems (4 SH)
Introduces a general framework for thinking about big data. Services such as Web analytics and intelligent e-commerce have promoted a rapid increase in the volume of data generated, analyzed, and archived. In order to solve the problems related to big data, a newer type of database product has emerged. Covers how to apply technologies like Hadoop, Accumulo, MongoDB, and various NoSQL databases to build simple, robust, and efficient systems to manage and analyze big data. Also describes an easy approach to big data systems that can be built and run by a small team of students. Guides students through the theory of big data systems, how to implement them in practice, and how to deploy and operate them once they are built.
• Prerequisite: INFO 6250 with a grade of B.

INFO 7260 Business Process Engineering (4 SH)
Addresses the question of how to understand and specify the flow of work responsibility and movement of information throughout the enterprise. For businesses to maximize the benefits of technology, they must transform their ad-hoc and often poorly defined ways of doing things to formal business processes. Analyzes the specification and implementation of complex information systems that integrate well into core business operations. Offers students an opportunity to learn how to use agile process specification techniques, dynamic process execution, and real-time measurement and reporting to support continuous business improvement and change.
• Prerequisite: Admission to the Graduate School of Engineering.

INFO 7265 Enterprise Systems Architecture and Engineering (4 SH)
Extends the rudiments of C and Unix covered in . Geared for students who want to explore the Unix operating system and deepen their understanding of the fundamentals of Unix. Topics include popular Unix tools and programs (vi, emacs, pipes, grep, and so on); Unix system calls (fork, exec, read, and write); introduction to Unix shells and scripting; static and dynamic libraries; use of make files; and software engineering project management from the perspective of the system developer. Requires a major term project using coding with advanced C/Unix techniques.
• Prerequisite: INFO 6245 and INFO 6260; engineering students only.

INFO 7270 PERL Programming (4 SH)
Focuses on PERL programming language fundamentals. Discusses and demonstrates applications of the language using programming assignments and projects. Topics include data types, control structures, subroutines and functions, string manipulation, file processing, networking, and CGI. Recommended for students who are pursuing a career in Unix/Windows programming, Web development, or system administration.
• Prerequisite: INFO 5100 or CSYE 6200.

INFO 7275 Advanced Database Management Systems (4 SH)
Introduces the skill set required to become a serious database applications developer. Offers an overview of the Oracle9i object-relational database system for those who have mastered the fundamental principles of database design and are competent with basic SQL. Gives students the opportunity to develop a strong understanding of the PL/SQL programming language, which is used to create triggers, user-generated functions, stored procedures, and packages for programming Oracle objects. Emphasizes advanced SQL features and Oracle-specific SQL enhancements. Covers optimization and tuning issues. Covers corresponding material for Transact-SQL (used for Microsoft SQL Server and Sybase database systems) as time and resources permit.
• Prerequisite: INFO 5100, INFO 6205, INFO 6210, or CSYE 6200; engineering students only.

INFO 7280 Model-Driven Architecture (4 SH)
Develops the skills to utilize new software modeling and management techniques in each state of the life cycle of component-based software systems. Applies and extends a basic knowledge of the Unified Modeling Language (UML). Introduces and applies metamodel management concepts using the OMG metaobject facility as a technology baseline. Develops a component-based software project throughout the course using C++ or Java; grading primarily based on the software project and its public presentation.
• Prerequisite: INFO 6205; engineering students only.
INFO 7285 Organizational Change and IT (4 SH)
Focuses on the change effort needed to integrate a project into the firm’s organizational structure, culture, business, and process metrics. Geared for students undertaking enterprise resource planning systems, or those involved in small or large organizational reengineering projects designed to make IT a primary focus of the firm’s business strategy. Topics include management theories and organizational design principles; strategy and critical success factor formulation; methods to reach information systems maturity; business process modeling techniques; quality, the mindset, and the problem-solving tools; human resource, cultural, and technical change enablers; how to plan a business reengineering project; and implementation of major organizational change.

INFO 7290 Data Warehousing and Business Intelligence (4 SH)
Examines the technical and management aspects of building a data warehouse. Explores the architecture, infrastructure, processes, data quality, database design, and data analysis involved in building the data warehouse for business analysis. Management issues include business goals, tool selection, project management, personnel skills, training, and user requirements. Topics include dimensional data modeling, extraction/transformation/load processes, data quality problems, datamarts, operational data stores (ODS), staging databases, and online analytic processing (OLAP).
- Prerequisite: INFO 6205 or INFO 6210; engineering students only.

INFO 7300 Engineering Cybersecure Software Systems (4 SH)
Addresses design and implementation issues critical to producing cybersecure software systems by using a software development perspective. Deals with the question of how to make the requirements for confidentiality, integrity, and availability integral to the software development process from requirements gathering to design, development, configuration, deployment, and ongoing maintenance. Covers emerging software life-cycle practices that address both cybersecurity problems caused by bad software practices that leave software vulnerable to cyberattack and other software vulnerabilities that are caused by deficiencies in modeling of security requirements, architecture, and design issues.
- Prerequisite: (a) INFO 5100 or CSYE 6200 and (b) INFO 6250; engineering students only.

INFO 7305 System Architecture and Technology Management (4 SH)
Aimed at information systems students aspiring to become software project managers or system or product architects in software and high-technology organizations. Designed to deepen the student’s understanding of system architectures and engineering, product development processes, and dynamics of innovation in high-technology industries. Responds to the question of how technology managers and software architects might work together to oversee and control these three critical areas. Covers the following topics in detail: software product design and engineering processes, systems architecture, modular and integral product paradigms, commonality and reuse, options thinking and prioritization strategies, as well as the identification and delivery of value for the user.

INFO 7310 Introduction to Distributed Security (4 SH)
Provides the student with the skills to understand and solve the difficult problems associated with securing broadly distributed systems. Examines the new security paradigms that have been developed to solve the problem of securing Web Services and compares and contrasts them with the more traditional security paradigms. Covers both the theory and practical aspects of basic distributed security principals, transport and message-based security, trust management, PKI, security specifications, risk management as applied to security, advanced access control, digital signature, XML encryption, security policy, and privacy.
- Prerequisite: INFO 6205.

INFO 7315 Web Services/Service-Oriented Architecture (4 SH)
Describes how a solid foundation to support a true electronic business infrastructure is being laid using new paradigms, such as an interoperable language and a new architectural way of looking at electronic business. Supporting these paradigms are Service Oriented Architecture (SOA) and Web Services. Covers the latest heterogeneous models for carrying out large-scale distributed computing for Web Services. The models use loose coupling based on XML, which is independent of computing platform and language. Explores the fundamentals of XML, XML schema, and SOAP using tools from Microsoft, IBM, and Sun. Uses the principals of an SOA and Web Services to describe how to architect large-scale distributed systems.
- Prerequisite: INFO 6205.
INFO 7320 Global Technology Outsourcing (3 SH)
Examines the critical issues in global outsourcing of technology: Why outsource, what can be outsourced, criteria for identifying elements for outsourcing, organizing for outsourcing, where to outsource, and managing the outsourcing operation to maximize global profit. Today, large numbers of white-collar and highly technical jobs, including software development and research activities, are increasingly being performed offshore. This practice could become even more pervasive and perhaps a standard feature of all businesses in the United States. Offered jointly by the D’Amore-McKim School of Business and the College of Engineering, this course is team taught by professors from both colleges with supplemental guest lecturers from appropriate industries.

* Prerequisite: INFO 6260; engineering students only.

INFO 7325 Introduction to Information Technology Auditing (4 SH)
Designed to provide a foundation for the study and professional career development of information technology (IT) auditing. Introduces the fundamentals of IT auditing, core reasons why this is a specialized area of auditing, and the principle objectives of IT auditing and its relationship to integrated financial or operational auditing. Offers an insight into management’s objectives regarding IT risk management. Uses the Cobit governance and control framework to emphasize management issues regarding control of IT and the achievement of value through managed IT processes. Introduces three primary types of IT audits: the audits of computerized information systems, IT processing environments, and the process of developing and implementing information systems.

* Prerequisite: Engineering students only.

INFO 7330 Information Systems for Healthcare-Services Delivery (4 SH)
Addresses the important information systems questions facing the delivery and assessment of healthcare services from administrative, financial, and clinical perspectives. These include the use of electronic medical records; health information exchanges; and performance evaluation of providers, patients, and payers. Provides an introduction on how healthcare is delivered. Also focuses on various information management tools being implemented as well as those needed to move care delivery and quality forward.

* Prerequisite: Open to students in the Graduate School of Engineering and in other Northeastern graduate schools.

INFO 7365 Enterprise Architecture Planning and Management (4 SH)
Defines IT strategies for implementing business-driven and technology-based modernization programs, companywide. Covers how to institute improved IT infrastructures to facilitate strategically informed decisions, at all hierarchical levels, across all business units and functional boundaries. Studies the strategies, programs and projects, business models, methods, and technologies needed to bring about deliberate enterprise-scale change as business strategies evolve. Offers students an opportunity to learn how to construct enterprise architectures and use them as road maps to budget scarce capital investment resources to IT development projects. Topics include system interoperability, business and technology alignment, system flexibility and adaptability to change, IT planning, and effective communication with the management leadership.

* Prerequisite: Admission to the Graduate School of Engineering.

INFO 7374 Special Topics in Information Systems (1 to 4 SH)
Covers state-of-the-art material of current interest.

* Prerequisite: Engineering students only.

* Repeatability: May be repeated without limit.

INFO 7390 Advances in Data Sciences and Architecture (4 SH)
Covers a wide range of skills and responsibilities that are necessary for managing complex business performance and operational data. Such data tend to be fragmented, poorly organized, and often flawed. Offers students an opportunity to learn how a more up-to-date mapping of complex data works and to be alerted to the care and attention they must give to such a task as well as the implications of the results. Covers best practices for managing all aspects of the data transformation life cycle, covering broad areas such as requirements gathering, meta-model design, data integration and transformation, as well as implementation and ongoing operations. Discusses tools for mapping fragmented data into business intelligence solutions that guide successful strategies.

* Prerequisite: (a) INFO 5100 or CSYE 6200 and (b) INFO 6205 or INFO 6210; engineering students only.
INFO 7405 Advances in Engineering Medical Information Systems (4 SH)
Focuses on the fundamentals of engineering patient medical records as timelines of medical encounters that capture critical clinical decisions made in various contexts such as assessments, diagnoses, treatments, etc. Emphasizes semantically rich clinical information models to support predictive analysis in order to recognize patterns of disease early. Record systems typically focus on data recording for legal purposes, ignoring the critical needs of patients and caregivers. Introduces innovative software design and architecture techniques that recognize the complex interaction between patients and caregivers, provide immediately available detailed information for both, and thus invigorate clinical workplaces. Covers techniques for engineering medical applications as sociotechnical systems that promote the safety, effectiveness, and efficiency of core clinical operations.
• Prerequisite: INFO 5100 and INFO 6250; engineering students only.

INFO 7420 Drug Development Processes and Information Systems Compliance (4 SH)
 Begins with the recognition that information technology (IT) has transformed the way that new drugs are developed today. From preclinical studies to small Phase-I clinical trials all the way up to large global Phase-III pivotal trials, virtually every aspect of drug development is evolving due to technological advances. Each of these advances carries with it technological, procedural, and regulatory challenges and uncertainties. This course explores many of today’s most pressing and challenging IT questions facing the pharmaceutical/biotechnology industry and the FDA regarding the use of electronic records, databases, and information management systems that have become an integral part of development programs and regulatory submissions.
• Prerequisite: Open to graduate students in the College of Engineering and in selected other colleges.

INFO 7976 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

INFO 7978 Independent Study (1 to 4 SH)
Offers work performed under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

INFO 7990 Thesis (1 to 8 SH)
Offers theoretical and experimental work conducted under the supervision of a departmental faculty.
• Repeatability: May be repeated without limit.

INFO 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Prerequisite: INFO 7990.
• Repeatability: May be repeated without limit.

INFO 7996 Thesis Continuation (0 SH)
Continues theoretical and experimental work conducted under departmental faculty supervision.
• Prerequisite: INFO 7990.

INTERDISCIPLINARY STUDIES IN ARTS, MEDIA, AND DESIGN (INAM)

INAM 0100 Skills for Success (1 SH)
Offers students an opportunity to gain and practice skills for better study strategies, test taking, stress management, and general academic practices as a student in the College of Arts, Media and Design. Offers students an opportunity to discuss techniques for managing their work, preparing for exams, and reflecting on their own learning styles. Participation is a key element in addition to practicing new skills covered in the course.

INAM 1000 Arts, Media and Design at Northeastern (1 SH)
Intended for freshmen in the College of Arts, Media and Design. Offers students an opportunity to become familiar with the liberal arts in general and with their major; to develop the academic skills necessary to succeed (analytical ability and critical thinking); to become grounded in the culture and values of the university community; and to develop interpersonal skills—in short, to familiarize themselves with all skills needed to become a successful university student.
• Prerequisite: Freshmen only; restricted to students in the College of Arts, Media and Design or by advisor approval.

INAM 2015 Creativity Lab (4 SH)
Offers students an opportunity to learn an iterative and collaborative studio practice of making, critiquing, and presenting finished original work based upon their individual and collective ideas and intentions. Students meet as a group and also attend individual and small group sessions with mentors in their field as they exercise their talents in art, architecture, communication, media, design, music, journalism, and/or theatre.
• Prerequisite: Restricted to students in the College of Arts, Media and Design who are completing their first year at Northeastern and whose Creativity Lab application has been accepted. Students should contact their academic advisor for application information.
INAM 4699 Advanced Television Production (4 SH)
Designed to provide students with guidance in the development and implementation of special projects in television and video production. Includes studies and creative experiential practices in advanced directing (both in the studio and in the field), lighting, scriptwriting, editing, graphics, and postproduction technology.
- **Prerequisite:** Junior or senior standing.
- **NU Core:** Capstone, experiential learning, writing intensive in the major.
- **NUpath:** Analyzing and using data, writing intensive in the major, demonstrating thought and action in a capstone.
- **Equivalent:** ARTS 4699, COMM 4699, HIST 4699, IDSC 4699, JRNL 4699, MUSC 4699, and THTR 4699.

INAM 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Repeatability:** May be repeated without limit.

INAM 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- **Prerequisite:** Restricted to students in the College of Arts, Media and Design.
- **Repeatability:** May be repeated without limit.

INAM 6965 Co-op Work Experience Abroad (0 SH)
Provides eligible students with an opportunity for work experience abroad.
- **Prerequisite:** Restricted to students in the College of Arts, Media and Design.
- **Repeatability:** May be repeated without limit.

**INTERDISCIPLINARY STUDIES IN SCIENCE (INSC)**

INSC 1000 Science at Northeastern (1 SH)
Introduces first-year students with majors in the College of Science to the liberal arts in general. Offers students an opportunity to become familiar with their college and majors; to develop the academic skills necessary to succeed (analytical ability and critical thinking); to become grounded in the culture and values of the University community; and to develop interpersonal skills—in short, presents students with the skills needed to become a successful university student.
- **Prerequisite:** Freshman or sophomore standing.
- **Equivalent:** BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, LING 1000, MATH 1000, PHYS 1000, and PSYC 1000.

INSC 1180 Science: Creation of Knowledge—Opportunities for Undergraduate Research (1 SH)
Designed primarily for undeclared freshmen and sophomore students with an interest in science. Through presentations, discussions, and projects with research faculty and student mentors, offers students an opportunity to learn from examples how new scientific knowledge is created, how scientists decide what questions to ask, and how to investigate them. Focuses on some of the new frontiers in science research at Northeastern and the opportunities for discovery and research available to undergraduate students in science at Northeastern. Seeks to help students explore whether a major in science is appropriate for them and to provide them with possible paths to pursue undergraduate research with faculty, in labs on campus, and through research on co-op.
- **Prerequisite:** Freshman or sophomore standing.

**INTERDISCIPLINARY STUDIES IN SOCIAL SCIENCES AND HUMANITIES (INSH)**

INSH 1000 Social Sciences and Humanities at Northeastern (1 SH)
Intended for freshmen in the College of Social Sciences and Humanities. Introduces freshmen to the liberal arts in general. Offers students an opportunity to become familiar with their major, to develop the academic skills necessary to succeed (analytical ability and critical thinking), to become grounded in the culture and values of the university community, and to develop interpersonal skills—in short, to become familiar with all the skills needed to become a successful university student.
- **Prerequisite:** Restricted to freshmen in the College of Social Sciences and Humanities.
- **Equivalent:** ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INTL 1000, LANG 1000, PHIL 1000, POLS 1000, and SOCL 1000.
INSH 1101 Picturing the World (or How We Came to Understand What Nature Is)  (4 SH)
Offers a multidisciplinary introduction to how we represent the world and the natural environment through hands-on study of early modern maps, art prints, and books. Examines how the invention of the scientific method (and fields from geography to botany) interfaces with the personal observations and experiences of travelers from Marco Polo to Charles Darwin. Further examines the way modern technologies, such as cinema, television, and digital media, are once again changing the way we see and understand the world.
• NU Core: Humanities level 1.

INSH 1102 Food in Contemporary Context (4 SH)
Covers a multidisciplinary set of perspectives on an intrinsic part of daily life—food. Food is not just about survival—it is about being human. Producing it, making it, eating it, obsessing about it is woven throughout our lives. It defines, and is defined by, culture. It is the basis of economies, has produced great fortunes, defines entire communities, and is the cause of conflicts. It is at once natural and artificial, grown and manufactured. It nourishes us, and it makes us sick. It is the source of sublime pleasure and no small anxiety. Food defines us, as much as we define it. With these considerations, this course uses food as a lens into contemporary life.
• NU Core: Social science level 1.

INSH 1210 Special Topics in Social Sciences (4 SH)
Focuses on topics that are concerned with the organization and functioning of societies and cultures.
• Repeatability: May be repeated up to 2 times.

INSH 1220 Special Topics in the Humanities (4 SH)
Focuses on topics that are concerned with the expression of human experience and values and that foster critical and analytical thinking.
• Repeatability: May be repeated up to 2 times.

INSH 2101 Love and Hate: Social, Psychological, and Literary Approaches (4 SH)
Studies materials that define and describe love and hate from the fields of literature and literary criticism, social psychology, and criminology and criminal justice. “Love” and “hate” are small words describing powerful emotions with profound effects on individuals and on social groups. Focusing largely on contemporary examples, offers students an opportunity to analyze the differences and areas of overlap in the above fields’ approaches to love and hate, to discuss societal responses to these emotions, and to apply the methodologies of each field to research questions of their own.
• Prerequisite: (a) ENGW 1111 (which may be taken concurrently), ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• Cross-list: PSYC 2101.
• NU Core: Comparative study of cultures.
• Equivalent: PSYC 2101.

INSH 2102 Bostonography: The City through Data, Texts, Maps, and Networks (4 SH)
Uses Boston as a case study for integrating computational methods with the social sciences and humanities to provide new insights into major cultural, historical, and societal questions as they relate to and extend beyond the city of Boston. Through lectures, discussions, and labs, the course examines a variety of data sets that measure geographic, historical, literary, political, civic, and institutional landscapes. Offers students an opportunity to combine analytical tools, such as geospatial mapping, data visualization, and network science, with readings, hands-on class activities, and museum or site visits, enabling a comprehensive view of complex cultural and social phenomena.
• Prerequisite: CS 2500 (may be taken concurrently).
• NU/Path: Interpreting culture, understanding societies and institutions.

INSH 2104 Statistics in the Social and Political World (4 SH)
Offers an introductory course in statistics for the social sciences. Topics include descriptive statistics, samples and populations, estimation, hypothesis testing of differences between groups, and measures of association among variables. Uses basic tools in SPSS to assist students in analyzing existing data sets relevant to the social sciences.
• Prerequisite: MATH 1215.
• Corequisite: INSH 2105.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: CRIM 3700, POLS 2400, and SOCL 2320.

INSH 2105 Recitation for INSH 2104 (0 SH)
Provides small-group discussion format to cover material in INSH 2104.
• Corequisite: INSH 2104.
INSH 7910 NULab Project Seminar (1 SH)
Offers students an opportunity to learn and use digital humanities methods with others in groups and across disciplines in the collaborative space of the NULab seminar.
• Repeatability: May be repeated up to 3 times.

INPR 1100 University Scholars Seminar on Innovation and Research (0 SH)
 Offers a weekly seminar designed to introduce University Scholars to the most innovative research, best ideas, and provocative people at Northeastern.
• Prerequisite: University Scholars only.
• Repeatability: May be repeated once.

INTL 1000 International Affairs at Northeastern (1 SH)
Introduces first-year international affairs students to the majors, the departments servicing IAF, and the university as a whole; familiarizes students with the skills needed for success as a university student.
• Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, LANG 1000, PHIL 1000, POLS 1000, and SOCL 1000.

INTL 1101 Globalization and International Affairs (4 SH)
Offers an interdisciplinary approach to analyzing global/international affairs. Examines the politics, economics, culture, and history of current international issues through lectures, guest lectures, film, case studies, and readings across the disciplines.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions.

INTL 1160 Middle East Studies (4 SH)
Concentrates on the twentieth and twenty-first centuries of the “Middle East” (Arab World, Israel, Turkey, and Iran), the links with southwest Asia (Pakistan, Afghanistan), and U.S. engagement with the Middle East. This course seeks to provide students with effective interdisciplinary analytical skills as well as historical, political, ethical, social, cultural, religious, and economic perspectives on the Middle East.
• NU Core: Social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 1160.

INTL 1185 Gender in the African Diaspora (4 SH)
Studies variations in gender roles throughout the African Diaspora, from precolonial Africa to the modern United States. Areas of the African Diaspora include Africa, the West Indies, Latin America, Europe, and the Islamic world. Issues include sexuality, labor, reproduction, and social constructions of gender.
• Cross-list: AFRS 1185 and WMNS 1185.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: AFRS 1185 and WMNS 1185.

INTL 1215 Society and Culture in Russia (4 SH)
Focuses on contemporary Russian society. Emphasizes the current and recent social, economic, and political characteristics of Russia and the ways in which it has evolved in the post-Soviet period.
• Cross-list: SOCL 1215.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: SOCL 1215.

INTL 2100 Modern Israel (4 SH)
Introduces students to an Israel rarely seen in the news: Films, art, music, short stories, food, and spiritual movements show Israel from a different point of view and expose students to the questions Israelis ask themselves in order to define their own identity. Modern Israel is a fascinating, vibrant, talented, imperfect nation of people from 100 different countries. Thus, conflicts, tensions and contradictions lie at its heart: Ashkenazi Jews complain the country is too Levantine; Sephardi Jews complain about deprivation; Israeli Arabs complain about their position in the nation; Orthodox Jews say the state is not sufficiently religious; seculars consider it antiquated in nature. Immigrants from Russia and Ethiopia, foreign guest workers, water crises, and the Arab-Israeli conflict also figure in the story.
• NU Core: Comparative study of cultures.
• Equivalent: MEST 2100.

INTL 2200 America and the Middle East (4 SH)
Focuses on U.S. engagement with the Middle East, primarily with Muslim societies, and with the Christian and Jewish communities across the region. Emphasizes Egypt, Syria, Iran, Iraq, Turkey, Israel/Palestine, and Lebanon. From America’s first proselytizing adventure to the Ottoman Empire in 1820 to the embrace of Saudi Arabia in the 1940s to the overthrow of the democratically elected prime minister in Iran in 1953 to the attacks of September 11, 2001, to the invasion and occupation of Iraq in 2003 to America’s response to the “Arab Awakening” in 2011 and beyond, the course covers history, politics, oil, war, and peacemaking within the framework of U.S. involvement in the Middle East.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions.
INTL 2240 Global Population and Development (4 SH)
Examines the reasons for global population growth and its economic, political, and social challenges. Topics include relation between population and development, environmental consequences, global imbalance in populations, influence of gender on population and development, attempts to control population growth in China and other countries, effects of aging population on economic growth and political life, population and labor force opportunities, population and migration, and the influence of population issues on international relations and global security. In 2012 the world’s population reached 7 billion, with an additional billion being added every 20 years. Emphasizes how issues in national and international affairs are intimately linked with population, focusing on its effects on attempts to improve the quality of life across the globe.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore or junior standing.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

INTL 2300 Religion in International Affairs (4 SH)
Explores the alternative roles religious actors, groups, and movements play in the international realm. When religion enters the international realm, it is primarily identified as a confrontational, radical, and violent political actor. This course challenges this predominant focus. Studies the patterns of interaction between religions and global politics; how religious movements travel across nation-states and regions and which role(s) they play in shaping, diluting, and/or avoiding conflict in international affairs; and the strengths and weaknesses of religious communities, such as Jewish and Muslim Diaspora, in building cooperation and conflict across the world. Emphasizes the role of religion in transition politics in general and in the Arab Spring in particular.
- NUpath: Understanding societies and institutions.

INTL 2350 Nationalism, Religion, and Minorities in the Modern Middle East (4 SH)
Introduces the ethno-religious mosaic of Islam, Christianity, and Judaism in the contemporary Middle East, with a focus on nationalism. Based on historical-political research and documentaries, the course discusses the emergence of nationalism as influenced by the West since the late-nineteenth century in countries such as Egypt, Israel, Palestine, Syria, Lebanon, Jordan, Iran, Iraq, and Turkey. Discusses local nationalism vs. Pan Arabism and their various expressions in the newly established nation-states of the area and also studies Zionism in its various incarnations. Have secular nationalism and the modern nation-states of the area and also studies Zionism in its various expressions in the newly established nation-states of the area and also studies Zionism in its various expressions. Emphasizes the role(s) they play in shaping, diluting, and/or avoiding conflict in international affairs; and the strengths and weaknesses of religious communities, such as Jewish and Muslim Diaspora, in building cooperation and conflict across the world. Emphasizes the role of religion in transition politics in general and in the Arab Spring in particular.
- NU Core: Comparative study of cultures.
- Equivalent: MEST 2300.

INTL 2360 Human Rights in the Middle East (4 SH)
Focuses on human rights in the Middle East. Emphasizes civil and political rights. Explores the development of human rights and briefly reviews basic definitions, concepts, legal texts, as well as mechanisms for enforcement and remedies. Offers students an opportunity to learn about human rights issues in the Middle East from a thematic and comparative perspective, examining issues of torture, extrajudicial and similar killings, liberty and security of persons, the right to vote, free speech, and freedom of the press. Explores current topics pertinent to international affairs such as counterterrorism/terrorism; democratization; and issues of interdependence with economic, social, and cultural rights.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore or junior standing.
- NU Core: Comparative study of cultures, writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: MEST 2360.

INTL 2370 World Regions (4 SH)
Introduces students to the regions of the world. Surveys the most important physical, social, economic, and cultural characteristics, emphasizing the diversity within large geographical areas such as Africa and South America. Also considers the complex connections between regions.

INTL 2400 Politics of Islam and Gender (4 SH)
Rethinks critically the gender dynamics in Muslim societies. Readings pull together interdisciplinary debates surrounding gender politics in Islam. Emphasizes the pessimist (critiques), optimist (apologetics), as well as critical feminist works, to explore feminism’s contested relationship to Islam. Presents multiple perspectives on contentious issues—including head scarf controversy, violence against women, and sexuality—to encourage critical thinking and constructive discussion.
- Prerequisite: (a) ANTH 1101, HIST 1185, HIST 1290, INTL 1160, PHIL 1270, PHIL 1280, POLS 3465, RELS 1270, RELS 1280, SOCL 1101, WMNS 1103, or WMNS 2500 and (b) sophomore standing or above.
- NU Core: Comparative study of cultures.

INTL 2480 Women and World Politics (4 SH)
Introduces a variety of issues facing women across the globe. Focuses on the gender dynamics of key issues in international affairs. These could include economic policy, conflict and war, human rights/women’s rights, political power, and collective action. Draws on examples from various world regions since the twentieth century to analyze similarities and differences across cases around the globe.
- Prerequisite: INTL 1101 and sophomore or junior standing.
- Cross-list: WMNS 2480.
- Equivalent: WMNS 2480.
INTL 3200 Cities in a Global Context (4 SH)
Examines the roots of the urbanization process, major ways of thinking about it, and the development of world cities and megacities. The twenty-first century will be a century in which urbanism is a central problem and opportunity. Considers the economic, political, cultural, and environmental dimensions of urbanism across the globe. Includes specific case studies from around the world. Encourages students to develop a knowledge of particular cities in order to examine the key themes of the course.
• Prerequisite: Sophomore standing or above.

INTL 3201 Cities in a Global Context (Abroad) (4 SH)
Focuses on the character of space, place, and culture of a contemporary world (global) city. Explores the material transformations of the city and how people understand and imagine the places, spaces, times, and environments they inhabit. Addresses issues of global geographies of cultural change, especially the relationship between the local and the global; questions of place, identity, and landscape, especially at the local level; the significance of place and space in the invention of modern traditions, including places of memory (memorials, museums); the nature of public space and its relations to citizenship; gentrification and the role of art in the city and nature-society relations as expressed in urban parks. Includes a combination of lectures and guided and self-directed field trips in the selected global city.
• Repeatability: May be repeated without limit.

INTL 3250 Democracy and Development in North Africa and the Mediterranean (4 SH)
Examines regional and national developments over the last several decades. Explores the persistence of authoritarian rule and the prospects for democratization, the role of Islamic movements in society and politics, the causes and consequences of neoliberal economic policies, the goals and strategies of North African women’s movements, and the role the region plays in the international system.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.

INTL 3300 Covering Conflicts: Peace, War, and the Media (4 SH)
Examines the media’s portrayal of conflicts and the peace process in the Middle East, Northern Ireland, Bosnia, Rwanda, and elsewhere. Evaluates the limits of fairness, balance, and accuracy in the coverage. Looks at the U.S. and international media—print, broadcast, and online—and some of the major stories in recent years and attempts to put these stories in historical, political, and social context. Analyzes the wide-ranging criticism of coverage from a variety of perspectives.
• Prerequisite: Sophomore standing or above.
• Cross-list: JRNL 3300.
• NU Core: Comparative study of cultures.
• Equivalent: JRNL 3300.

INTL 3400 International Conflict and Negotiation (4 SH)
Offers an interdisciplinary approach to analyzing international conflict and negotiations: how conflicts evolve, are managed, and/or resolved. In dealing with different types of regional and international conflicts, students focus on historical, ethnic, religious, geographic, and political aspects of a variety of conflicts and the consequences these conflicts hold for regional and international actors.
• Prerequisite: (a) INTL 1101 and (b) POLS 1160 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

INTL 3460 Transnational Activism in Global Civil Society (4 SH)
Examines transnational advocacy and activism from both theoretical and practical aspects. Explores the growing literature of transnational activism. Focuses upon the impact of such movements upon global and local civil society and issues of democratization. Also includes a training component in grassroots organization and NGO development. Offers students an opportunity to research local and global problems and organize a community development project over the course of the semester to address these issues.
• Prerequisite: INTL 1101.

INTL 3565 Morocco: History, Cultures, and Economic Development in the Mediterranean Basin (4 SH)
Offers students the opportunity to (1) better understand the origins and contemporary practice of Islam; (2) investigate the dynamics of Morocco as a multicultural society: Arab, Berber, African, and European; (3) explore the unique aspects of the major historical eras in Morocco: Islamic, French Imperialist, postcolonial; (4) consider the complex relationship between local economy and global economic trends; (5) identify the promises and problems involved in modernization in the postcolonial African/Islamic/Arab world(s); and (6) consider the dilemmas facing women as Morocco confronts the twenty-first century. Optional travel to Morocco by permission of instructor.
INTL 4350 Ethnography of Southeast Asia (4 SH)
Offers a seminar on the societies and cultures of Southeast Asia. Offers an interdisciplinary approach to this diverse and dynamic geopolitical region, with readings from anthropology, history, political science, and literature. Covers the major political and cultural changes that have shaped Southeast Asia in relation to the world—from the age of colonial expansion, to the rise of nation-states, to the present global era. Examines central questions in the ethnography of Southeast Asia, emphasizing the postcolonial legacies of Southeast Asia, states and violence, culture and mobility, and pressing contemporary issues in globalizing Southeast Asia.
• Prerequisite: (a) ANTH 1101 or SOCL 1101 and (b) junior or senior standing or permission of instructor.
• Cross-list: ANTH 4350.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: ANTH 4350.

INTL 4500 Latin American Society and Development (4 SH)
Explores the processes of social, economic, and cultural change in Latin America. While concentrating on the present, traces class formation, agrarian structures, ethnic identity, ceremonial organization, gender roles, and political conflict since the colonial era in a range of countries. Emphasizes the relationship of communities and national political and economic systems. May emphasize Central America and Mexico or countries in South America through case studies.
• Prerequisite: (a) ANTH 1101 or SOCL 1101 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• Cross-list: ANTH 4500.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.
• Equivalent: ANTH 4500.

INTL 4510 Anthropology of Africa (4 SH)
Explores Africa’s changing place in the world. Studies the history of Africa and explores the role of ethnography in the making of colonial Africa and the cultural transformations and continuities produced by the emergence of African cities during and after colonialism. Studies postcolonial Africa to critically and comparatively engage with contemporary issues facing African societies. Considers the efflorescence of new cultural forms of music, art, film, literature, in conjunction with new sources of identity such as nationality, religion, ethnicity, consumption, and migration.
• Prerequisite: (a) ANTH 1101 or SOCL 1101 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• Cross-list: ANTH 4510.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.
• Equivalent: ANTH 4510.

INTL 4515 Culture and Politics in Modern India (4 SH)
Introduces the histories, cultures, and peoples of India. Seeks to convey a sense of how knowledge has been constructed about the region and how the subcontinent has been shaped by its engagements with the world through such processes as colonization, state building, and globalization. Uses readings, films, and class discussions to examine themes and topics that include Orientalism, postcolonialism, caste and community, gender and sexualities, conflict and violence, development and resistance, and transnational structures and processes. Critically evaluates some commonly held assumptions, including classical understandings of tradition and modernity, cohesion and conflict, and nation and identity.
• Prerequisite: (a) ANTH 1101 or SOCL 1101 (either may be taken concurrently) and (b) junior or senior standing.
• Cross-list: ANTH 4515.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.
• Equivalent: ANTH 4515.
INTL 4700 Senior Capstone Seminar in International Affairs (4 SH)
Offers a senior research and writing seminar that integrates and assesses the knowledge and skills developed by students participating in the international affairs curriculum, including both experiential (co-op, Dialogue of Civilizations, study abroad, internship, or other approved international experience) and classroom-based components. Requires student self-reflection as well as new research, analysis, and writing, which culminate in a final paper and presentation. Topics include contemporary global issues and draw on relevant literature in the disciplines relating to international affairs.
• Prerequisite: International affairs majors and combined majors only with senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

INTL 4904 Special Topics (4 SH)
Covers selected topics in current events in global affairs and international studies.
• Repeatability: May be repeated without limit.

INTL 4940 Global Corps Practicum (4 SH)
Offers students an opportunity to participate in an intensive practicum on global civil society in an international setting and to live and work with international students in a host country. Covers the essentials of global citizenship and how to form a nongovernment organization to respond to local and global problems.
• NU Core: Comparative study of cultures, experiential learning.
• Repeatability: May be repeated without limit.

INTL 4944 Dialogue of Civilizations: Regional Engagement (4 SH)
Engages students with the cultures, societies, and peoples of particular countries and localities in one primary geographic region. Offers students an in-depth and on-site experience and an opportunity to learn about various aspects of the region, which may include politics, sociology, law, history, philosophy, culture, music, arts, literature, theatre, economics, and/or business. Students may connect with their peers in each locality and across societies, therein to gain an international experience designed to enhance their academic studies on campus in Boston. Culminating projects may include a research paper, an artistic expression piece (i.e., film or photos), or other assignment as determined by the professor.
• NU Core: Arts level 1.
• Repeatability: May be repeated without limit.

INTL 4945 Dialogue of Civilizations: Global Issues in Comparative Perspective (4 SH)
Focuses on transnational issues, cross-cultural communications, and human interactions across regions in the global marketplace of ideas and action. Offers students an in-depth and on-site experience and an opportunity to learn about a cross-cutting thematic issue through a comparative perspective (i.e., human rights, diplomacy, advocacy, etc.). Students may connect with their peers in each country/society and gain an international experience designed to enhance their academic studies on campus in Boston. Culminating projects may include a research paper, an artistic expression piece (i.e., film or photos), or other assignment as determined by the professor.
• Repeatability: May be repeated without limit.

INTL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

INTL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: INTL 4970.
• Repeatability: May be repeated without limit.

INTL 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

INTL 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

INTL 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

INTL 4994 Internship (4 or 8 SH)
Offers students an opportunity for internship work.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
INTL 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

INTL 5200 Political Economy: Interdisciplinary Perspectives (3 SH)
Examines how states, institutions, policy choices, and social forces shape—and are influenced by—the global economy and the world polity. Examines changes in relations among and between the countries of the Global North and the Global South. Draws on concepts, propositions, and theories from various disciplinary approaches to (international) political economy, as well as Marxist, world-systems, and feminist theories.
• Prerequisite: Junior, senior, or graduate standing.

INTL 7338 Dialogue of Civilizations: Globalization and Social Sciences (4 SH)
Offers students an opportunity to “engage” with the culture, civilization, and people of the countries studied and visited that enhances their academic studies on campus in Boston. Seeks to provide students with an in-depth and on-site experience researching politics, sociology, journalism, human services, law, public policy, and/or economics and business in the country of study. Students connect with their peers in each country/society. Culminates in an independent research project conducted by the students before, during, and after their time in-country. (Note that tuition via graduate awards is not permitted to cover the costs of this course.)
• Prerequisite: The student’s department determines the applicability of the course within the curriculum and must approve of the student’s enrollment prior to registration.
• Repeatability: May be repeated up to 2 times.

INTL 7344 Dialogue of Civilizations: Regional Engagement (4 SH)
Engages students with the cultures, societies, and peoples of particular countries and localities in one primary geographic region. Offers students an in-depth and on-site experience and an opportunity to learn about various aspects of the region, which may include politics, sociology, law, history, philosophy, culture, music, arts, literature, theatre, economics, and/or business. Students may connect with their peers in each locality and across societies, therein to gain an international experience designed to enhance their academic studies on campus in Boston. Culminating projects may include a research paper, an artistic expression piece (i.e., film or photos), or other assignment as determined by the professor.
• Repeatability: May be repeated without limit.

INTB 1202 Becoming a Global Manager (4 SH)
Offers an introduction to global business. Functions as a foundational, “cornerstone” course that frames the BSIB course of study and maps the way forward. Covers frameworks for understanding the context of global business and the competencies required of global managers. Students work in teams to complete a global business project. Assessments are used to develop self-awareness and establish a baseline for subsequent development. Offers students an opportunity to develop a four-year professional development plan (PDP) to guide their study and development during their time at Northeastern and to develop the global mindset necessary for becoming an effective global manager. The PDP is referenced in subsequent courses.
• Prerequisite: International business majors only.

INTB 1203 International Business and Global Social Responsibility (4 SH)
Introduces the student to forces and issues confronted in our era of rapid globalization. Managers must understand forces from interconnected social, political, and economic national environments that affect their company’s operations. At the same time they need to draw on their ethical foundations to address and act on social responsibility imperatives across national borders.
• Prerequisite: Business majors and combined majors only.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, employing ethical reasoning.
• Equivalent: INTB 1201 and INTB 1209.

INTB 1209 International Business and Global Social Responsibility (4 SH)
Does not count as credit for business majors. Counts as INTB 1203 for business minors only.
• Prerequisite: Nonbusiness majors only.
• NU Core: Comparative study of cultures.
• Equivalent: INTB 1201 and INTB 1203.

INTB 2202 Analyzing the Global Business Environment (4 SH)
Analyzes the global business environment—political, economic, sociocultural—and the use of various frameworks to aid in analysis and decision making. Introduces the global business environment in which firms have to compete. Specifically examines contemporary issues over the political, social, and economic consequences of the globalization of markets and industries. Also examines the responses of multinational enterprises to the challenges of globalization. Offers students an opportunity to review and revise their professional development plans (PDPs).
• Prerequisite: BUSN 1101 or INTB 1202; international business majors only.
• NU Core: Comparative study of cultures.
INTB 2501 Competing to Win in Emerging Markets (4 SH)
Presents an introduction to emerging markets, focusing on the BRIC countries of Brazil, Russia, India, and China. Takes the perspective of U.S. companies and what they must do to be successful in emerging markets. Discusses the differences between doing business in an emerging vs. a domestic market, the opportunities and potential of an emerging market, and the risks of operating in such a market. Then looks at the world from the perspective of emerging markets and discusses steps that their governments, companies, and entrepreneurs must take to succeed in the world economy. Analyzes what emerging markets must do to raise wages and incomes, accelerate wealth creation, and reduce poverty.

INTB 3202 Managing the International Assignment (4 SH)
Seeks to help students prepare for and succeed in an international assignment. Begins with classroom work during the semester before students leave for their expatriate year, continues throughout their year overseas, and concludes with debriefing sessions upon return. Requires monthly reports while overseas to document their academic and co-op learning, Exposes students to cultural diversity and the pervasive, but hidden, influence of culture on how people live, work, and manage. Offers students an opportunity to (1) develop abilities needed to function effectively in situations of cultural diversity; (2) develop an appreciation of the personal impact of an international assignment while they are living and working abroad.
• Prerequisite: Sophomore standing or above; international business majors only.
• Equivalent: INTB 3301.

INTB 3310 Cultural Aspects of International Business (4 SH)
Helps develop awareness of the hidden influence of culture on behavior, particularly with respect to management and management practices. With the increasing globalization of business, many managers find themselves being managed by, or collaborating with, people of different nationalities and cultures. Develops the ability to recognize, understand, and work with the cultural diversity that affects business conducted across national and cultural boundaries.
• Prerequisite: INTB 1201, INTB 1203, INTB 1209, or INTB 2202; business majors and combined majors only.
• NU Core: Comparative study of cultures.

INTB 3316 Economic, Social, and Political Dimensions of Doing Business in Brazil (4 SH)
Explores cultural, political, and social dimensions of doing business in Brazil. Investigates Brazil’s role in the global economy as well as the role of multinationals in this rapidly developing economy. Discusses the challenges facing companies that operate in a developing country as the country balances economic growth with environmental and social concerns.
• Prerequisite: INTB 2501 and sophomore standing or above.
• Corequisite: INTB 3318.

INTB 3318 Field Research in Emerging Markets in Brazil (4 SH)
Offers students an opportunity to learn how Brazilian companies contribute to Brazilian economic development while being profitable. Studies for-profit companies, exploring how they address issues of sustainability and corporate responsibility within the context of running a company in a rapidly growing economy. Also examines the role played by nonprofits, nongovernment organizations, and government agencies in reducing poverty and illiteracy and in protecting the environment.
• Prerequisite: INTB 2501 and sophomore standing or above.
• Corequisite: INTB 3316.

INTB 3320 International Business Management and Environment (4 SH)
Examines contemporary issues that confront today’s global managers. Explores the responses multinational enterprises have to the challenges of globalization. Seeks to build an understanding of the environment of international business while addressing the competencies required of global managers. Offers students an opportunity to develop a four-year professional development plan to guide their study and to help them develop the global mind-set necessary for becoming an effective global manager. Analyzes the political, economic, and sociocultural environment in which global businesses operate.
• Prerequisite: Junior or senior standing; BSIB exchange students only.
INTB 4202 Executing Global Strategy (4 SH)
Emphasizes global strategy and execution as well as the leadership requirements necessary to execute global strategy. Offers a capstone, “big picture” course that draws on and integrates all business fields and presents a global manager’s perspective. Uses the knowledge acquired in core courses—such as finance, accounting, operations, marketing, and organizational behavior—along with their international dimensions, to study how global managers reach strategic management decisions for the firm and its role in society. Offers students an opportunity to review and revise their professional development plans (PDPs) following their return from the expatriate experience and begin to develop post-Northeastern PDPs.
• Prerequisite: Junior or senior standing; international business majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: INTB 4501, STRT 4501, STRT 4514, and STRT 4516.

INTB 4310 Managing the Global Firm (4 SH)
Offers students an opportunity to obtain a conceptual foundation for understanding global trends that affect global competitiveness: the importance of the complex interplay of company-level competencies, cross-national sources of advantage in a technologically driven global competitive environment; and the need to analyze and respond effectively to ethical challenges of a globalizing world.
• Prerequisite: INTB 1201, INTB 1203, INTB 1209, or INTB 2202; business majors and combined majors only.

INTB 4860 Special Topics in International Business (4 SH)
Examines areas of current interest and special topics in the field of international business.
• Repeatability: May be repeated up to 2 times.

INTB 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

INTB 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: INTB 4970.
• Repeatability: May be repeated without limit.

INTB 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

INTB 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Repeatability: May be repeated without limit.

INTB 4998 International Business Undergraduate Thesis Continuation (0 SH)
Offers thesis continuation for students in the BSIB program who are working on their thesis as part of the dual-degree requirements.
• Prerequisite: Senior standing; international business students only.
• Repeatability: May be repeated once.

INTB 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

INTB 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
INTB 6200 Managing the Global Enterprise (3 SH)
Focuses on the international business environment, and examines the influence on global decision making of such areas as the international economy and trade issues, legal and political context differences, governmental actions, cultural and ethical system differences, exchange rates and international currency markets, international institutions like the World Trade Organization and the International Monetary Fund, and regional agreements like the European Union, NAFTA, and Mercosur. Also analyzes why firms internationalize their operations, how they can internationalize, and key areas such as international manufacturing, marketing, human resource management, and strategy.
• Equivalent: INTB 6208.

INTB 6201 International Business Management (3 SH)
Explores the organizational and functional challenges a firm’s manager must master to be effective across national borders in an era of increasing globalization. Such challenges affect the international manager’s strategic decisions and operational actions and arise from international economy and trade conditions, legal and political context differences, as well as cultural and ethical system issues.

INTB 6208 Global Management (3 SH)
Focuses on managerial decision making in international business. Covers key international business topics from international strategy, management, and organizational behavior such as globalization, national business environment analysis, cultural and ethical differences across borders, politics and law in international business, regional economic integration, motivations for going international, foreign direct investment, mode of entry selection, international organizational structure, MNC strategy, principles of international marketing, managing international operations, and international human resource management. Students read selected international business works, analyze and discuss cases, conduct international feasibility projects, and discuss current developments in the field.
• Prerequisite: Full-time MBA students only.
• Equivalent: INTB 6200.

INTB 6210 Multinational Management: Strategies and Operations (3 SH)
Focuses on international management, dealing with modes of entry into international operations including exporting, licensing, international marketing subsidiaries, foreign direct investment and joint ventures, and organizing for multinational operations. Cases deal with a variety of industries and country environments, with services and high-technology industries, and topics such as business-government relations in an international context.
• Prerequisite: INTB 6200.

INTB 6211 Managing in Transitional Economies (1.5 SH)
Examines companies that are engaged in business in countries with transitional economies, which face unique challenges and opportunities. By some measures, people who live and work in such countries (often referred to as developing) account for approximately 80 percent of the world’s population. These people represent a large, growing market and labor force, spread among countries that are extremely diverse and produce a wide array of products and services. Discusses economic forces that are powering globalization and the reactions they engender among governments and populations in developing countries. Also examines some of the differences between developed and developing countries, and consider how they impact managers.
• Prerequisite: INTB 6200.

INTB 6212 Cultural Aspects of International Business (3 SH)
Focuses on issues that arise when a firm operates in multiple countries with cultures that are different from its home country. Principally addresses the perspectives of U.S. firms operating overseas, but also explores other national firms operating in the United States and in third-country environments. A central issue is how corporate cultures evolve in the context of national cultures.
• Prerequisite: Business students only.

INTB 6213 Doing Business in Eastern Europe (6 SH)
Explores the economies of transition in Eastern Europe as students visit companies in several countries there. Focuses on implications of current economic reforms, foreign trade organizations, and government agency roles, as well as issues related to business culture in the countries visited.
• Equivalent: INTB 6214, INTB 6215, and INTB 6230.

INTB 6215 Economic and Business Development in China (6 SH)
Designed to expose students to the transitional economy and the business environment in China. For several years, China has been the fastest-growing economy in the world and it has recently been admitted to the WTO. Through visits and seminars at host universities and companies in China, students gain firsthand knowledge of the structure of the Chinese economy and how domestic and foreign companies do business there. Students travel to a number of cities in China and have opportunities to directly interact with Chinese government officials, company executives, and university faculty and students.
• Equivalent: INTB 6213, INTB 6214, and INTB 6230.
INTB 6216 Marketing Innovations in Europe (3 SH)
Exposes students to marketing innovations in a global setting. Examines the relationship between marketing and technology in an international setting by comparing a technologically advanced country, Finland, and an emerging market, Estonia. Covers factors that influence the marketing of technological innovations and factors that accelerate, and those that impede, the diffusion of technological innovation. Examines how companies market innovations in these countries, how consumer behavior evolves with the introduction of technological innovations, and how the nature of competition changes with the evolution of innovations. Exposes students to the socioeconomic and cultural context of innovations. Describes how organizations such as the European Union impact the marketing of innovations.

INTB 6217 Creating Sustainable Competitive Advantage through Global Innovation (3 SH)
Offers students an opportunity to learn about how companies overcome the barriers to managing global new-product development. Studies how distance, along with differences in culture, capabilities, costs, and customers, make the task of managing global new-product development efforts incredibly difficult and delicate. Also studies how firms develop and execute global innovation strategies, build and leverage global networks, create R&D capabilities abroad, manage distributed projects and virtual teams, and how emerging market firms innovate globally.

INTB 6218 Leadership and Organizational Behavior in a Global Environment (3 SH)
Aims to create awareness, understanding, and knowledge of how organizations select, develop, and train global leaders. Begins with a review of culture and its differences across national borders. Then studies multicultural team building (face-to-face and virtual), intercultural communication, international career development and management from the organization’s and the executive’s point of view, and broader organizational behavior challenges across borders.

INTB 6222 Cultural and Global Strategy Implementation (2 SH)
Focuses on the manager’s need to recognize, understand, and work with aspects of cultural differences in order to implement strategy effectively across national borders. Offers students an opportunity to map cultural differences using a number of conceptual frameworks that are used by managers. The implications of these differences and the use of guest speakers increase the range of learning opportunities.

INTB 6224 Competing to Win in Emerging Markets (3 SH)
Offers students an opportunity to develop an understanding of emerging markets. Studies how U.S. firms can and do compete with emerging markets, how emerging-market companies compete with developed companies, and how companies in emerging markets compete with each other. Explores the future of emerging markets and the steps they need to take to ensure their future viability and success, as well as the threats they face.

INTB 6226 Becoming a Global Leader (3 SH)
Seeks to help students build the cross-cultural skills necessary to comfortably and effectively work in different cultures and with people from different cultures. Discusses the alignment between the firm’s business strategy and the leader’s responses in a multicultural environment along with the methods for leadership effectiveness in multicultural teams and virtual environments. Using online, experiential, and discussion-based methods, offers students an opportunity to gain the self-awareness needed to generate a plan for their own global leadership development.
• Prerequisite: Students in selected MBA, MS, MSF, and MSIB programs only.

INTB 6230 International Field Study (3 SH)
Designed to give students intense exposure to the global business environment by immersing them in the business practices and culture of a country or region outside the United States. The course is taught primarily in the country or region of interest and involves a mix of classes, company site visits, and cultural activities. Fulfills the globalization requirement in the full-time MBA program.
• Repeatability: May be repeated without limit.
• Equivalent: INTB 6213, INTB 6214, and INTB 6215.

INTB 6231 Global Leadership Development (3 SH)
Presents a management-oriented approach to understanding global management and leadership. Exposes participants to the complexity contained within multicultural environments; one’s own leadership style and cultural competencies; how culture influences an organization’s strategy and operations; and how organizations attract, retain, and develop culturally agile talent. Designed to help corporate managers develop a global mind-set and build the cultural competencies required for global leadership.
• Prerequisite: Business administration students only.
INTB 6232 Doing Business in Emerging Markets (3 SH)
Takes the perspective of managers who are considering the best ways to enter and succeed in emerging markets such as Brazil, Russia, India, China, South Africa, and others that offer varying institutional opportunities and challenges. Examines how their action choices compare to those appropriate for entering advanced markets like the United States, Western Europe, or Japan. Emphasizes how socioeconomic, ethical, political, regulatory, and technological complexities affect the strategy choices that multinational firms, from and in emerging markets, make to succeed at home and abroad.

INTB 6238 Global Project (3 SH)
Offers students an opportunity to work on faculty-led teams to address a current issue facing a global corporate partner organization. Students interact directly with organizational leaders and employees to scope the project and work as a consulting team, harnessing campus and corporate resources to solve a problem and/or make recommendations. Faculty travel with the students to an international site to continue research, interviews, etc., and report findings to local corporate representatives. Feedback on the project reports are incorporated, and the final project report takes place post-travel with the corporate/sponsoring organizations’ representatives.

INTB 6260 Advanced Topics in Global Management and Strategy (3 SH)
Offers topics of current interest in the international business arena, emphasizing managing in emerging markets, analyzing global expansion, and developing analytical and quantitative modeling skills for the international business arena, often in the context of developing presentation and writing skills in a case competition format. Instructor interests will shape course format and meeting schedules.
• Prerequisite: INTB 6200.
• Repeatability: May be repeated without limit.

INTB 6280 Managing Innovation and Marketing in the Global Enterprise (3 SH)
Extends the principles of new product and service innovation and the marketing of these innovations to offshore markets, including the European Union; Brazil, Russia, India, and China (BRIC); and other emerging markets. Explores differences in business culture, government regulation, consumer/customer preferences, and employee management in these various contexts. Through cases and Web database research projects, offers students an opportunity to extend their innovative thinking to the world’s fastest-growing markets.
• Prerequisite: High-technology and business administration students only.

INTB 6290 Managing in Diverse Cultures to Execute Global Strategy (3 SH)
Offers students an opportunity to develop the knowledge and skills they need to manage in diverse cultural environments and to work effectively with people from other cultures. Specifically, offers students an opportunity to develop awareness of the pervasive and hidden influence of culture on behavior, particularly with respect to management practices in global operations; to develop familiarity with the types of situations and issues that managers often confront when working globally; to develop skill in using selected tools and frameworks that can guide managers working with diverse cultures; and to develop self-awareness of their own capabilities to work effectively in culturally diverse contexts.
• Prerequisite: Executive MBA students only.

INTB 6291 Expanding Globally for New Competitive Advantage (1.5 or 2 SH)
Explores geographic expansion and strategies to grow businesses worldwide while protecting domestic markets. Examines why firms globalize and identifies challenges companies face in transferring competitive advantages across borders. Emphasizes how firms manage global expansion, including choice of markets, pace of expansion, methods of entry, competition with local firms, and relations with host governments. Explores emerging market opportunities and competition. Investigates how global firms exploit their global presence to create new competitive advantages in matters such as promoting efficiency, developing talent, streamlining sourcing, exploiting scale, and driving innovation. Offers students an opportunity to gain a global mind-set by integrating lessons from international management, cultural, and strategy courses to address complex global strategy and implementation issues.
• Prerequisite: Executive MBA students only.

INTB 6292 Global Economic and Political Environments (2 SH)
Offers students an opportunity to learn about how the global economy functions; what challenges each region of the world faces; how those regions are interconnected; and the international agreements and institutions—such as the World Trade Organization, the World Bank, and the International Monetary Fund—through which those interdependencies are managed. Introduces the political forces that shape relations among countries and, therefore, the context in which firms make decisions. Examines the significance to companies of issues such as long-term trends in U.S. competitiveness in the global economy, the long-term implications of the rise of countries like China and India, and the importance of Europe as a market for U.S. companies.
• Prerequisite: Executive MBA students only.
• Equivalent: MECN 6291.
INTB 6293 International Residency in Mexico City (3 SH)
Offers students an opportunity to travel to Mexico City to participate in International Week at IPADE, Mexico’s premier, internationally ranked business school. Students are grouped in small teams comprised of participants from multiple countries. Teams prepare and discuss case studies on important business issues, contributing their different perspectives and outlooks, and leading thinkers and managers from Latin America and elsewhere share their business experience. The week includes visits to leading Mexican companies and cultural and historical sites and social events where participants meet and exchange views with peers from different companies, industries, and cultures.
• Prerequisite: Executive MBA students only.
• Equivalent: BUSN 6290.

INTB 6294 International Residency in China and Hong Kong (3 SH)
Designed to give students firsthand experience with the business environment and managerial practices of China and Hong Kong, as well as to experience Chinese culture, society, and values through sightseeing and cultural activities. Students hear from local experts and visit a number of companies. They are able to interact with senior managers, local entrepreneurs, and government officials from different cultures in formal and informal settings. Offers students an opportunity to understand the difference in markets, firms, governments, and institutions, comparing the U.S. economy to that of China and Hong Kong, and to understand the nature of the long-term challenges and opportunities that China represents for U.S. companies and managers.
• Prerequisite: Executive MBA students only.
• Equivalent: BUSN 6291.

INTB 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

INTB 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

INTB 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

INTP 1000 American Sign Language at Northeastern (1 SH)
Intended for freshmen in the College of Social Sciences and Humanities. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community, and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

INTP 3500 The Interpreting Profession (2 SH)
Presents an overview of the interpreting profession: responsibilities, ethics, and aptitudes of interpreters; professional associations; law and business of interpreting; the bilingual and bicultural context; basic translation and interpretation; environment and audience; special populations; freelance vs. in-house positions; and evaluation and certification.
• Prerequisite: AMSL 2102.

INTP 3510 Interpreting Inquiry Texts (4 SH)
Presents theoretical models of interpretation, but the primary focus is the interpretation of inquiry texts (job interviews, case histories, and applications) and the development of strategic decision-making skills within the context of dedicated and embedded inquiry texts. Presents an overview of linguistic and sociolinguistic factors, facets, and aspects of inquiry texts, and then seeks to develop in students the cognitive processes and skills involved in translation, consecutive interpretation, and simultaneous interpretation. The goal is that students develop the cognitive processes and decision-making skills needed to apply these differing strategies for achieving cross-cultural mediation.
• Prerequisite: AMSL 2102.

INTP 3515 Interpreting Narrative Texts (4 SH)
Focuses on the interpretation of narrative texts (personal narratives, storytelling) and the development of strategic decision-making skills within the context of dedicated and embedded narrative texts. Presents an overview of linguistic and sociolinguistic factors, facets, and aspects of narrative texts, and then seeks to develop in students the cognitive processes and skills involved in translation, consecutive interpretation, and simultaneous interpretation. The goal is that students develop the cognitive processes and decision-making skills needed to apply these differing strategies for achieving cross-cultural mediation.
• Prerequisite: INTP 3510.
INTP 3550 Performance Interpreting—Interpreting for the Theatre (4 SH)
Designed to take students through the process of interpreting a play from first read-through to final bow. Interpreting for theatrical performances is markedly different from other forms of interpreting. The availability of a script, the time to rehearse, and the possibility of getting feedback prior to the event makes this venue a hybrid, part interpreting and part performance. This course is offered in conjunction with or in advance of a Theatre Department production. Gives students the opportunity to learn how to analyze scripts for both content and interpreting issues; how to solve the production problems of logistics, placement, and lighting; and how to interpret a series of performances for members of the Deaf community.
• Prerequisite: (a) AMSL 2102 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Repeatability: May be repeated without limit.

INTP 4510 Interpreting Expository Texts (4 SH)
Focuses on the interpretation of expository texts (lectures, procedural texts) and the development of strategic decision-making skills within the context of dedicated and embedded expository texts. Presents an overview of linguistic and sociolinguistic factors, facets, and aspects of expository texts, and then seeks to develop in students the cognitive processes and skills involved in translation, consecutive interpretation, and simultaneous interpretation. The goal is that students develop the cognitive processes and decision-making skills needed to apply these differing strategies for achieving cross-cultural mediation.
• Prerequisite: INTP 3515.

INTP 4515 Interpreting Persuasive Texts (4 SH)
Focuses on the interpretation of persuasive texts (solicitation, political speeches) and the development of strategic decision-making skills within the context of dedicated and embedded persuasive texts. Presents an overview of linguistic and sociolinguistic factors, facets, and aspects of persuasive texts, and then seeks to develop in students the cognitive processes and skills involved in translation, consecutive interpretation, and simultaneous interpretation. The goal is that students develop the cognitive processes and decision-making skills needed to apply these differing strategies for achieving cross-cultural mediation.
• Prerequisite: INTP 4510.

INTP 4560 ASL-English Contrastive Analysis (4 SH)
Examines and contrasts the major linguistic features of American Sign Language and English. Systematically analyzes the two languages using the analytic and descriptive tools of linguistics to examine various dimensions of the languages such as phonology, morphology, and syntax. Also seeks to develop in students an ability to use the analytic and contrastive tools of linguistics as an aid in understanding novel linguistic constructions in each language.
• Prerequisite: DEAF 2700 and INTP 3510.

INTP 4650 Ethical Decision Making (4 SH)
Explores ethical standards and dilemmas in American Sign Language–English interpreting and other professions through discussions, hypothetical situations, and role-playing. Topics include culturally objective standards, ethics and professional principles, power relations within groups, and the Registry of Interpreters for the Deaf (RID) code of ethics. Students examine various alternatives to a duty-based approach to the RID code and draw upon ethical fieldwork experience to analyze the principles that guide ethical decision making among professional interpreters.
• Prerequisite: INTP 3515.
• Corequisite: INTP 4651.

INTP 4651 Ethical Fieldwork (2 SH)
Comprises the fieldwork component of INTP 4650. Students are placed in practical interpreting experiences in educational settings, agencies serving Deaf people, and with freelance interpreters. Focuses on ethical questions and dilemmas and decision making in a biweekly seminar format. Students are required to maintain a log and participate in online discussions. Fulfills the experiential education requirement for ASL majors.
• Prerequisite: INTP 3515.
• Corequisite: INTP 4650.

INTP 4940 Interpreting Research Practicum (4 SH)
Requires students to undertake a research project focused on some aspect of American Sign Language-English interpretation. Students work in research teams (with approval) and may begin their research project once enrolled in INTP 3510. In consultation with a faculty adviser, students select a research question, design and implement the data-collection component of the project, analyze results, and write up their research findings. In addition to a written report, students also present their research results to ASL majors at an annual “in-house” ASL research symposium.
• Prerequisite: INTP 4651 and junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
INTP 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. 
- Repeatability: May be repeated without limit.

INTP 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field. 
- Prerequisite: INTP 4970.
- Repeatability: May be repeated without limit.

INTP 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision. 
- NUpath: Integrating knowledge and skills through experience.

INTP 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. 
- Repeatability: May be repeated without limit.

INTP 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. 
- Repeatability: May be repeated without limit.

INTP 4994 Internship (4 SH)
Offers students an opportunity for internship work. 
- NUpath: Integrating knowledge and skills through experience. 
- Repeatability: May be repeated without limit.

INTP 4995 Interpreting Practicum (4 SH)
Places students in practical interpreting experiences in educational settings, agencies serving Deaf people, and with freelance interpreters. Students are required to record a set number of hours interpreting with supervision and analyzing their work with the supervising interpreter. Students maintain a log and participate in online discussions. Students present case studies drawn from their supervised work experience in biweekly seminars. Fulfills the experiential education requirement for ASL majors. 
- Prerequisite: INTP 4651.
- NU Core: Experiential learning.
- Repeatability: May be repeated without limit.

ITALIAN (ITLN)

ITLN 1101 Elementary Italian 1 (4 SH)
Designed for students with very little or no prior knowledge of Italian. Provides a lively introduction to basic oral expression, listening comprehension, and elementary reading and writing. The audiolingual approach, using practical vocabulary drawn from realistic situations, aims at good pronunciation and ease in response. Each lesson incorporates helpful information about daily life in Italy and the varied cultures within the world of Italian speakers. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources. 
- Prerequisite: ITLN 1101 or ITLN 1301.

ITLN 1102 Elementary Italian 2 (4 SH)
Continues ITLN 1101. Reviews and continues the study of grammar and basic language skills. Offers progressively more intensive practice in oral and written communication. Laboratory practice complements class work, enables students to work aloud at their own speed, reinforces their acquisition of essential structures, and acquaints them with a vast library of audio-visual resources. 
- Prerequisite: ITLN 1101 or ITLN 1301.

ITLN 1201 Elementary Italian 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Designed for students with little or no prior knowledge of Italian. Presents essentials of correct Italian usage through acquisition of basic skills in reading, writing, speaking, and aural comprehension. 
- Prerequisite: International business majors only.

ITLN 1202 Elementary Italian 2—BSIB (4 SH)
Continues ITLN 1201. Designed to meet the special needs of international business students. Includes completion of basic grammatical usage, reading of contemporary Italian material, and increased stress on oral and aural skills. 
- Prerequisite: ITLN 1201 or ITLN 1301; international business majors only.

ITLN 1301 Elementary Italian Immersion 1 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment. 
- Prerequisite: ITLN 1201 or ITLN 1301; international business majors only.

ITLN 1302 Elementary Italian Immersion 2 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
ITLN 2101 Intermediate Italian 1 (4 SH)
Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current Italian periodicals.
• **Prerequisite:** ITLN 1102 or ITLN 1302.

ITLN 2102 Intermediate Italian 2 (4 SH)
Continues ITLN 2101. Emphasizes further vocabulary building and mastery of fine points of grammar through written composition, prepared oral reports, and reading and discussion from current Italian periodicals.
• **Prerequisite:** ITLN 2101 or ITLN 2301.

ITLN 2151 Intermediate Italian for Business Purposes (4 SH)
Introduces the study of the language, registers, and conventions used in the world of Italian business, focusing on the lexis of Italian commerce, industry, and commercial law. Explores Italian business culture, its entrepreneurship, and the “made in Italy” brands. Emphasizes how business is conducted in Italy, taking into account language, customs, regional differences, and politics. Offers students an opportunity to develop the basic communication skills necessary for interviews, meetings, negotiations, and presentations and to function adequately in an Italian business environment.
• **Prerequisite:** ITLN 2101, ITNL 2201, ITNL 2301, or permission of instructor.

ITLN 2201 Intermediate Italian 1—BSIB (4 SH)
Designed for the special needs of international business students. Offers advanced grammar topics and continued stress on aural/oral acquisition. Provides some reading of literary, business, and popular texts.
• **Prerequisite:** ITLN 1202 or ITLN 1302; international business majors only.

ITLN 2202 Intermediate Italian 2—BSIB (4 SH)
Continues ITLN 2201. Designed to meet the needs of international business students. Continues acquisition of all major skills in Italian. Provides increased readings of literary and popular texts. Also includes student projects.
• **Prerequisite:** ITLN 2201 or ITLN 2301; international business majors only.

ITLN 2301 Intermediate Italian Immersion 1 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ITLN 2302 Intermediate Italian Immersion 2 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

ITLN 2900 Specialized Instruction in Italian (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• **Repeatability:** May be repeated without limit.

ITLN 3101 Advanced Italian 1 (4 SH)
Stresses the fundamentals of Italian to promote effective self-expression through speaking and writing and to explore the idiomatic aspects of the language. Through progressive class discussions and oral and written commentaries, students analyze a contemporary Italian novel or an Italian cultural reader, screenplay, or collection of short stories. The course strives, first, to help students read and comprehend modern Italian writing with confidence and to be able to talk and write about it in good Italian; and second, to provide preparation for advanced courses.
• **Prerequisite:** ITLN 2102 or ITLN 2302.

ITLN 3102 Advanced Italian 2 (4 SH)
Continues ITLN 3101. Enhances and reinforces those practical language and communication skills that students encounter when they are abroad.
• **Prerequisite:** ITLN 3101 or ITLN 3301.

ITLN 3201 Advanced Italian 1—BSIB (4 SH)
Offers advanced grammar review and expanded student participation to meet the special needs of international business students. Stresses active use of the language. Includes weekly composition and speaking assignments as well as grammar review when needed.
• **Prerequisite:** ITLN 2202 or ITLN 2302; international business majors only.

ITLN 3202 Advanced Italian 2—BSIB (4 SH)
Continues ITLN 3201. Offers advanced conversation and composition work for international business students and is the final course before students go abroad. Enhances and reinforces those practical language and communication skills students encounter abroad.
• **Prerequisite:** ITLN 3201 or ITLN 3301; international business majors only.
ITLN 3301 Advanced Italian Immersion 1 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

ITLN 3302 Advanced Italian Immersion 2 (4 SH)
Designed for students who are in an Italian-speaking country, this is an off-campus immersion course. Focuses on standard Italian as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

ITLN 3800 Special Topics in Italian (1 to 4 SH)
Focuses on a unique aspect of the Italian language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
  • Prerequisite: At least an intermediate level of skill in the language.
  • Repeatability: May be repeated up to 3 times.

ITLN 3900 Specialized Instruction in Italian (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
  • Prerequisite: At least an advanced level of competence in the language.
  • Repeatability: May be repeated without limit.

ITLN 4201 Advanced Proficiency Italian 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on ITLN 3202. Offers students an opportunity to continue to build vocabulary and master the fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
  • Prerequisite: ITLN 3202 or ITLN 3302; international business majors only.

ITLN 4202 Advanced Proficiency Italian 2—BSIB (4 SH)
Designed to meet the special needs of international business students. Builds on ITLN 4201. Offers students an opportunity to continue to build vocabulary and master the fine points of grammar through written composition, prepared oral reports, and reading and discussion based on assigned material.
  • Prerequisite: ITLN 4201; international business majors only.

ITLN 4800 Special Topics in Italian (1 to 4 SH)
Focuses on a unique aspect of the Italian language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
  • Prerequisite: At least an advanced level of skill in the language.
  • Repeatability: May be repeated up to 4 times.

ITLN 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • NUpath: Integrating knowledge and skills through experience.
  • Repeatability: May be repeated without limit.

ITLN 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
  • Repeatability: May be repeated without limit.

ITLN 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Repeatability: May be repeated up to 3 times.

ITLN 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated without limit.

ITLN 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated without limit.

JPNS 1101 Elementary Japanese 1 (4 SH)
Introduces basic grammar, sentence patterns, and vocabulary of Japanese with emphasis on spoken Japanese. Includes an introduction to the hiragana and katakana syllabaries in the written component. Designed for students with no previous knowledge of Japanese.
JPNS 1102 Elementary Japanese 2 (4 SH)
Continues JPNS 1101. Emphasizes the development of oral skills; secondary emphasis is on reading. Offers students the opportunity to learn basic grammatical patterns, expand vocabulary, and improve communication skills in modern Japanese. Includes the introduction to kanji characters in the written component.
• Prerequisite: JPNS 1101 or JPNS 1301.

JPNS 1301 Elementary Japanese Immersion 1 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Focuses on standard Japanese. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

JPNS 1302 Elementary Japanese Immersion 2 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Focuses on standard Japanese. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

JPNS 2101 Intermediate Japanese 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Japanese materials.
• Prerequisite: JPNS 1102 or JPNS 1302.

JPNS 2102 Intermediate Japanese 2 (4 SH)
Builds on JPNS 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary Japanese materials.
• Prerequisite: JPNS 2101 or JPNS 2301.

JPNS 2301 Intermediate Japanese Immersion 1 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

JPNS 2302 Intermediate Japanese Immersion 2 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

JPNS 2900 Specialized Instruction in Japanese (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.

JPNS 3101 Advanced Japanese 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: JPNS 2102 or JPNS 2302.

JPNS 3102 Advanced Japanese 2 (4 SH)
Builds on JPNS 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: JPNS 3101 or JPNS 3301.

JPNS 3301 Advanced Japanese Immersion 1 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

JPNS 3302 Advanced Japanese Immersion 2 (4 SH)
Designed for students who are in a Japanese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

JPNS 3800 Special Topics in Japanese (1 to 4 SH)
Focuses on a unique aspect of the Japanese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an intermediate level of skill in the language.
• Repeatability: May be repeated up to 3 times.
JPNS 3900 Specialized Instruction in Japanese (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

JPNS 4800 Special Topics in Japanese (1 to 4 SH)
Focuses on a unique aspect of the Japanese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

JPNS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

JPNS 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

JPNS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated up to 3 times.

JPNS 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

JPNS 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

JEWISH STUDIES (JWSS)

JWSS 1285 Jewish Religion and Culture (4 SH)
Explores the basic features of Judaism in the ancient, rabbinic, and modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.
- Cross-list: PHIL 1285.
- NU Core: Humanities level 1, comparative study of cultures.
- NUpath: Interpreting culture, understanding societies and institutions.
- Equivalent: PHIL 1285 and RELS 1285.

JWSS 1294 Strangers in a Strange Land? European Jewish History 1750–1945 (4 SH)
Examines cultural, religious, political, and economic developments in European Jewish life between 1750 and 1945. Emphasizes the diversity of Jewish experiences in Europe and the significant changes in Jewish identity that occurred as many Jews became increasingly integrated into their surrounding populations. Includes topics such as “Haskalah,” or “Jewish Enlightenment”; the development of Reform Judaism; political and economic emancipation; changes in gender norms; Zionism; and anti-Semitism and the Holocaust. Includes films, memoirs, and cartoons and graphic novels, as well as important texts in Jewish history.
- Cross-list: HIST 1294.
- NU Core: Humanities level 1, comparative study of cultures.
- NUpath: Understanding societies and institutions, engaging difference and diversity.
- Equivalent: HIST 1294.

JWSS 1520 Jewish Film (4 SH)
Explores major themes and issues in American Jewish life—assimilation and intermarriage, anti-Semitism, the Holocaust—through the lens of popular film. Includes weekly screenings of films such as Annie Hall and The Producers and readings, lectures, and discussions.
- NU Core: Comparative study of cultures.
- Equivalent: CINE 3460, IDSC 3460, and JWSS 3460.

JWSS 1575 Jewish Film and Fiction (4 SH)
Examines books and short stories with Jewish themes, such as Goodbye Columbus and The Chosen, and some of the films based on those works. Offers students an opportunity to develop critical knowledge of key issues in modern Jewish identity—immigration, assimilation and intermarriage, anti-Semitism, and the Holocaust—through the lens of fiction and film.
- Cross-list: CLTR 1575.
- NU Core: Comparative study of cultures.
- Equivalent: CLTR 1575.
JWSS 2259 Sex and Gender in the Jewish Experience (4 SH)
Explores how sexuality and gender have shaped Jewish culture and religion throughout history. Studies how ideas about masculinity and femininity have varied dramatically over time and place within the Jewish community and have often departed considerably from those of non-Jewish society. Begins with the role of Biblical texts in the construction of Western conceptions of gender and sexuality and continues through medieval and early modern Europe, up to contemporary feminist Judaism and current Jewish ideas about “queerness” and non-normative ways of living. Uses a wide range of primary sources (memoirs, fiction, religious texts, etc.) and secondary literature from multiple disciplines. Seeks to answer: Does ethnicity have a sex? Is religious identity gendered? What do “Jewish femininity” and “Jewish masculinity” mean?
• Cross-list: WMNS 2259.
• NU Core: Comparative study of cultures.
• Equivalent: HIST 1259, SOCL 1259, and WMNS 2259.

JWSS 2269 Jews and American Popular Culture (4 SH)
Examines why Jews, despite their small numbers, have had such a central influence on American popular entertainment. Jewish “moguls” essentially created the American radio, film, and television industries. Other Jews assumed prominence in the fields of popular song, jazz, folk music, vaudeville, Broadway, literature, literary criticism, stand-up comedy, as well as comic strips and books. Jews excelled in sports, particularly baseball, basketball, and boxing, and Jewish gangsters made an indelible mark on the dark side of the American imagination. Jewish department store moguls, fashion designers, and toy manufacturers helped shape the American Dream. Explores social history as well as works of popular culture to perceive the nuanced Jewish influence operating at the heart of Jewish-American creativity.
• NU Core: Comparative study of cultures.

JWSS 2285 America and the Holocaust (4 SH)
Examines the American response to the Holocaust, in terms of both contemporaneous knowledge and actions and the lasting impact on policy and culture. Starts with early twentieth-century events, such as the Armenian genocide, that shaped later attitudes. Explores the prewar period, particularly U.S. immigration and isolationist policies. Assesses Americans’ knowledge of European events as the extermination campaign unfolded and fights ensued over rescue possibilities. Examines changing depictions of the Holocaust that emerged in the postwar period as a result of critical events such as the Eichmann trial and popular television and film portrayals. Finally, considers how perceptions of the Holocaust have shaped subsequent U.S. responses to genocide.
• Cross-list: HIST 2285.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: HIST 2285.

JWSS 2300 Race, Religion, Ethnicity: The Example of Jewishness (4 SH)
Explores the relationship between Judaism and race from ancient times, through the birth of modern anti-Semitism in the nineteenth century and the Holocaust in the twentieth, to the resurgence of biologically based ideas of Jewish identity in recent decades. Seeks to answer the questions of what Jewishness is—race, religion, or ethnicity—and how and why Jews, along with other groups such as Italians, Irish, and Slavs, moved from being seen as racially “other” in nineteenth-century America to being considered “white” in the twentieth century. Through the lens of the Jewish experience, offers students an opportunity to acquire a deeper understanding of the historically changing meanings of such important concepts as race, ethnicity, and peoplehood.
• Cross-list: HIST 2300.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 2300.

JWSS 2313 Exploring the Jewish Diaspora—From Mountain Jews to Crypto-Jews (4 SH)
Explores vibrant Jewish life in foreign lands, including Argentina, Brazil, Canada, and South Africa, as well as unusual Jewish communities in places such as Uganda and northeastern India. Covers topics such as how Jewish religion and identity are reshaped by other cultures, the emergence of secret Jews who fled the Iberian peninsula more than five centuries ago, and a brief history of Jewish life in the modern diaspora. Includes presentations and discussion of diaspora art, literature, film, and music.
• Cross-list: PHIL 2313.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: PHIL 2313 and RELS 2313.

JWSS 2431 Immigration and Identity in the American Jewish Experience (4 SH)
Examines Jewish political, social, and cultural history from the arrival of the first group of Jews at New Amsterdam in 1654 to the present. Themes include immigration, adaptation, family life, religion, anti-Semitism, Zionism, the Holocaust, and American-Israeli relations.
• Prerequisite: Sophomore standing or above.
• Cross-list: HIST 2431.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 2431 and HIST 3431.
JWSS 2500 Zionism and the Challenges of Jewish Statehood (4 SH)
Examines the birth and development of political, religious, cultural, and social movements that gave rise to the modern state of Israel in 1948 and continue to shape Israeli society and politics today. Readings are drawn from Zionism’s founders and early opponents in nineteenth-century Europe (Herzl, Ha’Am, Buber, etc.); the state’s founders, leaders, and critics (Ben Gurion, Kook, etc.); and ends with contemporary thinkers in Israel and the United States (Morris, Hartman, Eisen, etc.). Emphasizes historical context as well as comparative analysis with other forms of nationalism, other movements of Judaism, and more.
• NU Core: Comparative study of cultures.

JWSS 2610 Contemporary Israeli Literature and Art Abroad (4 SH)
Explores contemporary Israeli culture through literature and art. Focuses on the tensions, pains, and pleasures of existence from various Israeli points of view. Takes place in Israel during the summer term, offering students an opportunity to meet with contemporary Israeli writers, visit sites of the literary settings, and explore art galleries and museums. Readings include short stories and poetry by major Israeli and Palestinian writers from 1948 through the present.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: ENGL 2610.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: ENGL 2610.

JWSS 3447 Topics in Jewish Studies (4 SH)
Covers special topics in Jewish studies.
• Repeatability: May be repeated without limit.

JWSS 3678 Bedrooms and Battlefields: Hebrew Bible and the Origins of Sex, Gender, and Ethnicity (4 SH)
Considers stories from Hebrew Scripture in English translation, beginning with the Garden of Eden through the Book of Ruth, asking how these foundational narratives establish the categories that have come to define our humanity. Analyzes how the Bible’s patterns of representation construct sexual and ethnic identities and naturalize ideas about such social institutions as “the family.”
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• Cross-list: ENGL 3678.
• Equivalent: ENGL 3678.

JWSS 3685 From Kafka to Kushner: Modern and Contemporary Jewish Literature (4 SH)
Surveys Jewish literary culture from the late modern (1880–1948) and contemporary (1948–present) periods. Considers themes of immigration and cross-cultural influences and issues of religious, ethnic, and gender identity. Emphasizes American and European literatures to begin to define an international Jewish literary canon, including Yiddish poets and playwrights, Russian Jewish writers, and modern writers.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: ENGL 3685.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: ENGL 3685.

JWSS 4660 Jewish Studies Module (1 SH)
Permits specialized Jewish studies topics to be studied as part of more general courses.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: JWSS 5660.

JWSS 4992 Directed Study (1 to 4 SH)
Offers students an opportunity for special readings and research in Jewish studies.
• Repeatability: May be repeated for up to 8 total semester hours.

JOURNALISM (JRNL)

JRNL 1000 Journalism at Northeastern (1 SH)
Intended for first-year students in the College of Arts, Media and Design. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

JRNL 1101 Journalism 1: Fundamentals of Reporting (4 SH)
Covers foundations of news writing for print media, including leads, story structure, objective tone, and attribution. Introduces fundamental reporting skills such as interviewing, researching, and observation. It then asks students, in their reporting, to step back and analyze the institutions they are writing about and the media itself in order to understand how societies and its institutions function and the validity of theories that explain these processes.
• NUpath: Exploring creative expression and innovation, understanding societies and institutions, writing intensive in the major.
JRNL 1150 Interpreting the Day’s News (4 SH)
Examines the media institutions that shape the news and how the challenges of economics, politics, diversity, and globalization change the function of the website, newspaper, news magazine, and news broadcasts. Examines stories and news decisions from different perspectives to evaluate national, political, local, foreign, sports, and science news in the U.S. media. Topics include responsibilities of the press and the changing ways news is gathered, processed, and disseminated. Explores how other societies in different parts of the world view the news; freedom of the press; and the role of reporters, producers, and editors.

• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

JRNL 2201 Journalism 2: Intermediate Reporting (4 SH)
Continues JRNL 1101. This is the second writing course for undergraduate journalism students with an emphasis on learning how to report news stories. Offers students the opportunity to find sources and interview them, do background research, and use public records. Developing story ideas using computer-assisted reporting will be covered. Examines how to develop a story idea and then focus and organize it. Covers basic principles of online journalism including writing, design, and integration of visuals and text for the Web. Introduces elements of design and layout.

• Prerequisite: JRNL 1101.

JRNL 2301 Visual Storytelling in Journalism (4 SH)
Continues JRNL 2201. Covers basic principles of journalistic storytelling with video, sound, and still images. Introduces students to the foundations of writing with audio and video, and explores the concept of “convergence,” preparing stories for presentation in different formats. Fulfills the Advanced Writing in the Disciplines requirement for journalism majors.

• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Advanced writing in the disciplines.
• NUpath: Exploring creative expression and innovation, advanced writing in the disciplines.

JRNL 2350 History of Journalism (4 SH)
Traces the development of American journalism from its European and English beginnings. Topics include the colonial press, the great personal journalists of the nineteenth century, and the impact of major technological changes in mass communications media in the twentieth century.

• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

JRNL 2410 Radio News Gathering and Reporting (4 SH)
Covers writing and editing news for radio, with practice in interviewing, organizing news scripts, and integrating audio materials into broadcast.

• Prerequisite: Sophomore, junior, or senior standing.

JRNL 3300 Covering Conflicts: Peace, War, and the Media (4 SH)
Examines the media’s portrayal of conflicts and the peace process in the Middle East, Northern Ireland, Bosnia, Rwanda, and elsewhere. Evaluates the limits of fairness, balance, and accuracy in the coverage. Looks at the American and international media—print, broadcast, and online—and some of the major stories in recent years and attempts to put these stories in historical, political, and social context. Analyzes the wide-ranging criticism of coverage from a variety of perspectives.

• Prerequisite: Sophomore standing or above.
• Cross-list: INTL 3300.
• NU Core: Comparative study of cultures.
• Equivalent: INTL 3300.

JRNL 3305 Special Topics (4 SH)
Offers specialized topics in journalism for the twenty-first century. Topic matter changes each semester.

• Repeatability: May be repeated up to 4 times.

JRNL 3425 Public Relations Principles (4 SH)
Presents the principles, history, and methods of public relations; processes of influencing public opinion; responsibilities of the public relations practitioner; and analyses of public relations programs. Through case studies and class discussions, offers students an opportunity to confront real-life ethical dilemmas and learn to apply ethical frameworks to evaluate and resolve them.

• Prerequisite: Junior or senior standing.
• Cross-list: COMM 3445.
• NUpath: Employing ethical reasoning, writing intensive in the major.
• Equivalent: COMM 3445.

JRNL 3430 Local Reporting (4 SH)
Discusses coverage of town/city government, with emphasis on the “beat” approach to reporting public affairs. Focuses on practical, in-the-field experience with town meetings, meetings of boards of selectmen, and other governmental agencies.

• Prerequisite: JRNL 2201; journalism majors and combined majors only.

JRNL 3435 Techniques of Journalism (4 SH)
Provides practice in writing in-depth and multiple-source stories requiring significant research. Provides an introduction to investigative reporting, practice in feature writing, and a review of legal issues.

• Prerequisite: JRNL 2201; journalism majors and combined majors only.
JRNL 3440 Editing (4 SH)
Provides practice in copyediting, headline writing, and origination editing. Presents assignments in photo selection, cropping, and cutline writing. Introduces page layout and discusses the principles of online editing.
• Prerequisite: JRNL 2201; journalism majors and combined majors only.

JRNL 3455 Sports Writing (4 SH)
Provides practice in journalistic coverage of amateur and professional athletics. Focuses on the role of sports writing in the news media and examines such topics as game coverage, feature profiles, and opinion columns.
• Prerequisite: Sophomore, junior, or senior standing.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

JRNL 3550 Law of the Press (4 SH)
Examines legal problems of libel, invasion of privacy, and access to government information; discusses the balance between private rights and the public’s “need to know.”
• Prerequisite: Sophomore, junior, or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Understanding societies and institutions, employing ethical reasoning, writing intensive in the major, demonstrating thought and action in a capstone.

JRNL 3610 Digital Storytelling and Social Media (4 SH)
Offers students an opportunity to learn the fundamentals of digital journalism. Emphasizes hands-on instruction in multimedia skills. Topics may include blogging, photography, video and audio production, use of social media as a reporting tool, and mapping and data visualization. Guest speakers and a consideration of the future of news may also be part of the course. Requires students to produce a final project that consists of storytelling across a range of platforms—for example, a written article, a photo story, and a video.
• Prerequisite: Sophomore standing or above.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.

JRNL 3615 Advanced Digital Storytelling (4 SH)
Continues JRNL 3610. Journalists now have access to more storytelling tools—blogs, smartphones, high-quality DSLRs, Facebook—than at any other time in our industry’s history. Offers students an opportunity to learn advanced techniques in using video and audio production, social media, and crowdsourcing to create compelling, professional-grade multimedia stories.
• Prerequisite: JRNL 3610 or permission of instructor.
• NUpath: Exploring creative expression and innovation.

JRNL 3625 Public Relations Practice (4 SH)
Demonstrates practices and techniques employed in the field including organization of events and functions. Studies campaign planning, research, and media relationships.
• Prerequisite: JRNL 3425.
• Cross-list: COMM 3625.
• Equivalent: COMM 3625.

JRNL 3627 Critical Thinking about Public Relations Strategies (4 SH)
Designed to bring together upper-level students from multiple disciplines who are interested in taking a microscopic view of how issues are purposefully driven by professionals interested in promoting causes, political candidates, public policy, and corporate image. Examines how corporations and others make decisions and which theories of institutional behavior best explain those choices. Are companies motivated solely by economics as Marx would argue, or do they approach their image in a more functional way? Are the messages of politicians determined by race and class, or do they respond to a different framework? Requires students to follow current issues and dissect significant past campaigns. Knowledge of public relations tactics is helpful but not necessary.
• Prerequisite: Junior or senior standing.
• Cross-list: COMM 3627.
• NUpath: Understanding societies and institutions, writing intensive in the major.
• Equivalent: COMM 3627.

JRNL 3630 Magazine Writing (4 SH)
Covers writing and freelancing magazine articles; analyzing magazines as markets; and selecting the best feature format—how-to-do-it, profile, personal experience, human interest, interpretive pieces, and others.
• Prerequisite: Sophomore standing or above and a firm grasp of journalistic concepts, including advanced reporting and writing skills; a prior journalistic co-op or internship or experience writing for a school, online, or professional publication is preferred.

JRNL 3680 Advanced Reporting (4 SH)
Offers students an opportunity to learn and apply advanced reporting techniques of the kind that editors and producers expect of their best reporters, especially those who cover demanding beats such as politics, government, healthcare, education, science, and business. Studies how to see and apply data and data visualization techniques, to develop and interview sources, to locate and decipher public records, to identify and conceptualize important stories, and to discuss and apply ethical theories to reporting to justify choices that may inflame or antagonize sources or readers. An assignment to do substantial enterprise stories for publication in major media outlets is part of the course.
• NUpath: Analyzing and using data, employing ethical reasoning.
JRNL 3945 Internship (1 to 4 SH)
Comprises academic credit for internship work in journalism.
- Repeatability: May be repeated without limit.

JRNL 4650 Journalism Ethics and Issues (4 SH)
Discusses the responsibilities of news media and ethical problems confronting decision makers in various journalistic fields and the principles found in codes of various professional societies. Requires students to write a paper on an ethical problem they faced while working in the media and place it in a framework of at least two ethical theories, for example, utilitarianism and deontology.
- Prerequisite: Junior or senior standing.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Employing ethical reasoning, writing intensive in the major, demonstrating thought and action in a capstone.

JRNL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
- Repeatability: May be repeated without limit.

JRNL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- Prerequisite: JRNL 4970.
- Repeatability: May be repeated without limit.

JRNL 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.

JRNL 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

JRNL 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

JRNL 5214 The Online Newsroom Experience (4 SH)
Offers students an opportunity to report and write for publication, take photos, and edit news copy for the e-Bulletin, the online news site for the New England Newspaper and Press Association. The e-Bulletin, now a news Web site after a transition from a printed newspaper, reports news for journalists at about 800 newspapers in New England and their online operations. It is also a multimedia site, offering all the news-delivery methods of the modern newsroom—video, audio, still photos, and text. This course seeks to prepare students for co-op jobs and provide networking opportunities with New England journalists.
- Prerequisite: Junior, senior, or graduate standing.
- NUpath: Exploring creative expression and innovation.
- Repeatability: May be repeated without limit.

JRNL 5306 Beat Reporting (4 SH)
Covers advanced reporting in specific topic areas. Topics change from semester to semester.
- Prerequisite: (a) JRNL 2201 and junior or senior standing or (b) graduate standing.
- Repeatability: May be repeated without limit.

JRNL 5307 Video Newswriting (4 SH)
Focuses on the fundamentals of journalistic writing with video, audio, narration, and graphics. Emphasizes writing and producing in various television news formats.
- Prerequisite: (a) JRNL 1101 with a grade of C and junior or senior standing or (b) graduate standing.
- NUpath: Exploring creative expression and innovation, writing intensive in the major.

JRNL 5309 Documentary Production (4 SH)
Offers students an opportunity to research, write, and produce a short video documentary and acquaint themselves with a range of professional documentary styles through screenings and discussions. Analyzes and addresses the ethical challenges facing documentary filmmakers and their interaction with subjects historically and in the new media age.
- Prerequisite: Junior, senior, or graduate standing and experience shooting video and editing on nonlinear editing software such as Final Cut Pro X, Adobe Premiere, or Avid.
- NUpath: Exploring creative expression and innovation, employing ethical reasoning.

JRNL 5310 Photojournalism (4 SH)
Covers camera procedures along with cropping, assignment techniques, theory, and photo-caption methods. Engages students in the ethical choices photjournalists face in covering wars, disasters, and vulnerable people in societies—both historically and in the new media environment.
- Prerequisite: Junior, senior, or graduate standing.
- NUpath: Exploring creative expression and innovation, employing ethical reasoning.
JRNL 5311 Design and Graphics (4 SH)
Introduces graphic design terminology and principles using software packages and leading desktop and web publishing programs. Covers how to plan a publication based on audience and budget. Design assignments include newspapers, magazines, brochures, advertisements, and corporate identity programs. Strict attention is paid to deadlines and quality of the printed publication.
• Prerequisite: Junior, senior, or graduate standing.
• NUpath: Exploring creative expression and innovation.

JRNL 5314 Video News Production 1 (4 SH)
Offers students hands-on opportunities to produce news stories for dissemination across video and several multimedia platforms. Seeks to engage students in the ethical challenges facing journalists historically and in the new media age. Students experiment with techniques used by TV and electronic news producers, including reporting, writing, videotaping, and editing on nonlinear digital editing equipment. Offers students an opportunity to create news stories and upload them to their websites with a variety of software programs, in line with journalistic and ethical standards.
• Prerequisite: (a) JRNL 2201 with a grade of C and junior or senior standing or (b) graduate standing.
• NUpath: Exploring creative expression and innovation, employing ethical reasoning.

JRNL 5315 Video News Production 2 (4 SH)
Continues JRNL 5314. Offers advanced study of video news gathering including shooting, interviewing, writing, editing, and field producing.
• Prerequisite: JRNL 5314 and junior, senior, or graduate standing.

JRNL 5360 Global Reporting (4 SH)
Discusses coverage of global issues and international public affairs and the function of the media in a global context. Topics include how news is gathered, processed, and disseminated by the various media abroad and how the media reflect culture, religion, and politics around the world. Focuses on practical, in-the-field experience with global governmental, business, and societal leaders. This course is part of the Dialogue of Civilizations program abroad. Graduate awards do not apply toward this program. International students wishing to register need to speak to the International Student and Scholar Institute prior to registration.
• NU Core: Comparative study of cultures.
• NUpath: Engaging difference and diversity.
• Repeatability: May be repeated without limit.

JRNL 6100 Reporting and Writing Fundamentals (1 SH)
Introduces the basics of news reporting and writing. Runs for three weeks beginning in mid-August.

JRNL 6200 Enterprise Reporting 1 (4 SH)
Defines and sharpens research, interviewing, and analytical skills necessary for good reporting. Focuses on learning to develop story ideas and conduct primary and secondary research for a major enterprise article. Skills are developed through an analysis of outstanding reportage, in-class discussion and exercises, and out-of-class assignments.

JRNL 6201 Enterprise Reporting 2 (4 SH)
Builds on skills and concepts covered in JRNL 6200. Covers a variety of Web-based and traditional resources. Employs computer-assisted reporting methodologies to assist students in investigating areas such as government corruption, safety and environmental risks, criminal justice, education, healthcare, real estate, campaign financing, and business and financial transactions. Offers students an opportunity to learn how to access public databases, to reference materials, and to analyze the information.
• Prerequisite: JRNL 6200.

JRNL 6202 Perspective on Journalism Ethics (4 SH)
Offers a seminar involving readings and discussions about philosophical and moral principles developed by Mill, Hume, and others, and their application to case studies and work experience in print and broadcast journalism. Issues include deception, conflict of interest, privacy, and corporate ownership. Students also evaluate the role of journalism reviews, codes of ethics, ombudsmen, and news councils.

JRNL 6300 First Amendment in Digital Age (4 SH)
Acquaints students with legal issues journalists encounter from the common law of libel to communicating on the Internet, from prior restraint to protecting sources. Also serves as an introduction to legal analysis, showing how law develops through statutes and judicial opinions.

JRNL 6301 Historical Perspective on Media (4 SH)
Examines the people and practices in American and foreign journalism that have exerted special influences on the formation of the contemporary press. Particular attention is paid to the development and evolution of the First Amendment and other legal protections for free expression. Offers a discussion and seminar format. Student research projects require work in original sources such as documents, interviews, and the examination of broadcasts in their contemporary contexts.

JRNL 6302 Literature of Journalism (4 SH)
Examines some of the great twentieth-century journalists including John Hersey, Susan Sheehan, and J. Anthony Lukas, and introduces students to the techniques of literary nonfiction. Also analyzes the potential conflicts between creative writing and journalistic accuracy.
Gone are the days when a journalist might be expected to start a story at 9:00 AM, file his or her copy by 4:00 PM, and then see it in the next day’s paper. We now have access to more storytelling tools—blogs, smartphones, high-quality DSLRs, Facebook—than in the next day’s paper. We now have access to more storytelling tools that allow us to tell stories in new and compelling ways.

These tools can be daunting, but it shouldn’t be. This course offers an opportunity to tell one story across a range of digital platforms. Through an analysis of overall trends and a look at individual magazine’s mission and modus operandi, students work as members of investigative reporting teams and introduces them to advanced reporting techniques and standards in the classroom. Provides an opportunity to learn how ideas for investigative reporting projects are developed; how to identify and interpret public records and online databases; and how to do interviews and write investigative stories. Working in small teams, the students are given an opportunity to develop and write investigative stories for publication.

 JRNL 6340 Fundamentals of Digital Journalism (4 SH)
Offers students an opportunity to learn the fundamentals of digital journalism and to place those skills within the context of a changing media environment. Studies multimedia tools within an intellectual framework—i.e., offers students an opportunity to learn hands-on skills and also to study best practices and theory. May include guest speakers and a consideration of the future of news. Requires students to produce a final project that consists of storytelling across a range of digital platforms.

 JRNL 6352 Nonfiction Writing (4 SH)
Concentrates on techniques that distinguish magazine writing from other types of journalism including first-person voice, strong point of view, observation-participation, and complex organizational structures. Also introduces students to the magazine market through an analysis of overall trends and a look at individual magazine’s mission and modus operandi.
• Prerequisite: JRNL 6200.

 JRNL 6354 Public Policy and the Press (4 SH)
Offers students an opportunity to learn how public policy decisions are made and how they can do informed reporting for print, broadcast, or online media. Explores the legislative and executive decision-making process at federal, state, and local levels of government. Special attention is given to the formulation of policy choices in such areas as transportation, housing, healthcare, immigration, and the environment. The course examines how budgetary decisions and fiscal policy are made. Analyzes the relationship between government and the press.

 JRNL 6355 Seminar in Investigative Reporting (4 SH)
Introduces students to the world of investigative reporting as it is practiced at major metropolitan newspapers. Asks students to work as members of investigative reporting teams and introduces them to advanced reporting techniques and standards in the classroom. Provides an opportunity to learn how ideas for investigative reporting projects are developed; how to identify and interpret public records and online databases; and how to do interviews and write investigative stories. Working in small teams, the students are given an opportunity to develop and write investigative stories for publication.

 JRNL 6400 News Internship (4 SH)
Provides students with the opportunity to report on public policy issues for newspapers, magazines, and legal affairs publications in Massachusetts and New England. Supplements live reporting with in-class discussion, including speakers in government, media, and the law.
• Repeatability: May be repeated without limit.

 JRNL 6305 Topics (4 SH)
Requires advanced work to develop media skills not covered in other classes.
• Repeatability: May be repeated without limit.

 JRNL 6306 Media Innovation Studio 1—Fundamentals (3 SH)
Constitutes the first of a three-course studio sequence designed to prepare experienced journalists to create new forms of journalism in the digital age. Offers students an opportunity to work with faculty members and peers via class exercises and peer-to-peer project collaboration to identify and develop the subject of a signature master’s project. Incorporates lectures on emerging media practices, including parallax scrolling, and instruction on digital journalism tools, including DSLR cameras, as well as reviews and critiques of professional and studio work by faculty and guest speakers.
• Prerequisite: JRNL 6306.

 JRNL 6307 Media Innovation Studio 2—Intermediate (3 SH)
Offers students an opportunity to integrate knowledge and skills derived from foundation courses to develop a master’s project. Creates a newsroom environment in which each student project is advanced through a journalistic collaborative process that features critiques from instructors and peers and integrates expertise from guest lecturers. Following the “teaching hospital” model, students work with the instructor, each other, and partnered media innovation visitors to develop their work.
• Prerequisite: JRNL 6306.

 JRNL 6308 Media Innovation Studio 3—Advanced (3 SH)
Continues the work of JRNL 6307. Offers students an opportunity to bring their master’s projects to fruition and approach prospective publication venues. The culminating goal of the studio sequence is publication of each student project.
• Prerequisite: JRNL 6307.

 JRNL 6310 Multimedia Journalism (4 SH)
Covers all the latest tools and tricks of multimedia journalism. Gone are the days when a journalist might be expected to start a story at 9:00 AM, file his or her copy by 4:00 PM, and then see it in the next day’s paper. We now have access to more storytelling tools—blogs, smartphones, high-quality DSLRs, Facebook—than at any other time in our industry’s history. Learning to use all these tools can be daunting, but it shouldn’t be. This course offers students an opportunity to tell one story across a range of media and, in the process, learn to create everything from epic tweets to compelling video.

 JRNL 6320 Seminar (4 SH)
Offers students the opportunity to discuss and analyze a major issue in journalism and write articles on that topic for publication in journalism reviews. Recent seminars have covered such issues as civic journalism, international reporting, and the impact of The New York Times on American and foreign journalism.

 JRNL 6330 Topics (4 SH)
Requires advanced work to develop media skills not covered in other classes.
• Repeatability: May be repeated without limit.

 JRNL 6335 Media Innovation Workshop (2 SH)
Provides an opportunity for students to develop and execute ideas for digital storytelling projects. The workshop is intended to bridge the gap between the classroom and the working world. Prerequisite: JRNL 6306.

 JRNL 6340 Fundamentals of Digital Journalism (4 SH)
Offers students an opportunity to learn the fundamentals of digital journalism and to place those skills within the context of a changing media environment. Studies multimedia tools within an intellectual framework—i.e., offers students an opportunity to learn hands-on skills and also to study best practices and theory. May include guest speakers and a consideration of the future of news. Requires students to produce a final project that consists of storytelling across a range of digital platforms.

 JRNL 6352 Nonfiction Writing (4 SH)
Concentrates on techniques that distinguish magazine writing from other types of journalism including first-person voice, strong point of view, observation-participation, and complex organizational structures. Also introduces students to the magazine market through an analysis of overall trends and a look at individual magazine’s mission and modus operandi.
• Prerequisite: JRNL 6200.

 JRNL 6354 Public Policy and the Press (4 SH)
Offers students an opportunity to learn how public policy decisions are made and how they can do informed reporting for print, broadcast, or online media. Explores the legislative and executive decision-making process at federal, state, and local levels of government. Special attention is given to the formulation of policy choices in such areas as transportation, housing, healthcare, immigration, and the environment. The course examines how budgetary decisions and fiscal policy are made. Analyzes the relationship between government and the press.

 JRNL 6355 Seminar in Investigative Reporting (4 SH)
Introduces students to the world of investigative reporting as it is practiced at major metropolitan newspapers. Asks students to work as members of investigative reporting teams and introduces them to advanced reporting techniques and standards in the classroom. Provides an opportunity to learn how ideas for investigative reporting projects are developed; how to identify and interpret public records and online databases; and how to do interviews and write investigative stories. Working in small teams, the students are given an opportunity to develop and write investigative stories for publication.

 JRNL 6400 News Internship (4 SH)
Provides students with the opportunity to report on public policy issues for newspapers, magazines, and legal affairs publications in Massachusetts and New England. Supplements live reporting with in-class discussion, including speakers in government, media, and the law.
• Repeatability: May be repeated without limit.
JRNL 6405 Journalism Applications (1 SH)
Supplements courses taken outside of the School of Journalism by requiring students to apply what they are learning in the course to the practice of journalism.
- Repeatability: May be repeated without limit.

JRNL 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

JRNL 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
- Repeatability: May be repeated without limit.

JRNL 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
- Repeatability: May be repeated without limit.

JRNL 6978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

JRNL 7976 Directed Study (1 to 4 SH)
Offers students work on individual projects under the supervision of an instructor.
- Repeatability: May be repeated without limit.

JRNL 7990 Thesis (4 SH)
Focuses on preparing a master’s thesis under supervision of a faculty committee.
- Repeatability: May be repeated without limit.

JRNL 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty.

LANDSCAPE ARCHITECTURE (LARC)

LARC 1330 Designed Ecologies of the City (4 SH)
Introduces the emerging field of urban ecology and ecologically inspired urbanism. Offers students an opportunity to develop contemporary insights about resilient urban form and speculative frameworks, ecological patterns and processes, urban ecosystems, and methods of urban habitat analysis. Covers urban hydrology, geomorphology, and soils; urban regions and ecoregions; urban effects on climate; ecosystem services; landscape ecology and infrastructural adaptation; postindustrial landscapes; and the theory of landscape and ecological urbanism. Other lecture topics address urban waterfront resilience, sea-level rise, waste, contamination, remediation, and ecological disturbance and succession.
- NU Core: Humanities level 1.

LARC 2130 Sustainable Urban Site Design (6 SH)
Focuses on site planning and design with an emphasis on parks and open-space systems in the adaptive reuse of urban sites. Projects focus on the creation and cultivation of public space, transformation of site conditions, and development of sustainable site materials. Emphasizes site analysis, development of an individual design process, and design communication strategies. This studio course introduces students to urban design precedents, site research, and remediation methods through case studies, lectures, site visits, and workshops.
- Prerequisite: LARC 1110 and LARC 1120; landscape architecture majors only.
- NUpath: Engaging with the natural and designed world.

LARC 2140 Designed Urban Ecologies (6 SH)
Continues LARC 2130. Focuses on sustainable community/campus/neighborhood design at the intersection of large-scale urban and environmental systems. Primary topics include mixed-use programming in relation to systems ranging from zoning and transit to the material flows of human and wildlife habitats. This studio course introduces basic geographical information systems (GIS) and application of landscape ecology principles. Projects examine the role of landscape systems and the formation and reformulation of land development scenarios.
- Prerequisite: LARC 2130; landscape architecture majors only.
- NUpath: Engaging with the natural and designed world.

LARC 2230 Site Materials and Methods (4 SH)
Introduces fundamental techniques of sustainable site engineering in the urban realm, including earthworks, water, and vegetal systems. Primary topics include grading, storm water management, urban plants, and basic site elements such as retaining walls, paving systems, and landscape on structure.
- Prerequisite: Landscape architecture majors only.
LARC 2240 Sustainable Site Construction and Detailing (4 SH)
Continues LARC 2230. Focuses on construction technologies, methods, and materials for sustainable site elements, including environmental performance infrastructures, circulation systems, and basic site structures. Introduces structural systems for site work via lecture and in-class exercises.
• Prerequisite: LARC 2230; landscape architecture majors only.

LARC 2330 Cities, Landscape, and Modern Culture (4 SH)
Presents the themes, core theories, and iconic works that gave shape to modernism in landscape architecture and urbanism. Focusing on the eighteenth-century through mid-twentieth-century projects and designers, lectures examine contextual factors and resulting formal, spatial, organizational, and material characteristics of built works. Offers students an opportunity to practice formulation of a critical design perspective via reading responses, project analysis, written work, and exams.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NU: path: Interpreting culture, understanding societies and institutions, writing intensive in the major.

LARC 2340 Cities, Landscape, and Contemporary Culture (4 SH)
Presents the themes, core theories, and iconic works that shape the field of contemporary landscape architecture and urbanism. Focusing on the late twentieth century through contemporary projects and designers, lectures examine contextual factors and resulting formal, spatial, organizational, and material characteristics of built works. Offers students an opportunity to practice formulation of a critical design perspective via reading responses, project analysis, written work, and exams.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NU: path: Interpreting culture, understanding societies and institutions, writing intensive in the major.

LARC 2430 Plant Identification (4 SH)
Focuses on identification of structural, growth, and community characteristics of woody plant materials. Presents plant materials as design elements with diverse cultural uses as well as ecological agents of environmental change. Combines lectures with field visits.
• NU: path: Engaging with the natural and designed world.

LARC 2440 Planting Design (4 SH)
Combines horticultural and ecological field study with studio design exercises to deliver introductory to advanced planting design techniques. Primary topics include how to design phytoremediation strategies for contaminated sites, seasonal planting considerations, strategic phasing, and maintenance techniques. This is a workshop-based course.
• Prerequisite: LARC 2430; landscape architecture majors only.

LARC 3155 Studio Abroad (6 SH)
Offers students an opportunity to learn sustainable landscape and urban design techniques in an international setting. Key topics include cultural influences on urban revitalization and ecological restoration, innovative material and site technologies, regional best management practices (BMPs), and integration of diverse historical influences into the design process.
• Prerequisite: (a) LARC 2140 or ARCH 2140 and (b) junior or senior standing; landscape architecture majors only.

LARC 3170 Landscape Planning and Urbanism Studio (6 SH)
Introduces sustainable landscape planning techniques with an emphasis on adaptive urbanism. Key topics include the designed and managed relationship of cities to their regional ecologies, such as sub/urbanized watersheds and coastal zones, as well as the spatial, material, and programmatic roles of environmental infrastructures in the civic landscape. Particularly emphasizes the market-based integration of recreation, transit, food, housing, and industrial networks with living systems such as urban forests, riparian corridors, managed habitats, and constructed wetlands.
• Prerequisite: (a) ARCH 2140 or LARC 2140 and (b) junior or senior standing.

LARC 4970 Junior/Senior Honors Project 1 (4 SH)
Offers students an opportunity to develop research toward an in-depth project related to the student’s major. Can be combined with Junior/Senior Honors Project 2 or a college-defined equivalent for an 8-credit honors project.
• Prerequisite: Junior or senior standing; restricted to students in the College of Arts, Media and Design.

LARC 4971 Junior/Senior Honors Project 2 (4 SH)
Offers students an opportunity to complete a research or design project related to the student’s major.
• Prerequisite: LARC 4970 and junior or senior standing; restricted to students in the College of Arts, Media and Design.

LARC 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

LARC 4993 Independent Study (1 to 4 SH)
Offers students an opportunity for independent work under the direction of members of the department. Course content determined by instructor in relation to student’s course of study.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated up to 15 times for up to 16 total semester hours.
LARC 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• Prerequisite: Junior or senior standing.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 3 times.

LARC 4996 Experiential Education Directed Study (4 SH)
Offers students an opportunity to integrate directed study work overseen by department faculty with approved experiential experience(s). Restricted to students using the course to fulfill the experiential education requirement.
• Prerequisite: Junior or senior standing.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 3 times.

LARC 5110 Advanced Design for Urban Environments Studio (6 SH)
Focuses on ecological, economic, and social resiliency of designed urban environments in response to globalization. Contemporary case studies of urban change provide the basis for design investigation into issues such as the impact of shifting industries on Detroit (deurbanization) or Shenzhen (rapid densification); shifting weather and water patterns in densely populated regions; societal shifts, from generational demographics to political upheavals and militarization/demilitarization of the urban landscape. Emphasizes the integration of interdisciplinary perspectives and advanced design analysis, conceptualization, and visualization skills into development of a global perspective on managing change in the built environment.
• Prerequisite: (a) ARCH 3170, LARC 3170, or SUEN 6110 and (b) junior, senior, or graduate standing; restricted to programs in architecture, landscape architecture, and sustainable urban environments.

LARC 5120 Comprehensive Design Studio (6 SH)
Offers students an opportunity to design and develop a site or district including all of its requisite systems. Students draw on their landscape architectural education to produce a design both responsive to specific criteria and prototypical of ways to build sustainable and adaptable public landscapes—often described as “resilience.” Projects are expected to respond to and integrate their contexts (urban, environmental, climatic, and economic); meet spatial, performative, and programmatic requirements and technical demands (materials, implementation and management strategies); and dynamic processes at play within and around the project site.
• Prerequisite: (a) ARCH 3170, LARC 3170, or SUEN 6110 and (b) junior, senior, or graduate standing; restricted to undergraduate students in architecture and in landscape architecture and to graduate students in sustainable urban environments.
• NU Core: Capstone.
• NUpath: Demonstrating thought and action in a capstone.

LARC 5210 Landscape Ecology (4 SH)
Introduces fundamental-to-advanced concepts in the field of landscape and urban ecology. Focuses on the landscape-scale spatial structure, temporal patterns, and geographic ranges produced by the intersection of large-scale environmental and human processes. Emphasizes spatial taxonomies (patch, corridor, mosaic, granularity, edge, ecotone) produced across diverse landscape types influenced by human development and landscape dynamics in the built environment (disturbance, fragmentation, accumulation, and succession). Incorporates basic techniques in geographic-information-system software.
• Prerequisite: Junior, senior, or graduate standing.
• NUpath: Engaging with the natural and designed world.

LARC 5220 Sustainable Landscape Practices (4 SH)
Offers a lecture/workshop/field-based course that builds upon landscape technology skills introduced in LARC 2230 and LARC 2240, with a focus on ecotechnologies operating in the built environment. Core topics include design and implementation metrics, material life-cycle management, funding models, and aesthetic and cultural aspects. Potential topics include green roofs, green walls, bioswales, pervious pavements, constructed wetlands, “complete street” elements, geosensor networks, alternative waste management, water detention and energy generation methods, and living infrastructures for coastal environments.
• Prerequisite: (a) ARCH 2240 or LARC 2240 and (b) junior, senior, or graduate standing; restricted to students in specific programs in architecture, landscape architecture, sustainable urban environments, and civil engineering.

LARC 5310 Urban Landscape Seminar (4 SH)
Offers a discussion-based seminar focusing on case studies of influential works in contemporary landscape, urbanism, and sustainable environmental design. Encourages students to seek interdisciplinary perspectives toward development of critical-thinking skills in relation to forces shaping urban environments in contemporary global culture. A diverse range of material from published design criticism to open-source social media engagement provides basis for discussion and written and oral presentations.
• Prerequisite: Junior, senior, or graduate standing.
• NUpath: Interpreting culture.
LARC 5420 Professional Practice in Landscape Architecture (4 SH)
Offers a lecture- and case-study-based course focusing on strategic planning, business models, organizational structures, logistics, and regulatory paradigms associated with professional practice in landscape architecture. Core topics provide an overview of common technical and business procedures, including RFQs; RFPs; marketing, public relations, and client management; hiring and human resource management; review board/regulatory boards; permitting; and licensure.
• Prerequisite: Junior, senior, or graduate standing; restricted to undergraduate students in architecture, in architectural studies, and in landscape architecture and to graduate students in architecture and in sustainable urban environments.

LANG 1000 Languages, Literatures, and Cultures at Northeastern (1 SH)
Intended for first-year students in the College of Social Sciences and Humanities. Introduces students to liberal arts. Offers students an opportunity to become familiar with their major; develop the academic skills necessary to succeed (analytical ability and critical thinking); obtain grounding in the culture and values of the University community; and develop interpersonal skills—in short, to develop the skills needed to become a successful university student.
• Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, INTL 1000, PHIL 1000, POLS 1000, and SOCL 1000.

LANG 3432 Romance Linguistics (4 SH)
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object-pronoun placement, word order, creolization, and subject-pronoun use. Conducted in English.
• Prerequisite: Reading knowledge of one Romance language or permission of instructor; LING 1150 recommended.
• Equivalent: LING 3432.

LANG 3434 Bilingualism (4 SH)
Focuses on the fact that half of the world’s population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in both languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: LING 3434.

LANG 3438 Structure of French (4 SH)
Looks at the French language from a linguistic point of view, focusing on elements of French phonology (sound system), morphology (word structure), and syntax (sentence structure). Topics include how French compares with other Romance languages, as well as with non-Romance languages like English.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: LING 3438.

LANG 3500 Introduction to Translation Studies (4 SH)
Offers an introduction to translation studies and practice. Explores the following themes: translation as intercultural communication; linguistic, functionalist, and other theories of translation; translation and gender; translation and philosophy; translation and politics; and the ethics of translation. Students undertake translations that are germane to the themes described above.
• Prerequisite: (a) Junior or senior standing and completion of a language course at the 2102-level or (b) permission of department.

LANG 3510 Translation and the Business World (4 SH)
Focuses on translation in the business world (commerce, computers, law, finance, trade, and economics). Dwells first on possible intercultural differences in doing business in a foreign environment and then moves on to practical exercises of business letters, résumés, annual reports, and texts related to international finance, trade, management information systems, and contracts.
• Prerequisite: (a) LANG 3500 and completion of a language course at the 2102-level or (b) permission of department.
LANG 3520 Translation and Literature (4 SH)
Delves briefly into some of the major concerns of literary translation of prose, poetry, and drama. Discusses different approaches (word-to-word vs. sense-to-sense, the visibility or invisibility of the translator, the pitfalls of translating historically or culturally remote texts, translation as creative rewriting, etc.). Discusses authors such as Borges, García Márquez, Neruda, Günter Grass, Canetti, Proust, Césaire, Beckett, Nabokov, and Pirandello.
• Prerequisite: (a) LANG 3500 and completion of a language course at the 2102-level or (b) permission of department.

LANG 3800 Special Topics in Language (1 to 4 SH)
Focuses on a particular theme of language and society that involves several languages (e.g., common literary themes, treatment of fairy tales, or folklore). The specific topic is chosen to reflect relevant comparative themes and expressed student interests.
• Prerequisite: An intermediate level of skill in a language.
• Repeatability: May be repeated without limit.

LANG 4670 Topics in French (4 SH)
Provides in-depth study of a specific topic in French studies. Topic to be chosen each year the course is offered.
• Prerequisite: LITR 4551.
• Repeatability: May be repeated without limit.

LANG 4700 Capstone Seminar (4 SH)
Provides the graduating student the opportunity to integrate the intellectual aspects of the program with its experiential elements, especially the study-abroad portion of the students’ program.
• Prerequisite: LITR 4551.
• NU Core: Capstone.
• NUpath: Demonstrating thought and action in a capstone.

LANG 4800 Special Topics in Language (1 to 4 SH)
Focuses on a particular theme of language and society that involves several languages (e.g., common literary themes, treatment of fairy tales, or folklore). The specific topic is chosen to reflect relevant comparative themes and expressed student interests.
• Prerequisite: An advanced level of skill in a language.
• Repeatability: May be repeated without limit.

LANG 4920 Foreign Language Teaching: Theory and Practice (4 SH)
Intended for students who want to improve their understanding of how learners learn a second/foreign language and develop an approach to language teaching that is theoretically sound. Some of the topics included in the course are: theories of language acquisition, learning strategies, individual differences in language acquisition, the role of the environment, and the role of formal instruction. The course provides hands-on experience in the design of language teaching activities, unit and daily lesson planning, and long- and short-range objectives that are consonant with the National Standards for Foreign Language Learning. The ultimate goal of the course is to help students to develop the investigative and decision-making skills needed to foster professional growth.
• Prerequisite: (a) SPNS 3101 or FRNH 3101 and (b) senior standing.

LANG 4930 Language and Society (4 SH)
Examines the role of language in society, focusing on issues such as language change, language contact, language and identity, language and power, language and globalization, and language and the internet.
• Prerequisite: An intermediate level of skill in a language.
• Repeatability: May be repeated without limit.

LANG 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 2 times.

LANG 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

LANG 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

LANG 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
LANG 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

LATIN AMERICAN AND CARIBBEAN STUDIES (LACS)

LACS 1220 Latino, Latin American, and Caribbean Studies (4 SH)
Offers an interdisciplinary introduction to Latinos and people of Latin American and Caribbean origin in the United States as well as to the regions of Latin America and the Caribbean. Dispels a series of powerful myths associated with U.S. Latinos and in Latin American and Caribbean society, such as racial inferiority, poverty, machismo, and violence. Introduces the construction of Latino, Latin American, and Caribbean identities as well as the politics, economics, history, and culture.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: ANTH 1220 and CLTR 1220.

LAW (LAW)

LAW 6100 Civil Procedure (5 SH)
This course introduces students to the procedural rules that courts in the United States use to handle non-criminal disputes. The purpose of this course is to provide a working knowledge of the Federal Rules of Civil Procedure and typical state rules, along with an introduction to federalism, statutory analysis, advocacy and methods of dispute resolution. The course also examines procedure within its historical context.
• Repeatability: May be repeated once.

LAW 6105 Property (4 SH)
This course covers personal property, estates in land, landlord-tenant relationships, mortgages, real estate financing and the doctrine of future interests. The course concludes with the study of private restrictions on land use and a detailed examination of zoning law.

LAW (FOR NON–LAW SCHOOL STUDENTS) (LW)

LW 1200 How Lawyers Think: An Introduction to American Legal Thought (4 SH)
Introduces students to legal analysis by exploring the history of American legal thought. Perhaps more than any other, American society is governed by lawyers. Explores how innovations in legal theory both emerged from and helped shape policy responses to some of America’s biggest governance challenges, including economic concentration and corporate power, the New Deal and the rise of the welfare state, the replacement of Jim Crow with civil rights guarantees, and the emergence of identity politics. As is true for many academic fields—such as economics, political science, or literary studies—expertise in law is gained through mastery of the discipline’s analytic techniques, which, in turn, shape how lawyers imagine possibilities, make policy, and engage in professional practice. Presumes no prior legal study.

LW 7303 Antitrust (2 SH)
The federal antitrust laws, first created to break apart the powerful business “trusts” of the late 1800s, have since been applied to markets as diverse as utilities, ski areas, sports leagues, copy machine repair services and computer hardware and software. This course will explore the core principles of antitrust law, with an emphasis on three substantive areas: monopolization, horizontal merger analysis, and agreements among competitors. Because antitrust cases and scholarship rely heavily upon economics, the course begins with an introduction to firm and market economics, and economic analysis plays a significant role in our discussions.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7303.

LW 7304 Bill of Rights (2 SH)
Description unavailable.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7304.

LW 7305 Civil Advocacy (2 SH)
Description unavailable.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7305.
LW 7323 Corporations (2 SH)
This course relates to the formation, financial structure, and governance of business enterprises, especially incorporated businesses. Partnerships, limited partnerships, limited liability companies and limited liability partnerships are also explored, principally as they compare to the corporate form. The topics studied include: rights of creditors to hold principals of the enterprise liable; distribution of control within the corporation; fiduciary duties of directors and officers; key aspects of the federal securities laws (including the regulation of insider trading and proxies); organic changes (such as mergers); shifts in control (such as takeovers and freeze-outs); and legal implications of the roles of corporations in society. The course introduces some of the specialized concepts explored in detail in courses on Securities Regulation and Corporate Finance.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7323.

LW 7329 Environmental Law (2 SH)
This course focuses on federal and state environmental laws. Topics include pollution control, waste management, and cleanup of contaminated land and water. The course explores legislative policy and regulatory decisions as well as enforcement issues. We will give attention to questions of environmental justice and to the strategic use of legal tools in working to ensure safe and healthy surroundings for diverse groups of people.
• Equivalent: LAW 7329.

LW 7333 Family Law (2 SH)
This is a basic course in family law and family policy. The first half of the course explores state regulation of intimate relationships, asking what purposes marriage serves, and looking at the law of incest, polygamy and same sex marriage. The second half of the course examines practical problems in family law: cohabitants’ rights; common law marriage; and the many issues relating to divorce, with a particular focus on money and children.
• Equivalent: LAW 7333.

LW 7335 Health Law (2 SH)
This course examines the legal regulation of the provision of healthcare services. Much of the focus is on the relationship between law and healthcare policy. Topics include access to health insurance and healthcare, healthcare financing, malpractice liability, the organization and responsibility of healthcare institutions, especially hospitals, the regulation of the quality of care and the formulation of health policy. This course is highly recommended for all students enrolled in the JD/MPH dual degree program, but is open to others as well.
• Prerequisite: Law and public policy students only.
• Equivalent: HLTH 6335 and LAW 7335.

LW 7336 Immigration Law (2 SH)
This course is designed to give the student an overview of U.S. immigration law. The focus is on the day-to-day practice of immigration law, including an examination of the substantive and procedural aspects of this practice, and a historical analysis of the changes in our immigration laws and policies. Topics covered include non-immigrant and immigrant classifications, the preference system for immigrants, grounds of inadmissibility and deportability, relief from removal, asylum, citizenship, administrative and judicial review, and the immigration consequences of crimes.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7336.

LW 7338 International Law (2 SH)
This course introduces students to fundamental concepts and unresolved problems in international law. We discuss historical and contemporary theoretical debates about the roles and utility of international law. Students are introduced to the sources of international law and to methods of international dispute resolution in domestic and international fora. This course explores the part that international law has played (or failed to play) in the prevention or conduct of war, the promotion of human rights and international economic development.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7338.

LW 7340 Labor Law 1 (2 SH)
A general introduction to the law of labor relations through an examination of the National Labor Relations Act and leading cases, in conjunction with historical, social and economic materials. Topics include organization, union recognition, unfair labor practices and collective bargaining.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7340.

LW 7358 Social Welfare Law (2 SH)
This course examines American public assistance as a legal institution. After reviewing the historical, sociological and juridical roots of the welfare system, students examine the laws governing major assistance programs, especially eligibility requirements, rules governing grant determination, work and family rules, and procedural rights. Primary emphasis is on statutory and regulatory construction. The course explores methods by which lawyers can deal with the system: advocacy in the administrative process, litigation, legislative reform and representation of recipient organizations.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7358.
LW 7369 Intellectual Property (2 SH)
In our modern day ‘information economy,’ the law of intellectual property has taken on enormous importance to both creators and users of intellectual creations. This course introduces students to the classic principles of copyright, patent, trademark, and trade secret law and explores the ways in which those principles are shifting and adapting in response to new technology.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7369.

LW 7394 Land Use (2 SH)
A survey of legal doctrines, techniques and institutions relating to regulation of the use of real property. Topics covered include constitutional questions of takings by public agencies, the scope of the police power as it affects land use and the basic techniques of zoning and subdivision control. Students study, among other issues, recent cases on exclusion of low income housing, current techniques to encourage housing development (inclusionary or “linkage” regulations) and First Amendment questions arising from land use controls.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7394.

LW 7396 Legislation (2 SH)
This course deals with the distinctive nature of legislation as a source of law. Topics for study include the legislative process, the role of legislatures and the theory and practice of statutory interpretation. Materials and lectures will be based in part on case studies taken from recent Supreme Court and Congressional actions, particularly in the area of civil rights. One session will be a simulated legislative session. Several short legislative drafting assignments will be required.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7396.

LW 7417 Entertainment Law (2 SH)
Entertainment law involves the study of business practices and legal principles applicable to the entertainment and sports industries. The course will emphasize practical application of those principles and practices in negotiation and litigation. Topics will include the antitrust environment of the sports and entertainment industries, Title IX in college athletics, antitrust control, ownership of creative work and compensation. Students should have a sound understanding of contract law.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7417.

LW 7423 State and Local Taxation (2 SH)
This course surveys the variety of regimes deployed by various states to fund state and municipal government, with primary attention to state income taxation of individuals and businesses, property taxation and sales taxes. Among the topics to be covered are federal and state constitutional constraints on state and local tax structures, alternative methods of state business taxation, and issues relating to the taxation of interstate activity. The course will approach these topics from the viewpoints both of state tax policy-making and of taxpayer planning and representation.
• Equivalent: LAW 7423.

LW 7424 Labor Law 1 (2 SH)
A general introduction to the law of labor relations through an examination of the National Labor Relations Act and leading cases, in conjunction with historical, social and economic materials. Topics include organization, union recognition, unfair labor practices and collective bargaining.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7424.

LW 7428 State and Local Government (2 SH)
This course offers an introduction to the workings of state and local governments, and to the roles of law and of lawyers in shaping and controlling their operation. Topics to be covered include: the sources and scope of state and of local lawmakers, intergovernmental relationships, modes of citizen participation in and control over the governing process, and state and municipal fiscal structure and operations. In exploring these topics, the course will focus both on the practical roles played by attorneys (employed inside or outside of government) in the governmental processes and on the place of decentralized governmental units within the vision of a democratic polity.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7428.

LW 7434 Secured Transactions (2 SH)
This course has as its principal focus the way that most credit in America is extended. The transactions covered range from the purchase by consumers of automobiles or large household goods on credit to mega-loans by banks to large corporations. The primary law studied is Article 9 of the Uniform Commercial Code as well as certain sections of the federal Bankruptcy Code. The course also seeks to introduce students to commercial law generally and to further their facility with issues of statutory construction.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7434.
LW 7444 Modern Real Estate Development (2 SH)
This course explores the basic elements of commercial real estate transactions, with a focus on the acquisition and financing of real estate development. We discuss the economic considerations (including basic tax benefits) and risk elements of real estate development, as well as some of the emerging trends in real estate development and their theoretical implications. We give limited consideration to residential real estate transactions. A complex real estate transaction serves as the basis for the course discussions. Course materials include typical transactional documents. During the term, one or more in-class drafting exercises are included to help focus the discussion of the issues.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7444.

LW 7453 Women, Feminism, and the Law (2 SH)
Description unavailable.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7453.

LW 7456 International Business Transactions and Trade (2 SH)
Description unavailable.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7456.

LW 7458 Employment Discrimination (2 SH)
This course focuses on the rights of workers to be free of discrimination in the workplace, and the obligations of employers to provide a discrimination-free workplace. Emphasis is placed on the scope and limitations of fair employment statutes, including definitions of employee and employer, types of actionable discrimination, shifting burdens of proof and other definitional or procedural issues that frequently determine the outcome of cases. The course will primarily address Title VII of the 1964 Civil Rights Act, but will also cover other state and federal anti-discrimination laws. We will not only discuss litigation, but will also address approaches that responsible employers might take to develop effective anti-discrimination policies.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7458.

LW 7463 Nonprofit Organizations (2 SH)
This course is about federal regulation of nonprofit organizations. Why does the government exempt certain organizations from tax? What are the rules that non-profit organizations must follow in order to retain their tax-exempt status? What activities by non-profit organizations are prohibited by federal law? These and other questions about non-profit organizations will be discussed. The course will focus on relevant Federal tax law, but there is no prerequisite for the course. Although the course is about the Internal Revenue Code, the concepts of income taxation (what is income? when is it income? etc.) are irrelevant because nonprofit organizations are exempt from tax.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7463.

LW 7464 Battered Women and the Law (2 SH)
This course begins with a focus on the dynamics of violence in intimate relationships, and on the cultural context in which abusive relationships are embedded. Later classes will examine those aspects of the legal system having the most immediate relevance to a woman seeking to protect herself against the violence of a partner, or to end an abusive relationship. Specifically, we will look at family law, alternative dispute resolution, abuse prevention legislation, criminal law and the criminal justice system, recent developments in tort law, the new federal Violence Against Women Act and violence against women as a violation of international human rights. The course will end with a look at the particular challenges faced by advocates working with battered women, and some innovative programmatic responses to the needs of battered women on the part of both public and private agencies and organizations.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7464.

LW 7465 Employment Law (2 SH)
This course surveys common law, statutory and administrative regulation of the employment relationship and current policy issues concerning paid employment. Topics discussed include labor market theory, job security, mass dismissals and plant closings, employer control of employee behavior, employee privacy, minimum wage and maximum hour regulation, child labor, international labor standards, sweatshops, part-time and contingent employment relationships, child care, leave policy, issues for parents and other caretakers who enter paid labor markets, unemployment insurance, healthcare insurance, retirement income, and the regulation of pension and benefit plans. Legal and policy issues of concern to low-wage workers receive particular emphasis.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7465.
NW 7469 Disability Law (2 SH)
This course explores how the law treats individuals with disabilities. We will analyze what is meant by the term “disability” and consider constitutional review of state actions discriminating against individuals with disabilities. Particular attention will be given to the rights and obligations created by the Rehabilitation Act, the Americans with Disabilities Act and the Individuals with Disabilities Education Act. The rights of individuals with disabilities to be educated, work, receive healthcare, and enjoy public accommodations will be considered in depth. This course is designed for students wishing to represent individuals with disabilities as well as students who may represent employers and public accommodations.
- Prerequisite: Law and public policy students only.
- Equivalent: LAW 7469.

NW 7475 First Amendment (2 SH)
This course examines several rights protected by the First Amendment to the Constitution. The focus is on the principles and processes developed by the judiciary to protect various forms of speech, expression and association. The course does NOT deal with the free exercise of religion or the establishment clause. The course also focuses on integrating doctrine with the core values of the First Amendment as well as emphasizing the need for students to develop their own preferred approach to protecting free expression. The course does not, except tangentially, deal with other parts of the Bill of Rights.
- Equivalent: LAW 7475.

NW 7477 International Human Rights Law (2 SH)
This course focuses on important themes and concerns in international human rights law. It provides a historical overview of the human rights movement and explores major theoretical and practical challenges that movement posed by cultural relativism, state sovereignty, structural barriers to implementation, and globalization. Students will be introduced to instruments comprising the International Bill of Rights (including civil, political, economic, social, and cultural rights standards) as well as to other treaties addressing specific rights violations. We will also examine regional approaches to human rights or human dignity. There is no pre-requisite for this course.
- Prerequisite: Law and public policy students only.
- Equivalent: LAW 7477.

NW 7482 Law, Policy and Society (2 SH)
This seminar is offered on a limited enrollment basis to law students, as well as to Ph.D. students in the Law, Policy and Society Program. Northeastern University faculty members lecture on their work in, and particular approach to, the field of law, policy and society. Seminar discussions focus on the meaning and usefulness of interdisciplinary research. Two papers evaluating various paradigms for analyzing issues in law, policy and society are required. *This course follows the University’s academic calendar.
- Prerequisite: Law and public policy students only.
- Equivalent: LAW 7482.

NW 7488 Sexuality, Gender and the Law (2 SH)
This course uses case law and theory to address doctrinal problems and justice concerns associated with gender and sexuality. The syllabus is organized around notions such as privacy, identity and consent, all of which are conceptual pillars upon which arguments in the domain of sexuality and gender typically rely. Doctrinal topics include same-sex marriage, sodomy, sexual harassment, discrimination, among others, but the course is not a doctrinal survey; it is a critical inquiry into key concepts that cut across doctrinal areas. Students should expect to write a paper and share some of what they have learned with the class.
- Prerequisite: Law and public policy students only.
- Equivalent: LAW 7488.

NW 7491 International Human Rights and the Global Economy (2 SH)
Can recognizing “the right to housing” make the demands of homeless persons for adequate housing more effective? Does the right to maintain cultural or religious traditions conflict with the right to be free from gender discrimination? This course highlights the growing influence of the international economic, social, and cultural rights framework as well as the implications of globalization for all international human rights. We will begin by examining the history and theoretical origins of socioeconomic and cultural rights such as rights to food, housing, health, education, and cultural expression. We then engage the legal framework under major international and regional human rights treaties and leading interpretations of them by international, regional, and domestic courts and other actors. Finally, we grapple with the tensions among collective rights, cultural imperatives, and traditional human rights. There is no prerequisite for this course.
- Equivalent: LAW 7491.
LW 7494 Bioethics and the Law (2 SH)
This course will focus on the intersection of law and bioethics and will consider how different ethical theories may guide legal decisions. Topics will include physician-assisted suicide, testing for HIV, reproductive technology, and rationing of healthcare. Students will be expected to write a research paper and share some of what they have learned with the class.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7494.

LW 7497 Children’s Law (2 SH)
This course will explore the legal position and legal needs of American children. We will consider parental control over and responsibility for children, and the constitutional dimensions of “family privacy.” The course covers the broad topic of child abuse and neglect, including mandated reporting, cultural issues in abuse and neglect, the foster care system and termination of parental rights. We will also consider issues particularly germane to older children, such as access to medical care without parental consent, rights in school and emancipation.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7497.

LW 7501 Patent Law (2 SH)
This course will provide an in-depth review of patent law and practice. The course will cover the administrative process for obtaining patents, including the requirements for patentability. The course will also cover enforcement of patent rights and the defense of patent infringement suits. The course will be presented in a simple, non-technical manner so that students of all disciplines can learn and understand the concepts.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7501.

LW 7512 Problems in Public Health Law (2 SH)
This course will explore the rationales for using law to protect and preserve the public’s health, the legal tools that may be used to achieve that end, and the conflicts and problems that may result from legal interventions. Topics discussed will include the use of law to reduce the spread of HIV and other infectious diseases, control of tobacco and other hazardous products, bioterrorism, and the threats TO CIVIL LIBERTIES AND MINORITY GROUPS engendered by all such legal efforts. This course is highly recommended for all students enrolled in the J.D./M.P.H. dual degree program, but is open to other students as well.
• Prerequisite: Law and public policy students only.
• Equivalent: HLTH 6512 and LAW 7512.

LW 7513 Trade Secret Law (2 SH)
The course addresses these issues, among others: Should the state protect trade secrets? If so, why? When is information entitled to protection as a trade secret? What constitutes the “misappropriation” of trade secrets? How do courts balance the “rights” of firms to protect their trade secrets and the “rights” of the firms’ former employees to obtain employment in their fields? Do courts enforce non-competition agreements in order to protect trade secrets? If so, under what circumstances? Should courts enjoin individuals from taking certain jobs based on the “theory” that those individuals “inevitably” will disclose the secrets of their former employers? What remedies are available to the victims of trade secret misappropriation? Should civil trade secret law, like patent, copyright and trademark law, be federalized? Why has the federal government criminalized trade secret theft, and how does federal law impact state trade secret law? In addition to participating in class discussions, students will prepare a brief in support of or opposition to a motion to preliminarily enjoin a hypothetical company’s former employee from working for or disclosing the company’s trade secrets to it’s competitor.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7513.

LW 7514 Natural Resources Law (2 SH)
This course addresses legal requirements and institutions dealing with animal and plant species, biological resources, habitats, and ecosystems. Major themes include biological diversity, endangered and threatened species, public and private rights in migratory resources, public trust doctrine, the allocation of power among federal, state, and local governments, and the roles of administrative agencies in ecosystem management. The course provides opportunities to explore specific topics of interest such as environmental ethics, wetlands protection, fisheries law, Native American hunting rights and fishing rights, and management of national parks, forests, and grazing lands.
• Equivalent: LAW 7514.

LW 7518 Affordable Housing Law—Theory and Practice (2 SH)
This course will explore how and why Federal law supports the production, finance and operation of affordable housing, and the consequences, both intended and unintended, of historical shifts in Federal housing policy. Students will examine in detail the ways in which both housing regulation and the tax code affect the structure and documentation of complex transactions, and will analyze the “real world” impact of changing policies and legal requirements on the practice of affordable housing law.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7518.

LW 7519 Community Economic Development (2 SH)
Description unavailable.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7519.
LW 7523 International Business Regulation (2 SH)
This course examines international and domestic law regulating multinational enterprises. It is intended for students interested in the work of international lawyers representing corporations and other economic actors, serving in relevant government agencies and international organizations, and engaged in the public interest work of NGOs. The course will cover, among other things, the role of lawyers in the international business environment, legal aspects of multinational enterprises, the international sale of goods, foreign investment issues, select international aspects of mergers and acquisitions, and international joint venturing.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7523.

LW 7525 Law and Economic Development (2 SH)
This course will examine the prevailing economic theories of and strategies for economic development since World War II and the legal and institutional frameworks devised to implement these strategies. Questions we will explore will include: What kinds of legal and institutional arrangements best facilitate economic growth? How does law structure and shape markets? What is “development” and how can it best be measured? Can legal instruments be used effectively to address underdevelopment in a structural way? While the focus will be on development in the so-called “developing world,” we will also explore some strategies for addressing development in a local community context. We will conclude the course by applying what we have learned to address several development case studies posing particular problems in particular regions and contexts.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7525.

LW 7528 Balancing Liberty and Security Seminar (2 SH)
This course will examine the challenges, obstacles and issues presented in the struggle to create a balance between securing our homeland and respecting the rights of all those who call this land home. We will examine recent Supreme Court decisions (Handi, Rasul, and Padilla) as well as international perspectives on counterterrorism strategies. The course will include a discussion of the privacy and human rights issues that have arisen since September 11th and the ethical responsibility of lawyers adjudicating those issues. Students will take a take-home exam at the end of the quarter.
• Equivalent: LAW 7528.

LW 7539 Employment Law—Job Security and Rights (2 SH)
This course surveys legal and policy issues concerning job security, focusing primarily on law governing the termination of private sector employment. Students develop an understanding of the history and scope of the underlying employment-at-will doctrine and the primary ways in which the at-will doctrine has been modified through common law and statute.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7539.

LW 7540 Employment Law—Compensation, Benefits, and Retirement (2 SH)
This course surveys the legal and policy issues concerning minimum wage and wage-payment laws, regulation of working time and overtime premiums, family medical leave, unemployment insurance, COBRA, Social Security and pensions and ERISA. It stresses close reading of statutes and administrative regulations. The problems of low-wage workers receive special emphasis.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7540.

LW 7541 Global AIDS Policy Seminar (2 SH)
The global HIV/AIDS pandemic, the preeminent public health and human rights challenge of our time, is structured by biological, economic, social, and cultural forces ranging from the arcane structures of the international intellectual property regime to the cultural norms that prefigure sexual intimacy. This seminar will explore selected policy options for reversing and responding to the tide of infection. Pharmaceutical research, development, and access, neo-liberal economic and trade policies, gender relations and prevention policies, global health initiatives and primary health systems, healthcare policy and health worker migration – these and many other topics will be the subject of classroom discussion and student research papers.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7541.

LW 7549 Comparative Law: Law, Markets, and Democracy in East Asia (2 SH)
Today, we see a variety of market developments and rule of law programs around the world promulgated by such international institutions as the World Bank, the International Monetary Fund, and the Asian Development Bank. Markets are viewed as the panacea to the ills associated with economic development, and “rule of law” is synonymous with democracy, equality, and universal rights. This course examines the truth of the above assumptions by a study of legal systems in East Asian countries, selected for their varying stages of economic development. The course will examine three areas: cultural forces behind legal systems; forces of economic development and political, social and legal institutions established to promote this national goal; and finally, the intended and unintended consequences of these legal institutions.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7549.
LW 7550 Refugee and Asylum Law (2 SH)
This course will explore the law of asylum and refugees. The primary focus will be on U.S. law as it has evolved since passage of the Refugee Act of 1980. This will include legislation and case law—both administrative and federal court cases. It will also look at relevant international law and standards utilized in other countries by way of comparison with U.S. Law. We will also examine the process of asylum adjudications to analyze issues of due process, credibility, cross cultural communication and integrity of the various legal procedures. We will explore new and emerging theories of asylum eligibility and policy developments which impact asylum seekers in the United States.
• Equivalent: LAW 7550.

LW 7561 Private Litigation in the Public Interest (2 SH)
How can lawyers working in the “private” arena influence public policy? This course looks at tort-based litigation that impacts tobacco control, climate change, and other policy arenas. It considers the financial consequences of “mass torts”, class actions and punitive damages on plaintiffs’ attorneys as well as on defendants, and examines doctrinal, ethical and practical issues raised by the effort to use civil remedies to achieve social change.
• Equivalent: LAW 7561.

LW 7580 Community Economic Development (2 SH)
Community economic development has been the subject of intense work and innovative approaches to poverty alleviation in the last several decades. But CED efforts have thus far lagged behind in producing sustainable forms of income generation for poor people. This seminar will examine current efforts to develop sustainable forms of income generation in Boston and nationwide. The students will then undertake the process of developing a new model for sustainable income development. In doing so, we will ask how the law can support such a model. Students will write research reports describing and critiquing current income generation programs in Boston.
• Equivalent: LAW 7580.

LW 7588 Reproductive and Sexual Rights and Health (2 SH)
This course will examine how sexual and reproductive health laws impede or increase access to sexual and reproductive healthcare and shape how we understand what constitutes sexual and reproductive health. Attention will be paid to understanding legal doctrine, public health research, and critically assessing issues arising from sexual and reproductive health law. The course will draw on various tools of analysis including critical race theory, critical legal theory, human rights, and a range of public health methods. Topics covered will include, amongst others, sexual and reproductive health law as it pertains to abortion, sexuality, pregnancy, marriage, healthcare in prisons, immigrants, HIV/AIDS, and sex education.
• Equivalent: LAW 7588.

LW 7595 Interdisciplinary Approaches to Policy and Advocacy (2 SH)
This course introduces students to the judicious use of studies done in various disciplines for policymaking and advocacy. Through the concept of “paradigm” students learn to identify the conceptual structure and methodologies underlying different disciplines and to understand the uses to which work within each paradigm can properly be put. The course examines the differences between science, law, policymaking, and advocacy, including the role of normative judgments in each. The justification of normative judgments, including concepts of social justice, will be considered. The use of studies from different disciplines for policymaking and advocacy with respect to tobacco control and obesity prevention will provide illustrative examples.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7595.

LW 7597 Civil Rights and Restorative Justice Clinic (2 to 6 SH)
The CRRJ (Civil Rights and Restorative Justice) Clinic engages students in legal research, litigation and legislative initiatives relating to anti-civil rights violence in the United States. CRRJ clinic students assist law enforcement agencies considering criminal investigation and pursue civil litigation against government entities. One of CRRJ’S projects, Reconstructing Cases of Racial Violence, involves researching cases where criminal prosecution may not be an option. Students reconstruct legal proceedings and conduct factual investigations. The project focuses on practical legal research skills and helps students integrate the law of torts, civil procedure, federal courts, criminal law, and constitutional law. Faculty will provide individual supervision of each student.
• Equivalent: LAW 7597.

LW 7617 Economic Perspectives on Health Policy (2 SH)
Uses basic economic concepts to illuminate the many factors that shape health, healthcare, and the healthcare system in the United States. Examines the role of these concepts in explaining the challenges faced in achieving three core goals of the healthcare system: increasing access, limiting cost, and improving quality. Explores how policy makers, market participants, and others can remedy access, cost, and quality deficiencies. Illustrates how economic concepts can be applied to the study of health and health behaviors.
• Equivalent: LAW 7617.
LW 7619 Healthcare Fraud and Abuse Law (2 SH)
This course provides an overview of the law relating to healthcare fraud. It will provide an overview of the healthcare fraud and abuse laws, emphasizing the role of whistleblowers, qui tam actions, criminal investigative techniques, trial issues inherent in white collar criminal prosecutions, innovative resolutions of corporate fraud including compliance programs, and sentencing. Topics will include an overview of the healthcare payment system, the frauds visited on that system, and the interplay of criminal prosecutions with the FDA regulation. This course is highly recommended for students in the JD/MPH program. LLM students specializing in health policy and law, and students interested in criminal law, but is open to others as well. Health Law is recommended but not required.
• Equivalent: LAW 7619.

LW 7620 Human Behavior, Legal Doctrine, and Policy Design (2 SH)
This course will compare accounts of human behavior, including the Utilitarian/Law and Economics view of man as a rational calculator of his self-interest, with classical and contemporary alternatives to that description, including Behavioral Economics. We will evaluate the reasons for doubting or crediting these competing accounts, and will then consider their implications for determining appropriate legal doctrines and regulatory approaches. For example, we may consider whether the views of human behavior which shape consumer protection case law and the Supreme Court’s commercial speech doctrine are justified, and whether – and in what circumstances—regulations are appropriate which seek to help people by prescribing, proscribing, or “nudging” their behavior. Students are expected to participate in class and write a research paper which may satisfy the writing requirement.
• Prerequisite: Law and public policy students only.
• Equivalent: LAW 7620.

LW 7622 Whistleblower Law (2 SH)
This course provides an introduction to the legal issues related to whistleblowing, a dynamic new area in employment, corporate compliance, and anti-fraud law. It focuses on tort-like remedies and monetary rewards available to whistleblowers under the Dodd-Frank, Sarbanes-Oxley, Foreign Corrupt Practices and False Claims Acts, along with protections under tax law, the First Amendment, and common law. There will be a final exam and a short paper (approximately 2 pages in length).
• Equivalent: LAW 7622.

LW 7632 Strategies for Public Interest Environmental Litigation (2 SH)
Environmental laws are passed and regulations are promulgated, but too often, enforcement is lax, illegal exceptions are granted, inconsequential penalties are levied, business, and pollution, continues as usual. Using real examples, we discuss how to evaluate, litigate and prevail in environmental enforcement cases brought in the public interest. The course covers philosophical and policy-related underpinnings of citizen suit enforcement, case development and analysis, attorney-client retainers and economic considerations, ethical considerations, strategic use of experts, citizen standing pointers and pitfalls, deposition and motions practice, agency relations and threat of preclusion, trial, settlement strategies and consent decree drafting, media, and post-trial/settlement monitoring and enforcement. Students will evaluate cases from actual agency and industry documents, draft strategy memos and pleadings, depose witnesses and conduct oral arguments.
• Equivalent: LAW 7632.

LW 7648 Access to Justice by Design (2 SH)
One of the biggest challenges facing the legal system is how many people are trying to navigate it without a lawyer; particularly for problems like divorce, child custody, personal debt, housing, and small claims. This class proposes that a user-centered design approach, mixed with an agile development approach, can increase the amount of procedural justice for self-represented litigants in the courts. Students will be exposed to how to practice agile user-centered design by creating new interventions for courts to help people without a lawyer to understand their legal options, create a strategy, and pursue a legal process. The class will involve fieldwork at the courts; identifying key fail points and frustrations of stakeholders by observing and conducting interviews, and brainstorming and testing new solutions.
• Equivalent: LAW 7648.

LAW AND PUBLIC POLICY (LPSC)

LPSC 1101 Introduction to Law (4 SH)
Examines the role of law and society from a regulatory, constitutional, and judicial perspective, noting the role each of these has played in shaping the current legal framework in the United States. Introduces students to the relationship between law, societal organizations (both nongovernmental organizations and not-for-profit organizations), the private sector, and the separate branches of government (the judiciary, congressional, and executive branches). Provides students with the opportunity to learn to legally analyze judicial opinions, prepare legal memoranda, and present an oral argument before a “judge.”
• NU Core: Humanities level 1.
• Equivalent: LPSC 2201.
LPSC 2301 Introduction to Law, Policy, and Society (4 SH)
Examines the relationship of society to its laws: how society creates changes in law or policy via societal pressure and social movements (such as the environmental, women’s rights, and corporate accountability movements); how law and policy affect individual rights and behavior; whether a society needs laws in order to function; the relationship between some branches of our government in effectuating social change; and some of the fundamental differences between societies governed by seemingly similar but pragmatically different laws, such as the right to a jury trial.
• Prerequisite: GPA of 3.000 or better.

Explores the implications of globalization on international human rights law. Analyzes numerous sources of international law, such as the universal declaration of human rights and the international covenant on economic, social, and cultural rights. Examines free trade and its impact on civil, political, economic, social, and cultural rights. Also explores the international mechanisms to resolve disputes and the impact of globalization on the rights of particular groups (e.g., women, children, and indigenous peoples).

LPSC 3303 Topics in Law and Public Policy (4 SH)
Covers special topics in law, policy, and society to fulfill students' interests.
• Prerequisite: LPSC 1101 with a grade of B or LPSC 2201 with a grade of B.
• Repeatability: May be repeated without limit.

LPSC 3305 Law and the City (4 SH)
Considers questions such as the following: Can cities regulate private gun ownership, such as the Mayors Against Gun initiative, within the confines of the Second Amendment? When do green city initiatives, such as wetlands and water table preservation programs, regulate private property to an extent that regulation becomes constitutional “takings”? How can cities employ zoning regulation to further urban planning and economic growth? U.S. cities are the source of many legal controversies that are on the cutting edge of modern jurisprudence, covering a wide range of subject areas. Analyzes key legal opinions and social research to examine how law is developing at the urban level.
• Prerequisite: Sophomore standing or above.

LPSC 3306 Law and Literature (4 SH)
Examines the role of literature in our understanding of the law and the legal system. Explores a variety of themes and delves into many of the policy questions currently facing society, such as the connection between literary writing and the legal system, the role of the lawyer, whether lawyers are heroes or villains, if we can really trust juries to find the truth, how to determine proper punishment for crimes, the role of government surveillance on society’s behavior, when the level of government control becomes too much, how society reacts to unjust laws, and what happens when law and justice are in conflict. Using literature, students have an opportunity to analyze current policy problems and assess potential solutions.
• Prerequisite: Sophomore standing or above.

LPSC 3304 Advanced Debates in Law and Public Policy (4 SH)
Explores the evolving roles of the courts, the legislative process, and social movements through case studies of current controversies in law and policy. Topics may include sentencing disparities in drug crimes, the changing laws of Internet use, funding of stem cell research, and safety on university campuses. Each case study includes a class debate or interactive simulation. Specific topics vary each semester.
• Prerequisite: (a) LPSC 1101 or LPSC 2201 and (b) junior or senior standing.
• Equivalent: LPSC 2304.

LPSC 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

LPSC 5201 Law and the City (3 SH)
Examines key legal structures, court decisions, and social research to consider the ability of cities to make and implement public policies that directly affect the everyday lives of millions of people. American cities and their residents are frequently faced with similar legal and political questions. Topics include federalism, land-use planning and development, business regulation, gun control, school choice, public health, and climate adaptation initiatives.
• Prerequisite: Juniors, seniors, and graduate students only.
LPSC 6313 Economic Analysis for Law, Policy, and Planning (3 SH)
Designed to familiarize master’s degree students with the essential ideas and methods of microeconomics and their application to a wide range of domestic public policy issues at the national, state, and local level. Emphasizes the role of program and management incentives in influencing behavior and policy outcomes. Focuses on understanding the ideas of microeconomic theory and applying them to a range of alternative public policy issues. Offers students an opportunity to develop a clear understanding of essential economic ideas and how the economic perspective can be applied to a wide range of public policy issues.

• Prerequisite: Master’s degree students only.

LPSC 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

LPSC 7215 Advanced Quantitative Techniques (3 SH)
Covers multivariate statistical models and their applications to social science data. The ordinary least squares (OLS) regression model and the assumptions underlying it are covered in detail, as are techniques for analyzing data when OLS assumptions do not apply, such as simultaneous equation models, time series models, and maximum likelihood techniques for limited and discrete dependent variables. This is an advanced course in quantitative techniques for graduate students in the social sciences.

• Prerequisite: LPSC 7305.

LPSC 7305 Research and Statistical Methods (3 SH)
Examines the methods and assumptions of research conducted in policy and legal studies. Explores how to identify researchable questions; how to formulate a set of hypotheses; and how to design, develop, and carry out research projects, including a study of quantitative and qualitative techniques for analyzing data. Focuses written assignments on critiques of published articles in reference journals addressing comparative strengths and weaknesses inherent in any research approach.

• Equivalent: IDSC 7305.

LPSC 7308 Law and Legal Reasoning (3 SH)
Designed to provide students with an introduction to American jurisprudence and the fundamentals of legal reasoning. Provides the basic skills necessary to use the law library to support LPS research and written work with legal resources.

• Equivalent: LAW 7435.

LPSC 7309 Topics (3 SH)
Examines selected topics in law, policy, and society.

• Repeatability: May be repeated without limit.

• Equivalent: IDSC 7309.

LPSC 7310 Research Design and Analysis (3 SH)
Continues LPSC 7305. Includes readings of original research and on the philosophy of social science. Emphasizes the problem of indeterminacy of social behavior, the ambiguous role of the law, and the conflict between the goals and assumptions of the research and the practical, public use of it. Includes practical exercises in writing dissertation proposals and outlines.

• Equivalent: IDSC 7310.

LPSC 7311 Strategizing Public Policy (3 SH)
Provides a practical overview to crafting effective strategies for advancing public policy changes at the federal, state, and local level using a range of legislative, litigation, and other policy tools. Uses a series of case studies on a wide range of policy topics to understand and evaluate how different policy strategies evolve in the interplay between branches and levels of government. Takes an interbranch perspective on how policy is made and places particular emphasis on the role litigation and the courts play in policy making, an aspect of public policy formulation that is often downplayed or overlooked.

LPSC 7312 Cities, Sustainability, and Climate Change (3 SH)
Provides an overview of the various aspects of urban sustainability planning. Examines sustainability as an urban planning approach with both ecological and social justice goals. Covers sustainable planning and offers students an opportunity to understand it within the context of smart growth and the new urbanism. Focuses on the two areas in which cities can reduce energy consumption and greenhouse gas emissions—the built environment and transportation. From there, the course examines planning efforts to reduce demand on water and sewer systems and to create employment in renewable energy and other “clean-tech” occupations. The course ends by placing urban initiatives in the context of state and national policy.

LPSC 7976 Directed Study (1 to 4 SH)
Offers a supervised reading and research activity with faculty supervision approved by a committee of the Law, Policy, and Society faculty.

• Repeatability: May be repeated without limit.

LPSC 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

• Repeatability: May be repeated without limit.

LPSC 7990 Thesis (1 to 4 SH)
Offers thesis supervision by members of the department.

• Repeatability: May be repeated without limit.
LPSC 7996 Thesis Continuation (0 SH)
Offers continued thesis supervision by individual members of the department.
• Prerequisite: LPSC 7990.

LPSC 8400 Planning Module in Urban Law and Policy (1 SH)
Relates a professional activity to urban and regional planning.
• Prerequisite: Architecture majors only.
• Repeatability: May be repeated without limit.

LPSC 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

LPSC 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

LPSC 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

LPSC 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

LPSC 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

LPSC 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

LPSC 9994 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

LPSC 9996 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

LPSC 9990 Dissertation (0 SH)
Offers dissertation supervision by members of the department.
• Repeatability: May be repeated once.

LPSC 9996 Dissertation Continuation (0 SH)
Offers continued dissertation supervision by members of the department.
• Prerequisite: LPSC 9990.
• Repeatability: May be repeated without limit.

LING 1000 Linguistics at Northeastern (1 SH)
Introduces first-year linguistics majors to the discipline, the department, and the University as a whole; offers students an opportunity to familiarize themselves with the skills needed for success as a university student.
• Prerequisite: Linguistics majors and combined majors only.
• Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, MATH 1000, PHYS 1000, and PSYC 1000.

LING 1150 Introduction to Language and Linguistics (4 SH)
Introduces students to their tacit linguistic knowledge of word structure (morphology), sentence structure (syntax), meaning (semantics), and speech sounds (phonetics and phonology). This structural knowledge is the basis for exploring the social dimensions of language: geographic dialects (e.g., Boston speech), Black English (Ebonics), men’s and women’s language, as well as biological questions of nature vs. nurture, language acquisition, and animal communication.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture.
• Equivalent: ENGL 1150.

LING 1449 English Now and Then (4 SH)
Introduces the linguistic study of the English language from current and historical perspectives. Topics include the Latin and Greek etymology of English words; the linguistics of modern English dialects; English as a global language; and the origins of English as a Germanic language, closely related to German and Dutch.
• Prerequisite: Not open to linguistics majors or combined majors.
• NU Core: Social science level 1.
• NUpath: Interpreting culture.

LING 2350 Linguistic Analysis (4 SH)
Offers a workshop that focuses on the three core areas in the study of language: syntax, morphology, and phonology. Examines the regularities that lie inside each language user’s mind, with a slant toward “doing” linguistics: playing with data, analyzing it, and ultimately explaining it.
• Prerequisite: LING 1150 or ENGL 1150.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: ENGL 2350.
LING 3402 African-American English (4 SH)
Addresses topics in the study of African-American English or Ebonics. Investigates the hypotheses about the origins of African-American English as well as arguments about the relation of the dialect to English and other languages. Considers issues regarding the use of the dialect in schools.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: AFAM 3402.

LING 3412 Language and Culture (4 SH)
Explores the complex, often inexplicit relationship between language and culture, using a variety of methods drawn from the fields of anthropological linguistics and sociolinguistics. Questions may include: How do language and thought interact? How is language used to create and maintain social institutions and individual personae? How is language used differently by and across gender, ethnicity, and social class?
• Prerequisite: (a) LING 1150, ENGL 1150, or permission of instructor and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or permission of instructor.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major.
• Equivalent: ANTH 3412.

LING 3422 Phonetics and Phonology (4 SH)
Surveys phonetics and phonology from both descriptive and theoretical perspectives. Phonetic topics include types of consonant and vowel articulations found crosslinguistically, aerodynamics of speech production, and the phonetics of supersegments. Basic approaches to phonology include underlying and surface representations, phonological rules, derivational vs. constraint-based explanation, and the interplay between phonetics and phonology in syllables and prosody. Offers students an opportunity to acquire practical skills in broad and narrow phonetic transcription, as well as phonological analysis.
• Prerequisite: LING 2350, ENGL 2350, or permission of instructor.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

LING 3424 Morphology (4 SH)
Introduces morphology, the study of the structure, distributional behavior, and use of words. Covers descriptive methods of analysis, hierarchical word structure, morphological processes and rules, productivity, morphological change, and the interaction of morphology with phonology and syntax. Introduces major contemporary theories, including split morphology and single-component architecture.
• Prerequisite: LING 2350.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

LING 3428 African Languages (4 SH)
Seeks to prepare students for serious theoretical and practical study of the West African language and literature known as Kwa, the largest language subgroup in the Niger-Congo family. Students explore the classification of African languages, the application of basic linguistics, and the history of these languages in Africa and the Western hemisphere, all leading to an introduction to spoken Yoruba and Igbo.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: AFRS 3428.

LING 3430 Applied Linguistics (4 SH)
Explores the solution of language-based real-world problems. Solutions to these problems depend on information not only from linguistics but also from a variety of other disciplines such as anthropology, sociology, education, ethnic and area studies (including literature), and public administration. Studies the relationship of linguistics to applied linguistics; second language acquisition; second and foreign language teaching; language policy and planning; and the linguistic aspects of multiculturalism.
• Prerequisite: LING 1150 or ENGL 1150.

LING 3432 Romance Linguistics (4 SH)
Provides a general linguistic introduction to one of the most important language families. Discusses the structural characteristics of several Romance languages. Includes defining a language family, how and why languages change, and the relationship of standard and nonstandard linguistic varieties. Studies contemporary theoretical issues in Romance linguistics including object-pronoun placement, word order, creolization, and subject-pronoun use. Conducted in English.
• Prerequisite: (a) LING 1150 and (b) reading knowledge of one Romance language or permission of instructor.
• Equivalent: LANG 3432.

LING 3434 Bilingualism (4 SH)
Focuses on the fact that half of the world’s population is bilingual, that is, uses two or more languages on a regular basis. Also explores the fact that bilingualism remains a poorly understood phenomenon surrounded by a number of myths: those that hold that bilinguals are found in bilingual countries and are equally fluent in both languages; that bilingual children suffer from cognitive impoverishment; and that bilingual education hinders the assimilation of minority groups. Reviews all aspects of bilingualism (in the world, in society, in the child, and in the adult). Discusses topics such as biculturalism and language change.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: LANG 3434.
LING 3436 Structure of Spanish (4 SH)
Considers the Spanish language from a linguistic point of view, focusing on elements of Spanish phonology (sound system), morphology (word structure), and syntax (sentence structure). Topics include how Spanish compares with other Romance languages, as well as with non-Romance languages like English.
• Equivalent: LANG 3436.

LING 3438 Structure of French (4 SH)
Considers the French language from a linguistic point of view, focusing on elements of French phonology (sound system), morphology (word structure), and syntax (sentence structure). Topics include how French compares with other Romance languages, as well as with non-Romance languages like English.
• Equivalent: LANG 3438.

LING 3442 Sociolinguistics (4 SH)
Focuses on why people choose to say things in different ways in different situations. Examines language behavior in its social context and outlines the linguistic constructs that allow conversation to occur, the types of variation that can occur in registers and dialects, and the possible reasons for choosing different linguistic varieties. Also explores linguistic variation in relation to social context, gender, socioeconomic class, race, and ethnicity.
• Prerequisite: (a) LING 1150 or ENGL 1150 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: SOCL 3442.

LING 3444 Linguistics in Education (4 SH)
Explores the role that language plays in education. Topics include the role of language acquisition in psychological development and the implications for formal education; literacy (what does it mean to be literate, how is literacy acquired, and the role that literacy plays in education); the role that language and discourse patterns play in the classroom, in student learning, and in testing; and multilingualism in the classroom.
• Prerequisite: LING 1150 or ENGL 1150.
• Equivalent: EDUC 3444.

LING 3448 Issues in Linguistics (4 SH)
Examines an issue in linguistics in which there are theoretical debates in one of a range of areas, including syntax, semantics, morphology, prescriptive/descriptive grammar, Ebonics, and others.
• Prerequisite: LING 1150 or ENGL 1150.
• Repeatability: May be repeated without limit.

LING 3450 Syntax (4 SH)
Introduces syntax, the theory of sentence structure. Explores how to do syntactic analysis using linguistic evidence and argumentation. Focuses primarily on English, with some discussion on the syntax of other languages. Other topics include syntactic universals and the relation between syntax and semantics.
• Prerequisite: LING 2350, ENGL 2350, or permission of instructor.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: ENGL 3450.

LING 3452 Semantics (4 SH)
Focuses on meaning and how it is expressed in language—through words, sentence structure, intonation, stress patterns, and speech acts. Considers how content, logic, and speakers’ and listeners’ assumptions affect what sentences can mean and how linguistic meaning is determined by one’s perceptual system or culture.
• Prerequisite: (a) LING 1150 or ENGL 1150 and (b) completion of the mathematical/analytical thinking level 1 requirement of the NU Core.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: ENGL 3452.

LING 3454 History of English (4 SH)
Surveys the linguistic and social history of the English language from its Indo-European beginnings to the present. Examines the changes that have occurred in the sound system, word and sentence structures, vocabulary, semantics, and spelling from a formal linguistic perspective. Considers issues in language change—the influence of foreign invasion and migration, differences in dialect, and the emergence of English as a “world” language.
• Prerequisite: LING 1150.
• Equivalent: ENGL 3454.

LING 3456 Language and Gender (4 SH)
Investigates the relationship between language and gender. Topics include how men and women talk; the significant differences and similarities in how they talk, why men and women talk in these ways, and social biases in the structure of language itself.
• Prerequisite: (a) LING 1150 or ENGL 1150 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: ENGL 3456.
LING 3458 Topics in Linguistics (4 SH)
Focuses on one of a range of topics from the perspective of current linguistics, such as American dialectics, contemporary syntactic theory, language and law, women’s and men’s language, words and word structures, or issues in linguistics and literature.
• Prerequisite: LING 1150 or ENGL 1150.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 3458.

LING 3460 Historical Linguistics (4 SH)
Introduces diachronic linguistics, the study of language change over time. Surveys common changes in the areas of sound systems, word and sentence structure, and semantic meaning. Introduces methodologies to access earlier stages of language, including the comparative method and internal reconstruction. Other topics include linguistic borrowing, analogical change, linguistic paleontology, and areal diffusion.
• Prerequisite: LING 2350.

LING 4654 Seminar in Linguistics (4 SH)
Explores a topic in current linguistics research.
• Prerequisite: (a) LING 2350 and (b) either two 3000-level LING courses or one 3000-level LING course and permission of instructor and (c) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.
• Equivalent: ENGL 4654.

LING 4891 Directed Study Research (4 SH)
Offers individualized research experience on a chosen topic under the direction of a faculty member. Research content and requisites depend on the instructor, and prior arrangements should be made with the faculty member well in advance of registration.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.

LING 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

LING 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

LING 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Fulfills the college’s experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MANAGEMENT (MGMT)

MGMT 3302 Negotiating in Business (4 SH)
Focuses on the nature of conflict, conflict resolution, and the structure and process of negotiations, negotiation ethics, as well as skills to deal with “difficult” negotiators. Negotiation is a lifelong skill that we use every day, not just a tactic to get a higher salary or a better deal. No matter what direction one’s professional life takes, negotiation is an essential part of one’s job and one’s life. To be effective, one must be a skillful negotiator. While some of us are naturally gifted negotiators, most of us are not; the concepts and techniques of skillful negotiations can be learned and practiced in the classroom. Offers students numerous opportunities to develop and practice negotiating skills.
• Prerequisite: Sophomore standing or above: business majors and combined majors only.
• Equivalent: MGMT 3320.
MGMT 3330 Developing Leaders for Global Sustainability (4 SH)
Offers students an opportunity to learn how to effectively research and communicate about global environmental sustainability in both their companies and their communities. Emphasizes how to be an effective lay consumer of scientific knowledge. Students work with the latest science on such global issues as climate change and energy depletion. Analyzes how key stakeholders—businesses, governments, and communities—interact on current issues in global sustainability.
• Prerequisite: Sophomore standing or above; business majors and combined majors only.

MGMT 3340 Managing Healthcare Organizations: Critical Challenges and New Approaches (4 SH)
Designed for students interested in careers with significant healthcare managerial responsibilities. Presents the critical challenges and core issues facing managers in hospitals; insurance and managed-care organizations; pharmaceutical, biotechnology, medical device, and software companies; long-term care organizations; healthcare research and consulting organizations; and the government. Covers the newest clinical care and financial models, the pivotal role of healthcare information technology, and the impact of federal and state laws and legislative initiatives on the operations and strategies of industry players.
• Prerequisite: Sophomore standing or above.

MGMT 3420 Managing Human Capital (4 SH)
Offers an overview of the human resources management (HRM) function, including recruiting and hiring new employees, overseeing compensation and benefits, improving employee relations, and ensuring compliance with labor laws. Focuses on what a (non-HRM) manager needs to know about HRM and also seeks to provide a foundation for the HRM professional.
• Prerequisite: Sophomore standing or above; business majors and combined majors only.
• Equivalent: MGMT 3308.

MGMT 3435 Social Networks and Organizations (4 SH)
Examines three different perspectives on “social networks”: interpersonal networks within organizations—their formation, their content and structure, and how those factors affect the performance of individuals and the organization; interorganizational networks (such as alliances or board interlocks)—factors that affect their formation and their impact on organizations and industries; and social network and social media—their use by organizations and how such use affects an organization’s mission, identity, and employees. Organizations increasingly comprise a shifting web of interactions among people that defy traditional hierarchies and structures. Understanding how these social networks form and operate can be critical not only to a manager’s day-to-day effectiveness but for long-term career success as well.
• Prerequisite: Sophomore standing or above; business majors and combined majors only.

MGMT 3510 Managing Global Teams Virtually and Locally (4 SH)
Studies how understanding culture, cross-cultural differences and similarities, as well as the characteristics of the global work context, are necessary for becoming successful leaders in global organizations. The main objectives of this course are to sensitize professionals and managers to similarities and differences in cultural values, management practices, and behaviors; to facilitate their adaptation to the global, multicultural work context; and to develop awareness to one’s own culture and how it is perceived by others. Offers students an opportunity to learn how to successfully manage multicultural and virtual teams.
• Prerequisite: ORGB 3201 or ORGB 3209.

MGMT 3530 Project Management (4 SH)
Discusses why good project management skills are essential to a wide variety of business careers. Covers why many important business projects fail due to poor planning, poor time management, going over budget, and/or ineffective communication. Includes a balance of strategic, technical, and behavioral issues in project management.
• Prerequisite: Junior or senior standing.

MGMT 4310 The Management Practices of Great Organizations (4 SH)
Focuses on a wide range of management practices, many of which are “radical” and represent organizations that “dare to be different.” The course uses many teaching approaches, including case studies, class exercises, and “competitions” that require students—and seek to increase their ability—to debate, present, think on their feet, and ask tough questions. Some organizations seem “to work”; they provide high-quality products and services, they treat their employees with respect, they behave ethically, they are strong financially, and the like. The key question of this course is “How do they do it; i.e., why do they work so well?” Students study and debate the criteria for a great organization in order to answer this question.
• Prerequisite: COOP 3945 and junior or senior standing; business majors and combined majors only.
• Equivalent: MGMT 3310.

MGMT 4410 Human Resources and Workforce Analytics (4 SH)
Introduces evidenced-based workforce management, including identifying the strategic work that is truly necessary to execute firm strategy, investing in differentiated management systems that support that work, and designing and implementing targeted measurement systems (HR function and workforce scorecards) designed to hold line managers accountable for strategic talent. Emphasizes helping students move from a focus on levels associated with a particular workforce attribute to understanding the impact of the workforce on business-level outcomes (e.g., how does product manager quality affect new product cycle time?). In addition to those interested in HR, the course could be highly relevant for students specializing in corporate finance, marketing, and international business.
MGMT 4501 Skills for Managerial Success (4 SH)
Builds on co-op experiences to focus on skills critical to effective management in all fields. Using experiential exercises, self-assessment, feedback, and coaching, offers students an opportunity to develop in such areas as leading teams; being effective team members; giving feedback; and improving written and oral persuasion, motivational, and problem-solving skills.
- **Prerequisite:** (a) COOP 3945 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing; business majors and combined majors only.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.
- **Equivalent:** MGMT 3303.

MGMT 4603 Leadership Seminar (4 SH)
Explores the hallmarks of effective leadership in a wide variety of organizational settings, including not only the top echelon of leaders but also those lower in the hierarchy, who by developing an appropriate skill set can accrue personal power and influence those who outrank them. Designed to help students assess their own leadership style, thereby increasing the likelihood of career success.
- **Prerequisite:** ORGB 3201, ORGB 3202, or COOP 3945; business majors and combined majors only.
- **Equivalent:** HRMG 4602 and MGMT 3406.

MGMT 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
- **Repeatability:** May be repeated without limit.

MGMT 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- **Prerequisite:** MGMT 4970.
- **Repeatability:** May be repeated without limit.

MGMT 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- **Repeatability:** May be repeated without limit.

MGMT 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

MGMT 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

MGMT 6207 Global Innovation Management (1.5 SH)
Examines the actions that managers must take to stimulate innovation and direct it in ways that allow the organization to accomplish its goals. Introduces such topics as what organization forms are most conducive to innovation, what factors hinder innovativeness and how can they be overcome, and what role managers play in bringing about innovation. Discusses elements of an organization’s infrastructure that contribute to innovativeness such as design, reward mechanisms, communication patterns, boundary spanning, control systems, leadership at all levels, and the organization’s culture.

MGMT 6208 Global New Product Development (1.5 SH)
Provides an overview of the best-practice model of the new product/service development process. Focuses on the stages of the development process and the critical role of the customer and market research in creating, designing, and developing a successful new product.
MGMT 6210 Law for Managers and Entrepreneurs (3 SH)
Covers the legal environment in which businesses operate and its impact on businesses and their transactions. Exposes students to a variety of legal concepts and topics, such as corporations and other legal entities; contract law, mergers and acquisitions, e-commerce, and other types of business transactions; intellectual property; compliance with securities, consumer products, and other regulations; debtor-creditor relations, employment, and agency law; torts and strict liability; and the international legal environment. Addresses the complementary application of legal, financial, business, and ethical analysis to business management and decision making. Offers students an opportunity to sharpen their analytical and critical thinking skills, to develop a manager’s understanding of laws and the legal system, and to use those skills and understanding to create opportunities for adding value and managing risk.

MGMT 6211 Business Law and Professional Ethics (3 SH)
Examines the critical aspects of business essential in understanding the business and legal environment. Examines contract law and areas of the law that relate directly to the accountancy profession. Develops knowledge of the Uniform Commercial Code as it relates to the law of sales, commercial paper, and secured transactions. Also explores the importance of ethics in the business and accounting environment, and considers potential ethical dilemmas.

MGMT 6212 Managerial Communication (3 SH)
Focuses on business communication strategies including written communication, business and professional speaking, and skills required to be successful in variety of business and professional contexts. Topics include audience and situation analysis, the writing process, informal and formal speaking, and presentations. In-class exercises, simulations, and individual and group work help participants develop and practice communication skills.  
Prerequisite: Accounting students only.

MGMT 6213 Managing Ethics in the Workplace and Marketplace (2 SH)
Seeks to stimulate creative individual and group thinking and learning for working professionals while offering practical guidance for improved decision making in both common and novel ethical business situations. Recent and historical executive and managerial criminal conduct and ethical lapses have destroyed careers and shareholder value in addition to severely eroding employee and public trust. Uses a series of case studies, readings, and field study experiences to actively engage students in a timely, relevant, and challenging fashion.

MGMT 6214 Negotiations (2 or 3 SH)
Designed to improve students’ understanding of the negotiations process and their ability to plan and conduct negotiations effectively. Includes such class activities as readings, lectures, and discussions as well as case discussions and role-playing negotiation exercises.  
Prerequisite: Business administration students only.

MGMT 6215 Strategic Security Management (3 SH)
Analyzes the contemporary role of the security manager as it necessarily evolves from that of content expert to one of business strategist. To effectively develop the competencies and mind-set necessary to establish a strategic approach to security management, this class uses a range of readings, case studies, and research materials with the goal of critically examining the behavioral, structural, ethical, legal, political, social, cultural, and competitive conditions of today’s complex, interdependent, and global business environment.

MGMT 6216 The Chief Executive Officer (3 SH)
Explores the CEO’s job and role in a business organization. Offers presentations by and discussions with chief executive officers of major corporations in the Greater Boston area. Cases and readings also help address the job requirements, problems, and opportunities facing top management.

MGMT 6217 Business and Government Regulation (3 SH)
Explores the process by which regulations are formulated at the various levels of government and their impact on business: the regulation of prices, industry concentration and monopoly, safety, environment, energy, and consumer rights. Emphasizes particular industries: transportation, communication, energy, healthcare, and finance. The overriding objective is to enhance the ability of managers to respond to and deal with government regulation, which today significantly affects virtually every aspect of business.

MGMT 6220 Leadership in the Strategy Process (3 SH)
Focuses on the leadership role in strategic implementation—usually the most time-consuming and difficult part of the strategic process, requiring leadership from every level of management. Emphasizes how to motivate people to achieve objectives, develop the right culture, enhance core competencies, and create the right structure to support the strategy, ultimately insuring that all elements of the organization are operating to support the strategy implementation process.
MGMT 6222 Healthcare Industry (3 SH)
Examines the evolution of the U.S. healthcare delivery system from early forms of organized institutional care through the current dynamic and increasingly integrated and managed care systems. Introduces students to the interactions of regulatory, economic, political, and social aspects of the healthcare system. Compares current policies and proposals for health reform. Students are asked to analyze the impact and consequences of actions in one era on the structure and function of healthcare practice in later years and to project these trends into the future.

MGMT 6223 Strategic Decision Making for Healthcare Professionals (3 SH)
Examines how healthcare organizations manage their resources and competitive environment to meet the goals of their many stakeholders. Applies three essential elements of strategic decision making—environmental analysis, strategy formulation, and strategy implementation—to the healthcare industry.

MGMT 6224 Healthcare Strategy (3 SH)
Examines how healthcare organizations manage their resources and competitive environment to meet the goals of their many stakeholders. Encourages students, through a combination of cases, readings, and project work, to apply three essential elements of strategic decision making—environmental analysis, strategy formulation, and strategy implementation—to the healthcare industry. Places special emphasis on comparing the healthcare industry to other leading industries; identifying specific management tools, activities, and methods from other industries; and applying them to healthcare. Also emphasizes the impact that creative and effective leadership may have in facilitating strategic and operational changes in healthcare delivery.

MGMT 6225 Sustainability and Leadership (3 SH)
Examines how organizational leaders influence decisions to advance an environmental agenda. Studies the scientific knowledge that organizational leaders must have to make effective sustainability decisions. Analyzes how a variety of organizations, including businesses, governments, government-sponsored enterprises, and nongovernment organizations, interact on environmental issues.
• Prerequisite: Online MBA students only.

MGMT 6226 Sustainability and the Business Environment (3 SH)
Examines how the environment affects corporate strategy, public policy, and individual decision making. Exposes students to the skills and knowledge needed to help organizations understand and act upon the principles of sustainability. Examines a variety of environmental problems, including global warming, use and disposal of toxic substances, and depletion of natural resources. Also studies how companies solve these problems by reducing their impact on the environment through solutions such as zero emissions, green design, and corporate environmental reporting.
• Prerequisite: Online MBA students only.

MGMT 6227 Organizational Network: Analysis, Implications, and Practice (3 SH)
Examines organizational phenomena using a social network perspective. Focuses on understanding social networks in and of organizations and on understanding the impact of these social networks on outcomes for both individuals and organizations, including career success, innovation, and performance. Offers students an opportunity to develop a strong grasp of key network concepts, to learn how to use specialized software to analyze social network data, and to translate social network analysis to applied management practice. Designed both to engage existing research and case studies and to apply that knowledge with hands-on organizational network analyses.
• Prerequisite: Business administration students only.

MGMT 6230 Physician-Executive Field Experience (3 SH)
Introduces students to the real and complex problems of management and systems change. Student teams work under the supervision of a faculty coordinator, physician-executives, and other administrative personnel on a project designed to further the mission of the specific sponsoring healthcare organization. Teams are asked to define and analyze a complex problem in the sponsoring organization with the goal of recommending desired management actions. Successful projects incorporate a detailed understanding of key clinical, economic, social, political, competitive, technological, and organizational variables that impact the project’s domain. Includes instruction on project management techniques and communication skills relevant to healthcare industry executives while serving as an introductory practice-based educational model consistent with the goals of effective medical and business school learning.
• Prerequisite: Business administration students only.

MGMT 6233 Introduction to Business Analytics (3 SH)
Introduces the key concepts of data science and data analytics as applied to solving data-centered business problems. Emphasizes principles and methods covering the process from envisioning the problem to applying data science techniques to deploying the results to improve financial performance, strategic management, and operational efficiency. Topics include an introduction to data-analytic thinking; application of data science solutions to business problems; data mining, supervised and unsupervised machine learning; methods for the detection of co-occurrences and associations; and achieving and sustaining competitive advantage with data science. Presents the application of these disciplines in the areas of marketing, supply chain management, finance, sales, and innovation.
• Prerequisite: Business administration and business analytics students only.
MGMT 6260 Advanced Topics in Management (3 SH)
Offers course topics that vary with instructor, with typical issues being current strategic and managerial problems of high-technology industries, the evolution of new industries, such as biotechnology and healthcare, government regulation as it affects business, the shaping of public policy and its impacts on industry, and a focus on current topics as shaped by the instructor’s research interests and writing.
• Repeatability: May be repeated without limit.

MGMT 6280 Innovation for Next-Generation Products and Systems (3 SH)
Focuses on next-generation products, systems, and services with an integrated framework that applies market innovation, user-centered design, architectural and platform innovation, and business model innovation. Offers students an opportunity to apply these concepts to new product/service/business process innovation opportunities in their own organization with executive sponsorship and faculty guidance.
• Prerequisite: MS-in-innovation students only.

MGMT 6281 Competitive Strategy for Dynamic Markets, Development, and Execution (3 SH)
Explores frameworks and business processes used by industry leaders to develop strategic plans. Uses a combination of case studies and student projects. Examines industrial products, financial services, medical technology and services, life sciences, information technology, and defense. Explores the gathering of market and competitive intelligence, new product/service strategy, assessing underlying human and technical competencies, and position in innovation within a dynamic industry ecosystem. Discusses execution of a corporate growth strategy across diverse business units and geographical interests.
• Prerequisite: High-technology and business administration students only.

MGMT 6282 Negotiation and Communication (3 SH)
Studies the basic foundations and processes of negotiations for different applications, including getting a promotion; working with executives, peers, and subordinates; interacting with customers; and working with suppliers. Being skilled in negotiation has become one of the most critical skills we need to be effective. Based on the concepts and skills of the best-selling Getting to Yes, this intensive course uses lectures, role-plays, and simulations in an effort to help students develop these essential skills.
• Prerequisite: High-technology and business administration students only.

MGMT 6283 Business Law, Corporate Governance, and Intellectual Property Strategies (3 SH)
Covers the fundamentals for business law and contracts, structures and processes for corporate governance, and approaches to risk mitigation. Explores the development, protection, and management of intellectual property across a variety of industry sectors and how such protections work or do not work in emerging markets. Exposes students to the intersection of law, business, and innovation.
• Prerequisite: Business administration students only.

MGMT 6290 CEO Symposium (1 SH)
Examines the challenges facing CEOs and the skills necessary to lead organizations using readings, discussions, and group exercises. Using an integrative case study based on a CEO who is an Executive MBA alum, study groups act as consultants and make recommendations to the CEO regarding the situation in the case. The CEO is present for the session and relates firsthand experiences and solutions.
• Prerequisite: Executive MBA students only.

MGMT 6293 Developing an Executive Understanding of Business Law and Intellectual Property (3 SH)
Offers students an opportunity to gain a greater understanding of the legal environment in which a business operates. Studies identifying and managing enterprise risk; establishing effective rules of governance, accountability, and transparency; insuring global compliance with internal and external requirements; using the legal system to further growth and innovation through the use of intellectual property protections; and managing with integrity, including managerial ethics and social responsibility.
• Prerequisite: Executive MBA students only.

MGMT 6295 Leadership for High Performance and Organizational Change (2 SH)
Focuses on the leadership behaviors that executives need to create and sustain high performance of their firms. Emphasizes change interventions that can be used to motivate employees to alter their patterns of behavior to meet the shifting needs of the competitive environment. Introduces skills and concepts related to organization diagnosis; organizational design, particularly across national borders; and human resource development that facilitate an executive’s ability to lead change and reinforce new behaviors.
• Prerequisite: Executive MBA students only.

MGMT 6296 Managerial Communication and Presentations (2 SH)
Focuses on business communication strategies. Provides students with the opportunity to learn how to use situational analysis and audience analysis to craft and deliver persuasive messages for a variety of business audiences.

MGMT 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.
MGMT 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
* Repeatability: May be repeated without limit.

MGMT 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
* Repeatability: May be repeated without limit.

MANAGEMENT INFORMATION SYSTEMS (MISM)

MISM 2301 Management Information Systems (4 SH)
Explores how a wide range of enterprises around the world use information and information technology to create better-managed, more innovative, and successful organizations. The twenty-first-century enterprise runs on information, and every part of the business has been transformed by the use of information technology. Today’s business leaders, therefore, must have ready access to timely, accurate, and relevant information to manage effectively in the global economy.
* Prerequisite: Business majors and combined majors only.
* Equivalent: MISM 2309.

MISM 2309 Management Information Systems (4 SH)
Does not count as credit for business majors. Counts as MISM 2301 for business minors only.
* Prerequisite: Nonbusiness majors only.
* Equivalent: MISM 2301.

MISM 2510 Fundamentals of Information Analytics (4 SH)
Focuses on information analytics concepts and techniques needed by educated information analysts, designers, and consumers to lead organizations in the contemporary information age. Includes concepts, techniques, methods, and strategies for the entire information life cycle—collection, organization, exploration, analysis, manipulation, visualization, interpretation, and presentation of information for business. Each of these topics is introduced with real-world examples and data sets, grounded in relevant theory and principles, and is reinforced using various user-friendly software tools to gain the necessary analytical skills and knowledge.

MISM 3305 Information Resource Management (4 SH)
Examines how information technology is used to support the functional areas of business (finance, accounting, marketing, manufacturing, and human resource management) to achieve business results (creating new products and services, redesigning business operations, and altering relations with customers and suppliers to achieve competitive advantage). Offers students an opportunity to understand the business issues involved in investing in new technologies.
* Prerequisite: CS 2510 (with a grade of C–), ECON 2350, IS 3500, MATH 2280, MATH 3081, MGSC 1201, MGSC 2301, MISM 2301, or POLS 2400; restricted to business majors and combined majors, to information science majors, and to computer science/information science combined majors.

MISM 3403 Data Management in the Enterprise (4 SH)
Offers students an introduction to and overview of the methodological frameworks and tool sets for the design, development, and implementation of data-management solutions. Today, almost no aspect of business operates without a strong reliance on the flow of information. Even small enterprises track huge volumes of data, from sales transactions and supply chain activities to Web site traffic. Knowledge workers and managers at all levels within the organization require an understanding of data management, database design and operations, and associated decision-support and data-analysis tools and systems to complete even day-to-day tasks. Offers students an opportunity to work hands-on, applying these methods and tools to solve actual business problems.
* Prerequisite: (a) CS 2510 (with a grade of C–), ECON 2350, IS 3500, MATH 2280, MATH 3081, MGSC 1201, MGSC 2301, MISM 2301, or POLS 2400 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; business majors and combined majors only.

MISM 3404 Data Communications (4 SH)
Introduces data communications concepts and terminology, network design and architecture, distributed information systems, and security within a business systems environment. The modern enterprise relies on being able to get information to where it is needed quickly, accurately, and securely. From the instantaneous global reach of the Internet, to mobile wireless devices, to multimedia communication, innovations in data communication have directly changed the way business is done today. Explores key emerging technologies such as Web services and Web 2.0, service-oriented architecture, wireless and mobile communication, and multimedia networking.
* Prerequisite: (a) CS 2510 (with a grade of C–), ECON 2350, IS 3500, MATH 2280, MATH 3081, MGSC 1201, MGSC 2301, MISM 2301, or POLS 2400 and (b) sophomore standing or above; business majors and combined majors only.
MISM 3406 Introduction to Web Design, Practices, and Standards (4 SH)
Seeks to equip students with the foundational skills and knowledge necessary to design, evaluate, and build websites. Offers a hands-on and lab-based course in which students have an opportunity to develop websites for small businesses, including nonprofits and for-profit entities. Studies accessibility tools and standards. Students participate in the analysis of a specific Web practice/service/technology that is relevant for improving the performance and/or security of websites. Uses Web development software for the labs. Each student is expected to have his or her laptop for this course. Prior programming skill is not required.
• Prerequisite: MISM 2301 or permission of instructor; business majors and combined majors only.

MISM 3501 Information Visualization for Business (4 SH)
Introduces the use of design, interaction, and visualization techniques and strategies to support the effective presentation and manipulation of business information. Based on principles from art, design, psychology, and information science, offers students opportunities to learn how to successfully choose appropriate methods of representing various kinds of business data to support analysis, decision making, and communication to organizational stakeholders.
• Prerequisite: Sophomore standing or above.

MISM 3515 Data Mining for Business (4 SH)
Covers key concepts, techniques, methods, and applications of data mining in the context of business. Offers students opportunities to learn how to distill key insights from a large amount of unknown data, which techniques to choose from, how to apply the techniques and methods to get the answer and insights from the data, and how to interpret the results from the analysis. Example predictive analysis techniques include market basket analysis and principle component analysis. Covers all techniques using business examples and user-friendly tools.
• Prerequisite: ECON 2350, MATH 2280, MATH 3081, MGSC 2301, or POLS 2400.

MISM 4501 Business Systems Integration (4 SH)
Examines significant improvements to business performance, which can be achieved through sharing information within the enterprise and with customers and suppliers. Realizing the full business benefits of shared information requires changing processes and organizational structures. This team- and project-based course offers students an opportunity to design and implement these strategies and to examine significant improvements to business performance.
• Prerequisite: (a) MISM 3403, IS 3500, or CS 2510 (the latter with a grade of C–) and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing; restricted to business majors and combined majors and to information science majors.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

MISM 4512 Special Topics in Information Technology Management (4 SH)
Examines various contemporary issues in information technology management. Topics may include wireless technologies for business; the emergence of global information systems; collaborative implementation; and others.
• Prerequisite: Business majors and combined majors only.
• Repeatability: May be repeated without limit.

MISM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: Business majors and combined majors only.
• Repeatability: May be repeated without limit.

MISM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: MISM 4970; business majors and combined majors only.
• Repeatability: May be repeated without limit.
**MISM 4993 Independent Study (1 to 4 SH)**

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.

- **Repeatability:** May be repeated without limit.

**MGSC 2201 Operations Management (2 SH)**

Considers the productive system of an enterprise whereby inputs of people, materials, information, and technology are transformed into useful goods and/or services. Topics include types of production processes, process flow analysis, capacity analysis, inventory and quality management, and so on. Provides an overview of the problems and issues encountered by an operations manager. Although a variety of models and techniques are discussed, the emphasis is on the problem formulation, managerial implication, and the impact on operations strategy.

- **Prerequisite:** ACCT 1201, ACCT 1202, or ACCT 1209 (any may be taken concurrently); business majors and combined majors only.
- **Corequisite:** SCHM 2201.
- **NU Core:** Mathematical/analytical thinking level 2.
- **Equivalent:** MGSC 3401.

**MGSC 2301 Business Statistics (4 SH)**

Offers students an opportunity to obtain the necessary skills to collect, summarize, analyze, and interpret business-related data. Covers descriptive statistics, sampling and sampling distributions, statistical inference, relationships between variables, formulating and testing hypotheses, and regression analysis in the context of business. Use of the SPSS statistical programming package is an integral part of the course.

- **Prerequisite:** Business majors and combined majors only.
- **NU Core:** Mathematical/analytical thinking level 2.
- **NUpath:** Analyzing and using data.
- **Equivalent:** MGSC 1201 and MNSC 1201.

**MGSC 5976 Directed Study (1 to 4 SH)**

Offers independent work under the direction of members of the department on chosen topics.

- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

**MGSC 5978 Independent Study (1 to 4 SH)**

Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.

- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

**MGSC 6200 Information Analysis (3 SH)**

Provides students with basic information analysis skills and tools needed to manage effectively in today’s information-intensive business climate. Exposes students to analytical problems from different areas of business and the quantitative concepts and techniques that can analyze them. Course objectives are to improve the information analysis skills of the students, to provide students with a working knowledge of important statistical tools, to help students become more critical evaluators of studies and reports involving statistical and quantitative methods, and to improve skills in communicating the results of analyses. Offers students the opportunity to learn how to evaluate, analyze, and interpret data, and present their findings and conclusions that will be most useful for managerial decision making through the use of business applications and analytical software.

- **Equivalent:** MGSC 6207.
MGSC 6201 Information Systems and Technology (3 SH)
Provides students with a fundamental understanding of the impact of technology on the organization and its financial systems. In particular, students are exposed to the new business models that technology enables and the control issues that these business models create. Discusses emerging technologies, digital business, supply chain, customer relationship management, and other technology subjects.
• Prerequisite: Admission to MS/MBA program.

MGSC 6204 Managing Information Resources (1.5 SH)
Focuses on issues of the strategic uses of information technology for competitive advantage, support of business processes, information and control, digital business, integration of business with technology, organizational communication, and data management. Information has become a key resource in doing business. Managers must understand that high-quality information adds value to existing products and services, enhances the creation of new products, changes the efficiency and effectiveness of business processes, and affects relationships with customers, suppliers, and competitors.
• Equivalent: MGSC 6205.

MGSC 6205 Management of Information Resources (2 SH)
Examines information and its role as a key resource in business. Today’s managers must understand that well-managed information can add value to facilitate the creation and revision of new products and services; promote the efficiency and effectiveness of business processes of the global extended enterprise; and transform the relationships with customers, suppliers, and competitors. Covers topics including the strategic uses of information and information technology, the role of information for transforming business processes; e-commerce; and the alignment of business processes, technology, and information.
• Equivalent: MGSC 6204.

MGSC 6206 Management of Service and Manufacturing Operations (3 SH)
Focuses on decision making by an operations manager. The operations manager’s major job function is to provide quality products and services desired by customers, on time and at a competitive cost. Helps the operations manager to perform this function in both the manufacturing and service sectors of the economy. Explores operations management concepts, techniques, and models. These include the optimum allocation and efficient utilization of manpower, materials, equipment, and technology at strategic and tactical levels in the organization. Topics include process analysis, capacity planning, materials management, resource allocation, quality management, and scheduling.
• Prerequisite: Business students only.
• Equivalent: MGSC 6208.

MGSC 6207 Data Analysis for Decision Making (2 SH)
Covers basic statistical skills in using methods of data analysis. Seeks to improve analytical skills of the students, to develop knowledge and appreciation for models and other technical tools, and to prepare students to be effective communicators of their analyses and findings to management. Uses business applications and computer software to teach students how to evaluate, analyze, and interpret data and models and present their findings and conclusions to assist in rational decision making. Topics include statistical sampling, estimation, testing hypotheses, and basic regression models.
• Equivalent: MGSC 6200.

MGSC 6208 Operations Management (2 SH)
Examines decisions related to the design, running, and control of agile operations systems. Addresses the issues confronting operations managers whether in the service or the manufacturing sectors of the economy. Operations are of primary importance in the implementation of corporate strategy and fundamental to supply chain strategies for competitive advantage. Explores concepts, techniques, and models that support the operations manager’s job to provide customer-centric, innovative, high-quality products and services, on time and at a competitive cost. These include the effective and efficient allocation of resources, such as technology, information, manpower, materials, and equipment at different levels of the organization. Discusses the analysis of different types of processes, capacity and quality planning, project management, and materials management in a collaborative supply chain environment.
• Equivalent: MGSC 6206.

MGSC 6209 Business Statistics (3 SH)
Offers an introductory course in business statistics. Seeks to provide students with the opportunity to learn the most common statistical and analytical tools used in business decision making and to develop skills that enable them to recognize business problems and which statistical methods can be used most effectively given the problem.

MGSC 6210 Information Systems Global Enterprise (3 SH)
Focuses on how to employ technology effectively in organizations, with emphasis on the global organization. Explores management issues of how to use new technologies in an organization along with issues of supply chain management, customer relationship management, outsourcing of technology services, information technology development, and the integration of technology within an organization through the use of enterprise systems.
• Prerequisite: MGSC 6204 or MGSC 6205.
MGSC 6211 Research Methods (3 SH)
Offers an introductory course in business research methods. Designed to introduce students to basic concepts and problems encountered in social science and business research, including types of data and measurement, sampling, probability, and research design. Also offers students an opportunity to become acquainted with a variety of approaches and techniques to develop their own research projects.

MGSC 6212 Data Management (3 SH)
Provides a management-oriented introduction to data administration, database management systems (DBMS), and their impact on business. Data drives businesses and are necessary for businesses to function and for customers to buy products and services. Topics include the rationale for the DBMS approach, database design, data models, DBMS software tools, and the role of the database administrator. Gives students the opportunity to use a DBMS package, gain experience in database design, and use a query language.
* Prerequisite: MGSC 6204 or MGSC 6205.

MGSC 6214 Business Data Communications (3 SH)
Focuses on the key technical and managerial issues governing the effective deployment and use of data communication technologies within a business. Discusses telecommunication fundamentals including telecommunication hardware, network topologies and protocols, network security, and installation of networks for both local and global business communications. Emphasis is on developing the ability to evaluate and then select from a variety of connectivity options, conduct a network performance analysis, conduct a cost-benefit analysis, and manage a data communications network. Also discusses the role of a systems or network administrator.
* Prerequisite: MGSC 6204 or MGSC 6205.

MGSC 6216 Knowledge Management (1.5 SH)
Discusses how knowledge differs from data and information, the role knowledge plays in organizations, and the role information technology can play in managing that knowledge. Knowledge is a key strategic resource in today’s economy, and organizations must create and share it effectively to be successful. Some of the most creative applications of information technology are those that enable teamwork, communication, problem solving, and innovation.
* Prerequisite: MGSC 6204 or MGSC 6205.

MGSC 6218 Information Analysis and System Design (3 SH)
Discusses how the successful application of information technology requires a careful understanding of information requirements in the context of a business application/process. Provides the tools, experience, and examples needed to identify and analyze such opportunities. Topics include the analysis of information needs, identification of data requirements, systems design methodologies, assessment of information technology capabilities, implementation strategies, and organizational changes resulting from information system changes.
* Prerequisite: MGSC 6204 or MGSC 6205.

MGSC 6220 Information Strategy in a Digital Business Economy (1.5 SH)
Focuses on what companies need to do to take full advantage of new information technologies that the Internet and other emerging technologies provide. The information economy has produced profound effects on doing business, and it will continue to do so in the future. New business opportunities are being created, and traditional businesses are being transformed in the electronic business environment. Emphasis is on supply chain issues, telecommunications issues, the role of the electronic marketplace, and effective uses of the Web.
* Prerequisite: MGSC 6204 or MGSC 6205.

MGSC 6221 Introduction to Health Informatics and Health Information Systems (3 SH)
Introduces the history and current status of information systems in healthcare: information architectures, administrative and clinical applications, evidence-based medicine, information retrieval, decision support systems, security and confidentiality, bioinformatics, information system cycles, the electronic health record, key health information systems and standards, and medical devices.

MGSC 6222 Business Systems Integration Strategy (3 SH)
Covers the concepts, skills, and techniques needed to integrate information systems. The dramatic growth in business being conducted over the Internet, the rapid change of business models, and the wave of corporate mergers have boosted dramatically the need for integrated business information. These demands force organizations to introduce new approaches and techniques to integrating business systems within the company and between companies.
* Prerequisite: MGSC 6204 or MGSC 6205.
MGSC 6223 Manufacturing Policy (3 SH)
Focuses on how to gain competitive advantage through manufacturing rather than just improving operational performance. Effective manufacturing fits the needs of the business, and strives for consistency between its capabilities and policies and the competitive advantage sought. To do so requires translating the business strategy into an appropriate collection of bricks and mortar, equipment, people, and procedures. Being able to move from the level of specific decisions to developing general capabilities—and back again—is central to developing and implementing an effective manufacturing strategy.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6224 Quality Management (3 SH)
Introduces quality management in various sectors of the economy. Provides students with an appreciation for the need for quality assurance in both the manufacturing and service environments. Emphasizes quality in the production and maintenance of software. Provides a general introduction to some of the technical/statistical tools used in quality assurance and control. Offers a forum to discuss and promote the concept of total quality and its implementation.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6225 Mass Customization (3 SH)
Overviews mass customization, which refers to designing, manufacturing, testing, and delivering products according to the customers’ individual requirements but at costs not significantly higher than mass production. It combines the productivity and cost advantages of mass production with the variety and quality of custom production. The paradigm shift toward mass customization is taking place in both manufacturing and service industries. Topics include manufacturing processes, typology of mass customization, information needs and customer focus, and implementation of a mass customization project. It is based on principles of industrial engineering, mechanical engineering, management science, and marketing.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6226 Statistical Methods and Applications in Functional Areas of Business (3 SH)
Surveys a variety of statistical models and applications of multiattribute data that arise in functional areas of business like marketing, organizational behavior, and finance. Emphasizes the applications of statistical models, such as multiple regression, clustering, discriminant analysis, logistic regression, and factor analysis. Introduces time series models that are relevant to the study of financial markets. Offers a blend of statistical theory and statistical practice on business-related data for informed decision making.
• Prerequisite: MGSC 6200 or MGSC 6207.

MGSC 6227 Project Management (3 SH)
Explores managing in a project environment from definition, planning, and implementation through managing the project termination phase. Examines alternative organizational structures, development of a work breakdown structure, cost estimation, management of project teams, scheduling techniques, risk management, and tailoring of communication patterns and monitoring and control systems to specific projects. Introduces software specifically designed for scheduling and performing risk analysis in project environments.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6228 Management of Service Operations (3 SH)
Introduces students to the problems and issues faced by managers in managing service operations. Develops the basic analytical skills required for solving the problems encountered, and provides a manager's perspective. Examines the general management tasks of executives at more senior levels of management and seeks to tie those to the middle-management tasks of managing the frontline operations. A major theme is that service operations are of primary importance in the implementation of business and corporate strategy. Thus we need to consider aspects of corporate strategy in order to determine priorities.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6260 Advanced Topics in Information Resources Management (3 SH)
Offers an in-depth examination of selected issues and problems in information resource management that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: MGSC 6200 or MGSC 6207.

MGSC 6261 Advanced Topics in Operations Management (3 SH)
Offers an in-depth examination of selected issues and problems in operations management that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.
• Prerequisite: MGSC 6206 or MGSC 6208.

MGSC 6280 Analytical Models and Methods (3 SH)
Presents analytical techniques and their applications that are useful for a variety of business problems ranging from basic market research to managerial forecasting. Emphasizes understanding analytical models and decision making rather than computational tasks for which computers are more suitable. Covers techniques and methods including statistical analysis of single- and multiattribute data, regression and forecasting models, and conjoint analysis.
• Prerequisite: High technology and business administration students only.
MGSC 6281 Service Innovation and Management (3 SH)
Examines innovation in services and the internal management of business processes. Uses a framework of service/process redesign. Emphasizes strategic initiatives and key organizational change elements critical for improving services to customers; increasing profitability; and building long-term customer loyalty across multiple industry sectors, including information technology, healthcare, financial services, and government. Introduces the various strategic aspects of process improvement in the delivery of services, including managing change and the resulting impact on the organization, supply-chain management in the service industry, process improvement, overcoming organizational resistance, customer involvement, empowerment, and the role of leadership in managing operations. Through guided project work, offers students an opportunity to apply these concepts to services and internal business processes at their own organizations.
• Prerequisite: MS-in-innovation students only.

MGSC 6290 Business Statistics (2 SH)
Focuses on building students’ analytical skills by using such tools as charts and tables to describe information, estimate, explore relationships, build regression equation, and predict results. Students gain insight about business situations where information analysis tools can be useful. Enhances the ability to communicate analytical results with written reports.

MGSC 6291 Creating Value through Process Improvement (2 SH)
Focuses on the process through which organizations transform inputs into outputs—both products and services—for customers. Examines, in particular, how some organizations have achieved breakthrough performance, reengineering their operations processes through application of lean, total quality management (TQM), just-in-time (JIT), and six sigma concepts. Students tour a local manufacturing company that practices lean six sigma and hear from senior management about its strategic impact. Offers students an opportunity to develop their ability to describe, analyze, and synthesize transformation processes; make and implement sound operations decisions; and develop effective operational design by achieving congruence among people, processes, and technology. Topics include quality management, continuous improvement, and service management.

MGSC 6292 Delivering Competitive Advantage through IT Strategy (2 SH)
Examines how to provide leadership in information technology (IT) management. Offers students an opportunity to learn how information and information systems can be a strategic resource for managing organizations and supporting business functions and processes. Examines how IT facilitates the capture, analysis, and sharing of a company’s information that, in turn, can be used to better control the enterprise and to enable learning and innovation. Topics include enterprise resource planning (ERP) systems, business intelligence, and Internet challenges and opportunities.

MGSC 6960 Exam Preparation—Master's (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

MGSC 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

MGSC 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

MANAGERIAL ECONOMICS (MECN)

MECN 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

MECN 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

MECN 6200 Global Competition and Market Dominance (3 SH)
Trains managers to understand the competitive implications of global economic policies, the business effects of technological change, and the commercial imperatives of alternative political systems at a macro level. At a micro level, it creates a framework for industry analysis in a global setting that combines economic analysis, competitive analysis, and business decision-making skills.
• Equivalent: MECN 6208.
MECN 6203 Global Managerial Economics (3 SH)
Develops understanding of the organization of the global economy and how this helps managers assess the winds of economic change and make better decisions for their shareholders. Addresses interactions among competitors, suppliers and customers, central banks and other financial intermediaries, and governments and how these interactions impact business decision making. Leads to a framework for industry analysis in a global setting that involves economic analysis, competitive analysis, and business decision-making skills.

MECN 6205 Sustainability and the Economics of Markets (3 SH)
Examines the idea that building a sustainable business enterprise often involves correcting market failures. Examines the responsibilities of the business enterprise to society at large. Also explores the causes of and remedies for market failures, such as immigration, education, healthcare, climate change, and finance, and what these mean for governments, businesses, and individuals.  
• Prerequisite: Online MBA students only.

MECN 6208 Economics for Managerial Decision Making (2 SH)
Focuses on the application of economic concepts to business decision making in an international setting. The goal is understanding those aspects of creating and sustaining shareholder value that managers control and those arising from external sources. Topics include analyses of competitive market forces, demand-supply interactions, production, costs and profits, market structures and industrial organization, and pricing strategies. Focuses also on the social, political, economic, and institutional forces that influence value and wealth. Topics include national income accounting, aggregate economic behavior, financial markets analysis, the determination of income, employment and inflation, growth and productivity, exchange rate determination, and absolute versus comparative advantage. Helps student-managers learn how to better evaluate economic trends and conditions enabling them to make more informed choices on behalf of their stakeholders.  
• Equivalent: MECN 6200.

MECN 6281 Understanding the Global Business Environment (1.5 SH)
Explores the hierarchical nature of economic activity, thus providing a perspective on a firm’s relative position and the origins of the forces that operate on it. Provides students with the opportunity to understand the organization of the global economy and the accounting system that underlies it, as well as understand the interactions among competitors, suppliers and customers, central banks and other financial intermediaries, and governments and how these interactions combine to create the parameter space for business decision making. By knowing how all the pieces fit and by knowing the pathways of influence among these pieces, managers can better read the winds of economic change and, as a consequence, can make better decisions for their shareholders.  
• Prerequisite: High-technology and business administration students only.  
• Equivalent: MECN 6280.

MECN 6290 How Economics and Politics Affect U.S. Businesses (3 SH)
Focuses on the macroeconomic environment in the United States in the context of economic and political trends in the United States and around the world. Specific topics include demand and supply analysis, national output and national income, and economic growth and productivity. Studies the complex role of government as an important stakeholder in the business environment through fiscal policy, monetary policy, international trade policy and practice, and industrial economic policy and practice. Offers students an opportunity to understand how macroeconomic and political events affect businesses, industries, and individuals.  
• Prerequisite: Executive MBA students only.

MECN 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

MECN 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.  
• Repeatability: May be repeated without limit.

MECN 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.  
• Repeatability: May be repeated without limit.
### MARINE STUDIES (MARS)

**MARS 3200 Marine Studies (4 SH)**
Surveys the issues and methodologies involved in the interdisciplinary study of marine environments. Examines the physical, biological, social, and historical processes that interact in this complex system. Guest lectures provide an overview of the range of disciplines in the study of the world’s oceans.

**MARS 3210 Marine Mammals (4 SH)**
Designed to familiarize students with biology and conservation of marine mammals. The course content is primarily scientific, but the goal of the course is to consider how scientific knowledge is used as a tool of conservation. Topics include the evolution and taxonomy of whales, seals, and other marine mammals, adaptations to the ocean environment, feeding and social behavior, and population ecology. Issues include whaling and sealing, environmental contaminants, entanglements in fishing gear, tuna/dolphin interactions, and the decline of Stellar Sea lions.

**MARS 3300 The Ocean World (4 SH)**
Provides a comprehensive, interdisciplinary introduction to the oceans. Focuses on the sea’s complexity and the far-reaching consequences of our interactions with them. Draws on specialists in the sciences, social sciences, humanities, and arts, each with an interest in marine issues and a commitment to bridging the gaps among disciplines. The course themes are broad, but, when appropriate, focus on Boston Harbor, a first step into the ocean world for this area.

**MARS 3305 Maritime History of New England (4 SH)**
Surveys maritime transportation, trade, travel, exploration, and warfare from approximately 3500 B.C. to the end of the wooden boat era in the late nineteenth century. Prior to the widespread application of steam power on land and sea, ships were the fastest, safest, and most economical means of transporting large cargoes over long distances. Literary and art history sources are also introduced, along with several films on maritime archaeology.

**MARS 3310 Water Resources Policy and Management (4 SH)**
Explores the ways in which water has affected our bodies, our planet, our history, our culture, and the danger posed by increasing demand, waste, and pollution on our limited supply of usable fresh water. Considers water through scientific, historical, and cultural viewpoints. Surveys contemporary water problems in all their dimensions-political, economic, and technological.

**MARS 3315 Wetlands: Ecology and Hydrology (4 SH)**
Investigates the vital role of wetlands in the hydrology and ecology of global landscapes. Topics include function of inland and coastal marshes, and swamps and bogs in water and nutrient cycles, and in support of biodiversity from microbes to vertebrates. Examines biological links between wetlands and human activities, such as agriculture, coastal development, and fisheries. Also covers legal framework for the protection and restoration of endangered wetlands.

**MARS 3325 Coastal Zone Management (4 SH)**
Focuses on outstanding issues in coastal environment affairs. Discusses scientific, legal, economic, and technical aspects of coastal issues and integrates them into problem-solving exercises.

**MARS 3425 Biology of Fishes (4 SH)**
Covers the evolution, systematics, anatomy, physiology, and behavior of freshwater, marine, and anadromous fishes from temperate to tropical environments. Examines the diversity of fish interactions in aquatic communities; predator/prey relationships, host/symbiont interactions, and the various roles of fishes as herbivores. Studies inter- and intraspecific predator-prey relationships among fish populations in aquatic communities and integrates principles of ecology. Provides access to the collection of the New England Aquarium resulting in an extraordinary opportunity to understand principles of ichthyology through the study of living fish. Hosted each year by a consortium member institution, this Massachusetts Bay Marine Studies Consortium is an intermediate-level survey course.

**MARS 3430 Biology of Whales (4 SH)**
Provides a comprehensive review of the biology and conservation of cetaceans. Emphasizes a grounding in cetacean mammalogy and population biology. Prepares students to understand conservation problems presented as case histories by leading researchers in the field. Hosted each year by a consortium member institution, this Massachusetts Bay Marine Studies Consortium course.

**MARS 4500 Advanced Seminar in Marine Studies (4 SH)**
Focuses on outstanding issues in the marine environment. Using a seminar format, students from colleges and universities throughout the Boston area convene to address the complex interactions of disciplines including scientific, legal, economic, and technical aspects of issues that come into play in marine affairs. Seminars are led by experts actively involved in the issues.

- **Prerequisite:** MARS 3200 and junior or senior standing.
MARKETING (MKTG)

MKTG 2201 Introduction to Marketing (4 SH)
Provides an overview of the role of marketing in business and society. Considers the planning, implementation, and evaluation of marketing efforts in consumer and business-to-business companies, in service and goods companies, and in for-profit and nonprofit organizations. Also examines contemporary issues in marketing that can affect organizational success. A term project is used to enable students to apply their learning about the fundamentals of marketing.
• Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209 (any of which may be taken concurrently); business majors and combined majors only.
• Equivalent: MKTG 2202 and MKTG 2209.

MKTG 2202 Introduction to Marketing in a Global Context (4 SH)
Covers the role of marketing in business and society. Considers the planning, implementation, and evaluation of marketing efforts in consumer and business-to-business companies, in services and goods companies, and in for-profit and nonprofit organizations. Focuses on the cultural, social, and political challenges faced by global firms as they conduct market research and develop and vary marketing strategies to be successful in multiple markets internationally. Also examines contemporary issues in marketing that can affect organizational success. Requires students to apply their learning about the fundamentals of marketing in a term project.
• Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209; international business students only.
• Equivalent: MKTG 2201 and MKTG 2209.

MKTG 2209 Introduction to Marketing (4 SH)
Does not count as credit for business majors. Counts as MKTG 2201 for business minors only.
• Prerequisite: Nonbusiness majors with sophomore standing or above.
• Equivalent: MKTG 2201 and MKTG 2202.

MKTG 2301 Marketing and Society (4 SH)
Examines the role of marketing and business in society’s central contemporary problems as well as the way marketing can take a positive and influential role in the efforts to address these problems. Reviews some of our society’s main problems and a critical view of marketing and business in today’s world. Also examines changing marketing practices and roles for businesses as firms and institutions become more socially responsible and ethically aware. Finally, introduces and analyzes the role of prosocial marketing, how marketing can influence people’s behavior for advancing a socially desirable change. Offers students an opportunity to better understand our society and enhance an ethical mind-set, while highlighting the ways marketers can contribute to societal well-being.
• Prerequisite: Sophomore standing or above.

MKTG 3301 Marketing Management (4 SH)
Focuses on the marketing process through the use of case studies simulating actual business settings and marketing challenges. Develops skill in marketing decision making, critical analysis, and communication. Topics include techniques for undertaking market analysis, marketing strategy (segmentation and positioning), and marketing implementation (4 Ps). A marketing plan project is used to enable students to apply their understanding about the marketing process.
• Prerequisite: (a) MKTG 2201, MKTG 2202, or MKTG 2209 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; business majors and combined majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

MKTG 3401 Marketing Research (4 SH)
Focuses on the marketing research process and the analysis of data using statistical software. Helps students develop an understanding of consumer attitudes and behavior processes as the basis of the design of marketing problems. Topics include problem definition, research design, sampling, attitude measurement, questionnaire design, data collection, and data analysis. Students are expected to work on group projects. The course requires no previous computer experience.
• Prerequisite: (a) MKTG 2201, MKTG 2202, or MKTG 2209 and (b) ECON 2350, IS 3500, MATH 2280, MATH 3081, MGSC 1201, MGSC 2301, or POLS 2400 and (c) 56 SH toward degree; business majors and combined majors only.

MKTG 3501 Marketing Analytics (4 SH)
Studies the importance of using an analytical approach to support marketing decision making in organizations and offers students an opportunity to learn how to implement such an approach in practice. Focuses on data science in marketing: identifying and acquiring the right data for addressing different marketing challenges, building skills necessary for conducting relevant quantitative analyses, and guiding how to use obtained insights to make better marketing decisions. Topics may include product innovation, market identification and segmentation, customer valuation, media attribution models, and assessment of digital and social media. Students are expected to apply statistical concepts and use relevant software packages for analyzing marketing datasets.
• Prerequisite: MKTG 3401 (may be taken concurrently) and sophomore standing or above; business majors and combined majors only.
MKTG 4220 Marketing in Asia (4 SH)
Studies the opportunities and challenges associated with the increasing globalization of Indian and Asian markets. During this Dialogue of Civilizations, students study key environmental forces shaping consumer needs and preferences, the impact of foreign political and economic factors on entering companies, the influence of international competition, market segmentation, and strategy decisions specific to Asian marketing. Analyzes the impact of cultural, social, political, and economic factors on marketing strategies. Offers students an opportunity to learn how to determine when to use different market entry and penetration strategies and how to examine the different skills and systems required to implement marketing strategies in India and broader Asia.
• Repeatability: May be repeated without limit.

MKTG 4310 Retailing (4 SH)
Explores the basic concepts of retailing strategy and positioning, evaluating the retail environment and customer behavior and trends. Retail functions are also examined, focusing on site selection and trading area; merchandise selection and display; layout and design; retail pricing; customer service and image management; retail technology; and operations management. Students do extensive fieldwork applying and exploring the concepts through homework assignments and projects. Industry experts provide exposure to current trends and procedures.
• Prerequisite: MKTG 2201, MKTG 2202, or MKTG 2209; business majors and combined majors only.
• Equivalent: MKTG 3310.

MKTG 4420 Sales Management (4 SH)
Focuses on the entire sales effort. Offers students the opportunity to apply a proven selling process and present compelling solutions to customers. Topics include how to translate product features into buyer benefits, how to handle customer objections, and how to close sales and deals. Covers team selling and relationship marketing. Intended for students interested in a sales career as well as future product managers who must rely on the sales force to introduce new products and promotions.
• Prerequisite: (a) MKTG 2201, MKTG 2202, or MKTG 2209 and (b) junior or senior standing; business majors and combined majors only.
• Equivalent: MKTG 3420.

MKTG 4504 Advertising and Brand Promotion (4 SH)
Focuses on managing and integrating marketing communications in relation to a company’s overall marketing objectives. Includes advertising; creative and media strategy; the communication process; direct and interactive marketing; consumer and trade promotions; public relations; and the social, ethical, and economic considerations underlying marketing communications in the twenty-first century.
• Prerequisite: (a) MKTG 2201, MKTG 2202, or MKTG 2209 and (b) junior or senior standing; business majors and combined majors only.

MKTG 4506 Consumer Behavior (4 SH)
Focuses on demographics, lifestyle, social and cultural trends, and their impact on consumer motivations and behavior. A thorough understanding of the consumer is at the heart of marketing. Topics include the consumer decision-making process, family, learning, personality, and group dynamics, and their impacts on the business world. Ultimately, we are all consumers and we are all part of society, so consumer behavior is critical to all of us.
• Prerequisite: (a) MKTG 2201, MKTG 2202, or MKTG 2209 and (b) junior or senior standing; business majors and combined majors only.

MKTG 4508 Digital Marketing (4 SH)
Examines the impact of technology on the marketing of goods and services. Focuses on the Internet and the World Wide Web. Investigates recent trends in e-business and identifies marketing strategies that work in this new environment. Introduces students to frameworks that help explain current issues in electronic marketing. Although the focus is on Internet marketing strategy, phenomena such as television home shopping and database marketing are also explored. Readings, cases, discussions, lectures, guest speakers, student reports, and exercises on the World Wide Web are all utilized.
• Prerequisite: MKTG 2201, MKTG 2202, or MKTG 2209 and junior or senior standing; business majors and combined majors only.

MKTG 4510 New Product Development (4 SH)
Provides an overview of the new-product-development process, with an emphasis on customer involvement in this process. Detailed insights are provided on such topics as new-product strategy, idea generation, idea selection and evaluation, concept development and testing, product development and testing, and market testing and product launch.
• Prerequisite: MKTG 3401 (may be taken concurrently); business majors and combined majors only.
MKTG 4512 International Marketing (4 SH)
Introduces those aspects of marketing that are unique to international business within the framework of traditional functional areas of marketing. Focuses on the environment and the modifications of marketing concepts and practices necessitated by environmental differences. Topics include cultural dynamics in international markets, political and legal environmental constraints, educational and economic constraints, international marketing research, international marketing institutions, and marketing practices abroad.
- **Prerequisite:** MKTG 2201, MKTG 2202, or MKTG 2209; business majors and combined majors only.

MKTG 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
- **Repeatability:** May be repeated without limit.

MKTG 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
- **Prerequisite:** MKTG 4970.
- **Repeatability:** May be repeated without limit.

MKTG 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

MKTG 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

MKTG 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

MKTG 6200 Creating and Sustaining Customer Markets (3 SH)
Focuses on marketing analysis and planning. Emphasizes analysis of customer needs and company and competitor capabilities. This analysis forms the basis of a sound marketing strategy that provides value to customers in a way superior to competitors. Discusses how to deliver this strategy through the development of an integrated marketing program covering product offerings, pricing, promotion, and distribution.
- **Prerequisite:** Professional accounting and business administration students only.
- **Equivalent:** MKTG 6208.

MKTG 6206 International Marketing (3 SH)
Develops understanding of the opportunities and challenges facing the international marketing executive, the decision-making process in marketing goods abroad, and the environmental forces—economic, cultural, and political—affecting the marketing process in the international marketplace.

MKTG 6208 Marketing and Customer Value (4 SH)
Examines the role of marketing as an organizational function and a set of processes in creating, communicating, and delivering offerings that provide superior value to customers. Gives students an opportunity to develop skills in market analysis, including customer, competitor, and company analysis, as well as decision-making capabilities in both marketing strategy and implementation. Emphasizes methods for the identification, acquisition, and retention of customers in a way that provides mutual value to the customer and the organization in the context of a global business environment.
- **Equivalent:** MKTG 6200.
MKTG 6210 Marketing Research (3 SH)
Provides an overview of the major qualitative and quantitative marketing research methodologies available to marketing managers. Explores customer relationship management (CRM) and multivariate statistical techniques including conjoint analysis, customer satisfaction, and service quality measurement.
• Prerequisite: (a) MKTG 6200 or MKTG 6208 and (b) MGSC 6200 or MGSC 6207.

MKTG 6212 International Marketing (3 SH)
Develops understanding of the opportunities and challenges facing the international marketing executive, the decision-making process in marketing goods abroad, and the environmental forces—affecting the marketing process in the international marketplace.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6214 New Product Development (3 SH)
Focuses on the challenges and decisions new-product managers face as they take ideas through the new-product-development process. Companies need to create, develop, and market new products and services continually to compete effectively in a rapidly changing environment. Provides an overview of the new-product-development process, with an emphasis on customer involvement in this process. Provides detailed insights on such topics as new-product strategy, idea generation, idea selection and evaluation, concept development and testing, product development and testing, and market testing.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6216 Market Focused Strategy (3 SH)
Offers an advanced course in defining and managing an organization’s product-market strategy. Intended for marketing specialists and nonspecialists interested in incorporating a market focus from a general management or consulting perspective. Emphasizes using market information to choose and manage the company’s relationships with customers and competitors in a complex, changing environment, as well as the practical concerns of implementing and evaluating marketing strategy.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6218 Marketing in Service Sector (3 SH)
Provides students with knowledge of management needs and techniques associated with the service sector of the economy. Includes understanding the differences between goods and service marketing, and how these differences influence marketing strategy and the tactical design of marketing mix variables. Assists in understanding the difference between tangible goods and services, differences in the consumer evaluation process between goods and services, special marketing problems created by the differences between goods and services, and strategies that address the unique problems in service marketing.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6222 Digital Marketing (3 SH)
Explores the latest trends in technology and new media, their effect on marketing goods and services, and how to deliver value to the customer using the latest technological innovations. Examines the latest trends in digital marketing, such as mobile marketing, and how the mobile platform can be used for branding purposes and to enhance customer relationships. Explores topics such as branding and advertising via mobile phones, online social networks and communities, technology adoption in global emerging markets, and how the Internet empowers customers and enables firms to engage in customer advocacy. Also examines how marketing research is conducted for technological innovations and ethical concerns that arise with technology usage, such as privacy and security issues, identity theft, and the role of trust in digital marketing.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6223 Brand and Advertising Management (3 SH)
Offers students an opportunity to obtain an in-depth understanding of the brand-building process amid radical changes in today’s marketing communications platforms. Exposes students to concepts, frameworks, and theories critical to developing branding and advertising strategy in the twenty-first century, including brand positioning, target audiences definition, creative advertising, integrated marketing communications, the influence of social media, and assessing marketing and media effectiveness.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6224 B2B and Strategic Sales (3 SH)
Covers business-to-business marketing and the key roles of managing relationships with large buyers, going to market, and the sales organization. Begins with an understanding of why and how firms, institutions, and organizations purchase products and services and the importance of the multifunctional buying center. Covers a proven selling process and presents compelling solutions to customers. Going-to-market topics include managing value-added resellers and distributors. Intended for all interested in marketing: future product managers who must rely on the sales force and distributors to introduce new products and promotions, future sales managers, and marketing executives who must manage the marketing-sales interface.
• Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6225 Sustainability and Innovation in Product Design (3 SH)
Examines various strategies organizations have used for sustainability in innovation. Introduces the concept of designing products for the “triple bottom line”—people, planet, and profit. Uses case study discussions and a product development group exercise to help demonstrate the opportunities and issues arising from sustainability initiatives in corporations.
• Prerequisite: Online MBA students only.
MKTG 6226 Consumer Behavior (3 SH)
Focuses on the consumer as the key element of marketing strategy and application. Explores demographic, lifestyle, social, and cultural trends and their impact on consumer attitudes, motivations, and behavior. Other topics include group dynamics, family, learning, personality, and emotions and their impact on the business world. Offers an in-depth look at the consumer decision process as a model to guide the planning and evaluation of marketing strategies.

- Prerequisite: MKTG 6200 or MKTG 6208.

MKTG 6228 New Media and Digital Marketing Analytics (3 SH)
Examines how marketers are collecting and using big data and marketing analytics tools on new media and devices to create successful digital marketing strategies. Explores how marketers can benefit from consumer-generated content on social media devices, such as location-based marketing via mobile devices, to reach consumers 24/7. Introduces digital marketing analytics tools and techniques commonly used to conduct market research and analysis. Offers students an opportunity to better understand the impact of devices, such as “wearables,” and recent phenomenon, such as the Internet of Things, on marketing strategies. Investigates privacy and ethical concerns that arise from the collection, analysis, and use of consumer data. Incorporates cases, discussions, readings, lectures, real-life examples, and student research projects and reports.

- Prerequisite: Business administration and business analytics students only.

MKTG 6260 Special Topics in Marketing (3 SH)
Offers an in-depth examination of selected issues and problems in marketing that are of current interest to faculty and students. Specific topics alternate depending on faculty availability and interest as well as student enrollment criteria.

- Repeatability: May be repeated without limit.

MKTG 6280 Gaining Customer Insight (3 SH)
Introduces the substantive and procedural aspects of marketing strategy and customer markets. Topics include how to identify target markets, how to leverage data and analyses to enhance the development of a marketing strategy, and how to develop knowledge of various techniques for uncovering customer needs/wants. Studies the importance of customer insights to business success. Offers students an opportunity to develop and implement a concept test.

- Prerequisite: MS-in-innovation students only.

MKTG 6281 Go-to-Market for New Products and Services (3 SH)
Studies the fundamentals for creating go-to-market strategies to support new products and services, including integrative communication systems, multichannel marketing, relationship selling, and pricing tactics for emerging and existing products. Using a series of cases, the course examines product launch, channel management, and marketing of services for different industry sectors. Also covers the role of social networking in marketing.

- Prerequisite: High-technology and business administration students only.

MKTG 6282 Digital Marketing (3 SH)
Explores how technology affects the marketing of goods and services. Emphasizes learning how to deliver value to the customer using technology. Explores marketing strategies in this age of technology and what firms need to do to be effective in the twenty-first century. Students analyze and evaluate issues facing firms that wish to compete amid continuous technological innovation, global competition, and rapidly changing dynamics. Examines factors that impede and accelerate the adoption and diffusion of innovations in the marketplace. Examines how the Internet has affected product, pricing, distribution, and communication strategies for goods and services. Also examines new trends such as mobile marketing. Encourages students to explore ethical concerns such as privacy and security issues and the role of trust in digital marketing.

- Prerequisite: Business administration students only.

MKTG 6283 Marketing and Selling Innovation (3 SH)
Reviews the product portfolio concept, examining the need for balanced portfolios and focusing on issues related to product proliferation and simplification. Discusses market-based pricing strategies, sales efforts, distribution, and communication in the context of enhancing the firm’s product position in the marketplace. Focuses on developing and executing sales. Explores business-to-business and business-to-customer strategies.

- Prerequisite: MS-in-innovation students only.

MKTG 6290 Creating and Sustaining Markets (3 SH)
Covers conceptual schemes and models for analyzing marketing problems and opportunities. Offers students an opportunity to develop skills used in addressing the important issues involved in the creation, promotion, distribution, and sale of goods and services. Introduces customer analysis, competitor analysis, and the broad environmental trends affecting the success of marketing programs. Uses real-case analyses to illustrate the importance of profitable positioning and strategic fit. Examines the relationship between marketing activities and the other functional areas of the firm.

- Prerequisite: Executive MBA students only.
MKTG 6291 E-Business/Electronic Marketing (2 SH)
Explores current issues in electronic marketing/e-business. Examines the Internet as a technology that has profoundly affected marketing in recent years. Topics include the rise and fall of dot-coms and continuing Internet activities beyond the bursting of the dot-com bubble. Also presents theoretical frameworks for the understanding of the adoption and diffusion of innovation.

MKTG 6292 Best Practices for New Product and Services Development (2 SH)
Offers an overview of the best-practice model of the new product/service development (NPD) process. Introduces success/failure factors, new product strategy, portfolio management and project selection, idea generation, and concept development and testing. Offers students an opportunity to learn the major challenges facing new product managers in planning and developing new products, particularly in the Fuzzy Front End of the NPD process; the role of the customer and of marketing research in the Fuzzy Front End; and critical best practices that can lead to successful new products/services.
• Prerequisite: Executive MBA students only.

MKTG 6293 Leveraging Traditional and Digital Platforms for New Marketing Strategy (2 SH)
Emphasizes the elements of the marketing mix in creating and sustaining value for the firm and its customers. Given the changes to technology and marketing strategy over the past decade, this course focuses especially on how to learn and apply this new complexity in the design and implementation of marketing programs to address them. Offers students an opportunity to develop qualitative and quantitative analytical skills to measure return on marketing investment and to understand the importance of traditional and digital marketing mix elements and their alignment with overall business strategy.
• Prerequisite: Executive MBA students only.

MKTG 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

MKTG 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

MKTG 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.

MATERIALS ENGINEERING (MATL)

MATL 5375 Corrosion of Materials (4 SH)
Studies the thermodynamics and rate of corrosion both in aqueous and nonaqueous environments. Topics include different forms of corrosion, mixed potential theory, corrosion testing, corrosion prevention, environmental effects, dependence on materials structure, and high-temperature metal-gas reactions. Emphasis is on metals, alloys, and engineering plastics.
• Prerequisite: ME 2340 with a grade of B or graduate standing.

MATL 5380 Particulate Materials Processing (4 SH)
Covers the processing of metallic and ceramic materials from particulate form. Includes particulate fabrication, characterization, handling, and consolidation for alloys, ceramics, and composites. Other topics include the principles of sintering in the absence and presence of liquid, advanced materials processing by rapid-solidification powder metallurgy, and the processing and structures of advanced ceramics.
• Prerequisite: ME 2340 with a grade of B or graduate standing.

MATL 6250 Soft Matter (4 SH)
Introduces the relatively young field of soft matter, which encompasses the physical description of various states of soft materials including liquids, colloids, polymers, foams, gels, granular materials, and a number of biological materials. Soft matter (also known as “soft condensed matter” or “complex fluids”) is less ordered than metals and oxides (hard condensed matter) and is more subject to thermal fluctuations and applied forces. Focuses on critical thinking, problem diagnosis, estimation, statistical analysis, and data-based decision making. Includes many in-class demonstrations from colloidal assembly to emulsion stability to cellular apoptosis. Highlights applications such as industrial processing, life sciences, and environmental remediation.
• Prerequisite: Graduate study in related field or permission of instructor.

MATL 6285 Structure, Properties, and Processing of Polymeric Materials (4 SH)
Provides an introduction to the organic chemistry of polymers, the effects of chemical composition on structure, melting point, and degradation, and the thermodynamics of polymers. Other topics include the mechanical properties of polymers, analysis and testing, the effects of processing on structures and properties, and the processing of industrial polymers, with applications.
• Prerequisite: Engineering students only.
• Equivalent: MATL 7385.
MATL 6300 Computational Material Science (4 SH)
Covers the principles and practice of modern computer simulation techniques used to understand solids, liquids, and gases. Reviews the statistical foundation of thermodynamics followed by in-depth discussion of Monte Carlo and molecular dynamics techniques, as well as their links to mesoscale and continuum computational techniques. Discusses intermolecular potentials; extended ensembles; and mathematical algorithms used in molecular simulations, parallel algorithms, and visualization.
> Prerequisite: ME 6200 and knowledge of materials science; restricted to students in the College of Engineering, the College of Computer and Information Science, and the College of Science.

MATL 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
> Prerequisite: ENCP 6000.
> Repeatability: May be repeated without limit.

MATL 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
> Repeatability: May be repeated without limit.

MATL 7345 Macroscopic Transport in Materials Processing (4 SH)
Discusses principles of mathematical and physical modeling of the processing of primary and electronic materials. Practical examples include continuous casting, rheocasting, metal-matrix composites, thermal spraying, magnetohydrodynamics, microgravity processing, growth of semiconductor crystals, and chemical vapor deposition. Explores transport equations as tools of mathematical models and similarity criteria as tools of physical models. Topics include Newtonian and non-Newtonian fluid mechanics, multiphase flow, dimensionless numbers, conductive and convective heat transfer, thermal radiation, diffusion and mass transfer with chemical reaction, order-of-magnitude analysis, and intelligent processing techniques.
> Prerequisite: Knowledge of heat transfer.

MATL 7350 Mechanical Behavior and Strengthening Mechanisms (4 SH)
Covers dislocation theory and includes such topics as crystalline defects, elastic properties of dislocation, movement of dislocations, multiplication, intersection, annihilation, dislocations in crystalline materials, and dislocation arrays and crystal boundaries. Examines application of dislocation theory to microplasticity, dynamic recovery and recrystallization, strengthening mechanisms, and high-temperature deformation.
> Prerequisite: Knowledge of materials science course; engineering students only.

MATL 7355 Thermodynamics of Materials (4 SH)
Covers fundamentals of materials thermodynamics that encompass the first, second, and third laws, entropy, enthalpy, and free energy. Emphasis is on phase stability and equilibria, phase diagram computation with applications to phases in metals, alloys, and ionic compounds.
> Prerequisite: Knowledge of thermodynamics course and materials science course; engineering students only.

MATL 7360 Kinetics of Phase Transformations (4 SH)
Focuses on the different types of phase transformations that occur in materials in relation to theory and practice. Topics include the diffusion equations, mechanisms of diffusion in crystalline solids, random walk theory, ionic conduction, high-diffusivity paths, diffusional and nondiffusional phase transformations, and microstructural evolution in material processing.
> Prerequisite: MATL 7355; engineering students only.

MATL 7365 Properties and Processing of Electronic Materials (4 SH)
Focuses on electronic principles and the processing techniques underlying the processing/structure/property relationships of materials. Covers metals and alloys, semiconductors, and insulators. Topics include electronic structures, band theory; thermal, electrical, and magnetic properties; and processing methods including film deposition.
> Prerequisite: Engineering students only.

MATL 7374 Special Topics in Materials Engineering (4 SH)
Offers topics of interest to the staff member conducting this class for advanced study.
> Repeatability: May be repeated without limit.

MATL 7390 Advanced Materials Processing (4 SH)
Introduces students to such new topics in materials processing as advanced joining, advanced coatings, nanocrystalline materials, biomaterials, materials in information technology, rapid prototyping, and nano/microfabrication.
> Prerequisite: Engineering students only.

MATL 7395 Fundamentals of Solidification (4 SH)
Discusses fundamental aspects of the solidification of metals and alloys in both conventional and advanced solidification processing. Topics covered include the nucleation and growth of solids, the morphological stability of the solid/liquid interface, capillarity effects, cellular and dendritic solidification, effects of diffusion and convection, eutectic solidification, and the solidification of undercooled melts.
> Prerequisite: MATL 7560; engineering students only.

MATL 7945 Master's Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.
> Prerequisite: Engineering students only.
MATL 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

MATL 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

MATL 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

MATL 7996 Thesis Continuation (0 SH)
Offers continuing master’s thesis supervision under individual faculty supervision.
• Prerequisite: Engineering students only.

MATHEMATICS (MATH)

MATH 0100 Algebra Review (4 SH)
Designed for arts and sciences, criminal justice, and other majors who need to build their algebraic skills in order to succeed in the next math or math-related courses required by their major. Most students are directed to this course as a result of placement tests. Concepts include solving first- and second-degree equations, understanding slopes and graphs of lines, solving simultaneous equations in several variables, solving rational equations, and graphing inequalities. Requires the analysis and solution of word problems. (Does not count toward graduation credit.)

MATH 1000 Mathematics at Northeastern (1 SH)
Designed for freshman math majors to introduce them to one another, their major, their college, and the University. Students are introduced to our advising system, register for next semester’s courses, and learn more about co-op. Also helps students develop the academic and interpersonal skills necessary to succeed as a university student.
• Prerequisite: Mathematics majors only.
• Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, PHYS 1000, and PSYC 1000.

MATH 1110 College Algebra (4 SH)
Covers laws of exponents, roots, graphing of equations and inequalities, special curves (that is, conic sections), functions and operations on functions, complex numbers, matrices, and vectors. If time permits, also explores elementary discrete probability and least squares curve fitting.
• Prerequisite: Not open to students in the College of Computer and Information Science.

MATH 1120 Precalculus (4 SH)
Focuses on linear, polynomial, exponential, logarithmic, and trigonometric functions. Emphasis is placed on understanding, manipulating, and graphing these basic functions, their inverses and compositions, and using them to model real-world situations (that is, exponential growth and decay, periodic phenomena). Equations involving these functions are solved using appropriate techniques. Special consideration is given to choosing reasonable functions to fit numerical data.
• Prerequisite: Not open to students in the College of Computer and Information Science.
• Equivalent: MATM 1120.

MATH 1130 College Math for Business and Economics (4 SH)
Introduces students to some of the important mathematical concepts and tools (such as modeling revenue, cost and profit with functions) used to solve problems in business and economics. Assumes familiarity with the basic properties of linear, polynomial, exponential, and logarithmic functions. Topics include the method of least squares, regression curves, solving equations involving functions, compound interest, amortization, and other consumer finance models. (Graphing calculator required, see instructor for make and model.)
• Prerequisite: Not open to students in the College of Computer and Information Science.

MATH 1180 Statistical Thinking (4 SH)
Introduces statistical thinking to students without using any sophisticated mathematics. Uses extensive class discussion and homework problems to cover statistical reasoning and to evaluate critically the usage of statistics by others. Readings from a wide variety of sources are assigned. Topics include descriptive statistics, sampling theory, and fundamentals of statistical inference (confidence intervals and hypothesis testing).
• Prerequisite: Not open to students in the College of Computer and Information Science.
MATH 1213 Interactive Mathematics (4 SH)
Develops problem-solving skills while simultaneously teaching mathematics concepts. Each unit centers on a particular applied problem, which serves to introduce the relevant mathematical topics. These may include but are not limited to polling theory, rate of change, the concepts behind derivatives, probability, binomial distributions, and statistics. The course is not taught in the traditional lecture format and is particularly suited to students who work well in collaborative groups and who enjoy writing about the concepts they are learning. Assessment is based on portfolios, written projects, solutions to “problems of the week,” and exams.
• Prerequisite: Not open to students in the College of Computer and Information Science.
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: MATH 1215.

MATH 1215 Mathematical Thinking (4 SH)
Focuses on the development of mathematical thinking and its use in a variety of contexts to translate real-world problems into mathematical form and, through analysis, to obtain new information and reach conclusions about the original problems. Mathematical topics include symbolic logic, truth tables, valid arguments, counting principles, and topics in probability theory such as Bayes’ theorem, the binomial distribution, and expected value.
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: MATH 1213.

MATH 1216 Recitation for MATH 1215 (0 SH)
Provides small-group discussion format to cover material in MATH 1215.

MATH 1220 Mathematics of Art (4 SH)
Presents mathematical connections and foundations for art. Topics vary and may include aspects of linear perspective and vanishing points, symmetry and patterns, tilings and polygons, Platonic solids and polyhedra, golden ratio, non-Euclidean geometry, hyperbolic geometry, fractals, and other topics. Includes connections and examples in different cultures.
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Exploring creative expression and innovation, conducting formal and quantitative reasoning.

MATH 1225 Game Theory (4 SH)
Uses the unifying theme of game theory to explore mathematical techniques for gaining an understanding of real-world problems. Includes matrix algebra, linear programming, probability, trees, von Neumann’s minimax theorem, and Nash’s theorem on equilibrium points. Considers zero-sum and non-zero-sum games, multiplayer games, and the prisoner’s dilemma. Explores the applications of game theory, including conflict analysis, and various issues in psychology, sociology, political science, economics, and business.
• Prerequisite: Mathematics SAT of at least 600 or permission of instructor.
• NU Core: Mathematical/analytical thinking level 1.

MATH 1231 Calculus for Business and Economics (4 SH)
Provides an overview of differential calculus including derivatives of power, exponential, logarithmic, logistic functions, and functions built from these. Derivatives are used to model rates of change, to estimate change, to optimize functions, and in marginal analysis. The integral calculus is applied to accumulation functions and future value. Emphasis is on realistic business and economics problems, the development of mathematical models from raw business data, and the translation of mathematical results into verbal expression appropriate for the business setting. Also features a semester-long marketing project in which students gather raw data, model it, and use calculus to make business decisions; each student is responsible for a ten-minute presentation. (Graphing calculator required, see instructor for make and model.)
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Conducting formal and quantitative reasoning.
• Equivalent: MATM 1231.

MATH 1241 Calculus 1 (4 SH)
Serves as both the first half of a two-semester calculus sequence and as a self-contained one-semester course in differential and integral calculus. Introduces basic concepts and techniques of differentiation and integration and applies them to polynomial, exponential, log, and trigonometric functions. Emphasizes the derivative as rate of change and integral as accumulator. Applications include optimization, growth and decay, area, volume, and motion.
• Prerequisite: Not open to students in the College of Computer and Information Science.
• NU Core: Mathematical/analytical thinking level 1.
• NUpath: Conducting formal and quantitative reasoning.
• Equivalent: MATM 1241.
MATH 1242 Calculus 2 (4 SH)
Continues MATH 1241. Introduces additional techniques of integration and numerical approximations of integrals and the use of integral tables; further applications of integrals. Also introduces differential equations and slope fields, and elementary solutions. Introduces functions of several variables, partial derivatives, and multiple integrals.
- Prerequisite: MATH 1231, MATH 1241, or MATH 1341; not open to students in the College of Computer and Information Science.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.
- Equivalent: MATH 1242.

MATH 1251 Calculus and Differential Equations for Biology 1 (4 SH)
 Begins with the fundamentals of differential calculus and proceeds to the specific type of differential equation problems encountered in biological research. Presents methods for the solutions of these equations and how the exact solutions are obtained from actual laboratory data. Topics include differential calculus: basics, the derivative, the rules of differentiation, curve plotting, exponentials and logarithms, and trigonometric functions; using technology to understand derivatives; biological kinetics: zero- and first-order processes, processes tending toward equilibrium, bi- and tri-exponential processes, and biological half-life; differential equations: particular and general solutions to homogeneous and nonhomogeneous linear equations with constant coefficients, systems of two linear differential equations; compartmental problems: nonzero initial concentration, two-compartment series dilution, diffusion between compartments, population dynamics; and introduction to integration.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.

MATH 1252 Calculus and Differential Equations for Biology 2 (4 SH)
Continues MATH 1251. Begins with the integral calculus and proceeds quickly to more advanced topics in differential equations. Introduces linear algebra and uses matrix methods to analyze functions of several variables and to solve larger systems of differential equations. Advanced topics in reaction kinetics are covered. The integral and differential calculus of functions of several variables is followed by the study of numerical methods in integration and solutions of differential equations. Provides a short introduction to probability. Covers Taylor polynomials and infinite series. Special topics include reaction kinetics: Michaelis-Menten processes, tracer experiments, and inflow and outflow through membranes.
- Prerequisite: MATH 1251.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.

MATH 1260 Math Fundamentals for Games (4 SH)
Discusses linear algebra and vector geometry in two-, three-, and four-dimensional space. Examines length, dot product, and trigonometry. Introduces linear and affine transformations. Discusses complex numbers in two-space, cross product in three-space, and quaternions in four-space. Provides explicit formulas for rotations in three-space. Examines functions of one argument and treats exponentials and logarithms. Describes parametric curves in space. Discusses binomials, discrete probability, Bézier curves, and random numbers. Concludes with the concept of the derivative, the rules for computing derivatives, and the notion of a differential equation.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.

MATH 1340 Intensive Calculus for Engineers (6 SH)
Contains the material from the first semester of MATH 1341, preceded by material emphasizing the strengthening of precalculus skills. Topics include properties of exponential, logarithmic, and trigonometric functions; differential calculus; and introductory integral calculus.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.
- Equivalent: MATH 1341 and MATM 1341.

MATH 1341 Calculus 1 for Science and Engineering (4 SH)
Covers definition, calculation, and major uses of the derivative, as well as an introduction to integration. Topics include limits; the derivative as a limit; rules for differentiation; and formulas for the derivatives of algebraic, trigonometric, and exponential/logarithmic functions. Also discusses applications of derivatives to motion, density, optimization, linear approximations, and related rates. Topics on integration include the definition of the integral as a limit of sums, antiderivatives, the fundamental theorem of calculus, and integration by substitution.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.
- Equivalent: MATH 1340 and MATM 1341.

MATH 1342 Calculus 2 for Science and Engineering (4 SH)
Covers further techniques and applications of integration, infinite series, and introduction to vectors. Topics include integration by parts; numerical integration; improper integrals; separable differential equations; and areas, volumes, and work as integrals. Also discusses convergence of sequences and series of numbers, power series representations and approximations, 3D coordinates, parameterizations, vectors and dot products, tangent and normal vectors, velocity, and acceleration in space.
- Prerequisite: MATH 1341 or permission of head mathematics advisor.
- NU Core: Mathematical/analytical thinking level 1.
- NUpath: Conducting formal and quantitative reasoning.
- Equivalent: MATM 1342.
MATH 1343 Calculus 2 for Engineering Technology (4 SH)
Builds upon the differential and integral calculus topics in MATH 1341 to develop additional tools such as partial derivatives and multiple integrals needed by students of engineering technology. This course is not equivalent to MATH 1342.
• Prerequisite: MATH 1341.
• NU Core: Mathematical/analytical thinking level 1.

MATH 1352 Recitation for MATH 1342 (0 SH)
Provides small-group discussion format to cover material in MATH 1342.

MATH 1365 Introduction to Mathematical Reasoning (4 SH)
Covers the basics of mathematical reasoning and problem solving to prepare incoming math majors for more challenging mathematical courses at Northeastern. Focuses on learning to write logically sound mathematical arguments and to analyze such arguments appearing in mathematical books and courses. Includes fundamental mathematical concepts such as sets, relations, and functions.

MATH 2201 History of Mathematics (4 SH)
Traces the development of mathematics from its earliest beginning to the present. Emphasis is on the contributions of various cultures including the Babylonians, Egyptians, Mayans, Greeks, Indians, and Arabs. Computations and constructions are worked out using the techniques and notations of these peoples. The role of mathematics in the development of science is traced throughout, including the contributions of Descartes, Kepler, Fermat, and Newton. More modern developments are discussed as time permits.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, conducting formal and quantitative reasoning.

MATH 2210 Foundations of Mathematics (4 SH)
Investigates the modern revolutions in mathematics initiated by Cantor, Gödel, Turing, and Robinson in the fields of set theory, provability, computability, and analysis respectively, as well as provides background on the controversy over the philosophy and underlying logic of mathematics.

MATH 2230 Mathematical Encounters (4 SH)
Covers interesting and significant developments in pure and applied mathematics, from ancient times to the present. Fundamental mathematical ideas have a power and utility that are undeniable and a beauty and clarity that can be inspirational. Selected topics may include: prime and irrational numbers, different infinities and different geometries, map coloring, and famous unsolved and recently solved problems. Provides students with an opportunity for hands-on experience actually doing some of the mathematics discussed and to research topics in the library and on the Web.
• Prerequisite: MATH 1120, MATH 1215, MATH 1231, MATH 1241, or MATH 1341; not open to students in the College of Computer and Information Science.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning.

MATH 2250 Programming Skills for Mathematics (2 SH)
Introduces basic programming skills for applied mathematics. Also serves as preparation for co-op assignments. Topics include Excel macros, MATLAB programming, and the R statistical package. Every mathematics major or student in a mathematics combined major is required to take this course or an equivalent course in another department.
• Prerequisite: Not open to students in the College of Computer and Information Science.

MATH 2280 Statistics and Software (4 SH)
Provides an introduction to basic statistical techniques and the reasoning behind each statistical procedures. Covers appropriate statistical data analysis methods for applications in health and social sciences. Also examines a statistical package such as SPSS or SAS to implement the data analysis on computer. Topics include descriptive statistics, elementary probability theory, parameter estimation, confidence intervals, hypothesis testing, nonparametric inference, and analysis of variance and regression with a minimum of mathematical derivations.
• Prerequisite: Nonmathematics majors only; not open to students in the College of Computer and Information Science.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.
• Equivalent: MATH 2285.
MATH 2285 Introduction to Multisample Statistics (4 SH)
Provides an introduction to statistical techniques, including multisample statistics and regression. Offers an opportunity to learn to choose appropriate statistical data analysis methods for applications in various scientific fields and to learn to use a statistical package to implement the data analysis. Topics include descriptive statistics, elementary probability theory, parameter estimation, confidence intervals, hypothesis testing, analysis of variance, and regression. May also include optimal design.
• Prerequisite: MATH 1120, MATH 1215, MATH 1231, MATH 1241, or MATH 1341; not open to students who have completed MATH 2280; not open to students in the College of Computer and Information Science.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.
• Equivalent: MATH 2280.

MATH 2310 Discrete Mathematics (4 SH)
Provides the discrete portion of the mathematical background needed by students in electrical and computer engineering. Topics include Boolean algebra and set theory, logic, and logic gates; growth of functions, and algorithms and their complexity; proofs and mathematical induction; and graphs, trees, and their algorithms. As time permits, additional topics may include methods of enumeration and finite-state machines.
• NU Core: Mathematical/analytical thinking level 1.

MATH 2321 Calculus 3 for Science and Engineering (4 SH)
Extends the techniques of calculus to functions of several variables; introduces vector fields and vector calculus in two and three dimensions. Topics include lines and planes, 3D graphing, partial derivatives, the gradient, tangent planes and local linearization, optimization, multiple integrals, line and surface integrals, the divergence theorem, and theorems of Green and Stokes with applications to science and engineering and several computer lab projects.
• Prerequisite: MATH 1342 or MATH 1252.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning.

MATH 2322 Recitation for MATH 2321 (0 SH)
Provides small-group discussion format to cover material in MATH 2321.

MATH 2323 Calculus 3 for Business, Economics, and Mathematics (4 SH)
Covers multivariable calculus with applications from economics and business. Designed for combined majors in business and mathematics and in economics and mathematics, but open to all who have taken first-year calculus. Topics include Gaussian elimination, matrix algebra, determinants, linear independence, calculus of several variables, chain rule, implicit differentiation, optimization, Lagrange multipliers, and integration of functions of several variables with applications to probability.
• Prerequisite: MATH 1342.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Conducting formal and quantitative reasoning.

MATH 2331 Linear Algebra (4 SH)
Uses the Gauss-Jordan elimination algorithm to analyze and find bases for subspaces such as the image and kernel of a linear transformation. Covers the geometry of linear transformations: orthogonality, the Gram-Schmidt process, rotation matrices, and least squares fit. Examines diagonalization and similarity, and the spectral theorem and the singular value decomposition. Is primarily for math and science majors; applications are drawn from many technical fields. Computation is aided by the use of software such as Maple or MATLAB, and graphing calculators.
• Prerequisite: MATH 1242, MATH 1252, MATH 1342, or CS 2800.
• NU Core: Mathematical/analytical thinking level 2.

MATH 2341 Differential Equations and Linear Algebra for Engineering (4 SH)
Studies ordinary differential equations, their applications, and techniques for solving them including numerical methods (through computer labs using MS Excel and MATLAB), Laplace transforms, and linear algebra. Topics include linear and nonlinear first- and second-order equations and applications include electrical and mechanical systems, forced oscillation, and resonance. Topics from linear algebra, such as matrices, row-reduction, vector spaces, and eigenvalues/eigenvectors, are developed and applied to systems of differential equations.
• Prerequisite: MATH 1342.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: MATH 2351.

MATH 2342 Recitation for MATH 2341 (0 SH)
Provides small-group discussion format to cover material in MATH 2341.
MATH 3000 Co-op and Experiential Learning Reflection Seminar 1 (1 SH)
Intended for math majors who have completed their first co-op assignment or other integrated experiential learning component of the NU Core. The goal is to examine the mathematical problems encountered in these experiences and relate them to courses already taken and to the student’s future program. Faculty members and other guests contribute to the discussion. Grades are determined by the student’s participation in the course and the completion of a final paper.
• Prerequisite: Mathematics majors and computer science/mathematics combined majors only.

MATH 3081 Probability and Statistics (4 SH)
Focuses on probability theory. Topics include sample space; conditional probability and independence; discrete and continuous probability distributions for one and for several random variables; expectation; variance; special distributions including binomial, Poisson, and normal distributions; law of large numbers; and central limit theorem. Also introduces basic statistical theory including estimation of parameters, confidence intervals, and hypothesis testing.
• Prerequisite: MATH 1242, MATH 1252, or MATH 1342.
• NUpath: Analyzing and using data.

MATH 3090 Exploration of Modern Mathematics (4 SH)
Offers students a research-minded, elementary, and intuitive introduction to the interplay between algebra, geometry, analysis, and topology using an interactive and experimental approach.
• Prerequisite: MATH 1242, MATH 1252, or MATH 1342; intended for math majors, math combined majors, and students pursuing a math minor; all others should obtain permission of instructor.
• NU Core: Mathematical/analytical thinking level 2.

MATH 3150 Real Analysis (4 SH)
Provides the theoretical underpinnings of calculus and the advanced study of functions. Emphasis is on precise definitions and rigorous proof. Topics include the real numbers and completeness, continuity and differentiability, the Riemann integral, the fundamental theorem of calculus, inverse function and implicit function theorems, and limits and convergence. Required of all mathematics majors.
• Prerequisite: (a) MATH 2321 and (b) MATH 2331 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

MATH 3175 Group Theory (4 SH)
Presents basic concepts and techniques of the group theory: symmetry groups, axiomatic definition of groups, important classes of groups (abelian groups, cyclic groups, additive and multiplicative groups of residues, and permutation groups), Cayley table, subgroups, group homomorphism, cosets, the Lagrange theorem, normal subgroups, quotient groups, and direct products. Studies structural properties of groups. Possible applications include geometry, number theory, crystallography, physics, and combinatorics.
• Prerequisite: MATH 2321 and MATH 2331.

MATH 3311 Elementary Differential Geometry (4 SH)
Studies differential geometry, focusing on curves and surfaces in 3D space. The material presented here can serve as preparation for a more advanced course in Riemannian geometry or differential topology.
• Prerequisite: MATH 2321 and MATH 2331.

MATH 3341 Dynamical Systems (4 SH)
Studies dynamical systems and their applications as they arise from differential equations. Solutions are obtained and analyzed as parameterized curves in the plane and used as a means of understanding the evolution of physical processes. Applications include conservative systems, predator-prey interactions, and cooperation and competition of species.
• Prerequisite: MATH 2341.

MATH 3527 Number Theory (4 SH)
Introduces number theory. Topics include linear diophantine equations, congruences, design of magic squares, Fermat’s little theorem, Euler’s formula, Euler’s phi function, computing powers and roots in modular arithmetic, the RSA encryption system, primitive roots and indices, and the law of quadratic reciprocity. As time permits, may cover diophantine approximation and Pell’s equation, elliptic curves, points on elliptic curves, and Fermat’s last theorem.
• Prerequisite: MATH 1242, MATH 1252, or MATH 1342.
• NU Core: Mathematical/analytical thinking level 2.

MATH 3530 Numerical Analysis (4 SH)
Considers various problems including roots of nonlinear equations; simultaneous linear equations: direct and iterative methods of solution; eigenvalue problems; interpolation; and curve fitting. Emphasizes understanding issues rather than proving theorems or coming up with numerical recipes.
• Prerequisite: MATH 2331 or MATH 2341.
MATH 3532 Numerical Solutions of Differential Equations (4 SH)
Covers numerical problems in interpolation, differentiation, integration, Fourier transforms, and the solving of differential equations. Emphasizes practical methods and techniques. The heart of the course is a study of modern methods for finding numerical solutions of ordinary differential equations, both initial value problems and boundary value problems. Homework and projects are based on MATLAB.
• Prerequisite: (a) MATH 2331 and (b) MATH 2341 or MATH 2351.

MATH 3533 Combinatorial Mathematics (4 SH)
Introduces techniques of mathematical proofs including mathematical induction. Explores various techniques for counting such as permutation and combinations, inclusion-exclusion principle, recurrence relations, generating functions, Polya enumeration, and the mathematical formulations necessary for these techniques including elementary group theory and equivalence relations.
• Prerequisite: MATH 1242, MATH 1252, or MATH 1342.
• NU Core: Mathematical/analytical thinking level 2.

MATH 3541 Chaotic Dynamical Systems (4 SH)
Presents an experimental study using simple mathematical models of chaotic behavior in dynamical systems. (Such systems are frequently found in science and industry.) Goals include the development of skills of experiment and inquiry, integration of visual and analytical modes of thought, and appreciation of issues of problem formulation and representation.
• Prerequisite: MATH 1342 and two semesters of calculus.
• NU Core: Mathematical/analytical thinking level 2.

MATH 3560 Geometry (4 SH)
Studies classical geometry and symmetry groups of geometric figures, with an emphasis on Euclidean geometry. Teaches how to formulate mathematical propositions precisely and how to construct and understand mathematical proofs. Provides a line between classical and modern geometry with the aim of preparing students for further study in group theory and differential geometry.
• Prerequisite: MATH 2331 or MATH 2341.

MATH 4020 Research Capstone (4 SH)
Offers students the experience of engaging in mathematical research that builds upon the math courses that they have taken and, possibly, their co-op assignments. Requires students to complete a research project of their own choosing. Focus is on the project and on the students presenting their work. Also requires students to write a reflection paper. Intended for juniors or seniors with experience or interest in mathematics research.
• Prerequisite: (a) MATH 3150 or permission of instructor and (b) MATH 3175 or permission of instructor and (c) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

MATH 4025 Applied Mathematics Capstone (4 SH)
Emphasizes the use of a variety of methods—such as optimization, differential equations, probability, and statistics—to study problems that arise in epidemiology, finance, and other real-world settings. Course work includes assigned exercises, a long-term modeling project on a topic of the student’s choosing, and a reflection paper.
• Prerequisite: MATH 3081 and junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

MATH 4525 Applied Analysis (4 SH)
Demonstrates the applications of mathematics to interesting physical and biological problems. Methods are chosen from ordinary and partial differential equations, calculus of variations, Laplace transform, perturbation theory, special functions, dimensional analysis, asymptotic analysis, and other techniques of applied mathematics.
• Prerequisite: (a) MATH 2321 and (b) MATH 2331 and (c) MATH 2341 or MATH 2351.

MATH 4535 Mathematical Topics in Computer Vision (4 SH)
Studies topics in computer vision and the mathematical approaches to them. These include but are not limited to detection of object boundaries in images, nonlinear diffusion, optimization, and curve evolution. Students are required to be able to program algorithms that the course develops.
• Prerequisite: MATH 2321 and programming experience with MATLAB or an equivalent computer algebra system; familiarity with matrices and their properties is helpful.

MATH 4541 Advanced Calculus (4 SH)
Offers a deeper and more generalized look at the ideas and objects of study of calculus. Topics include the generalized calculus of n-space, the inverse and implicit function theorems, differential forms and general Stokes-type theorems, geometry of curves and surfaces, and special functions.
• Prerequisite: MATH 2321, MATH 2331, and MATH 3150.
MATH 4545 Fourier Series and PDEs (4 SH)
Provides a first course in Fourier series, Sturm-Liouville boundary value problems, and their application to solving the fundamental partial differential equations of mathematical physics: the heat equation, the wave equation, and Laplace’s equation. Green’s functions are also introduced as a means of obtaining closed-form solutions.
• Prerequisite: MATH 2351 or MATH 2341.

MATH 4555 Complex Variables (4 SH)
Provides an introduction to the analysis of functions of a complex variable. Starting with the algebra and geometry of complex numbers, basic derivative and contour integral properties are developed for elementary algebraic and transcendental functions as well as for other analytic functions and functions with isolated singularities. Power and Laurent series representations are given. Classical integral theorems, residue theory, and conformal mapping properties are studied. Applications of harmonic functions are presented as time permits.
• Prerequisite: MATH 2321.

MATH 4565 Topology (4 SH)
Introduces the student to fundamental notions of topology. Introduces basic set theory, then covers the foundations of general topology (axioms for a topological space, continuous functions, homeomorphisms, metric spaces, the subspace, product and quotient topologies, connectedness, compactness, and the Hausdorff condition). Also introduces algebraic and geometric topology (homotopy, covering spaces, fundamental groups, graphs, surfaces, and manifolds) and applications. Other topics are covered if time permits.
• Prerequisite: MATH 3150.

MATH 4571 Advanced Linear Algebra (4 SH)
Provides a more detailed study of linear transformations and matrices: LU factorization, QR factorization, Spectral theorem and singular value decomposition, Jordan form, positive definite matrices, quadratic forms, partitioned matrices, and norms and numerical issues. Topics and emphasis change from year to year.
• Prerequisite: MATH 2331.

MATH 4575 Introduction to Cryptography (4 SH)
Presents the mathematical foundations of cryptography, beginning with the study of divisibility of integers, the Euclidian Algorithm, and an analysis of the Extended Euclidian Algorithm. Includes a short study of groups, semigroups, residue class rings, fields, Fermat’s Little Theorem, Chinese Remainder Theorem, polynomials over fields, and the multiplicative group of residues modulo a prime number. Introduces fundamental notions used to describe encryption schemes together with examples, which include affine linear ciphers and cryptanalysis and continues with probability and perfect secrecy. Presents the Data Encryption Standard (DES) and culminates in the study of the Advanced Encryption Standard (AES), the standard encryption scheme in the United States since 2001.

MATH 4576 Rings and Fields (4 SH)
Introduces commutative rings, ideals, integral domains, fields, and the theory of extension fields. Topics include Gaussian integers, Galois groups, and the fundamental theorem of Galois theory. Applications include the impossibility of angle-trisection and the general insolvability of fifth- and higher-degree polynomials. Other topics are covered as time permits.
• Prerequisite: MATH 3175.

MATH 4581 Statistics and Stochastic Processes (4 SH)
Continues topics introduced in MATH 3081. The first part of the course covers classical procedures of statistics including the t-test, linear regression, and the chi-square test. The second part provides an introduction to stochastic processes with emphasis on Markov chains, random walks, and Brownian motion, with applications to modeling and finance.
• Prerequisite: MATH 3081.

MATH 4606 Mathematical and Computational Methods for Physics (4 SH)
Covers advanced mathematical methods topics that are commonly used in the physical sciences, such as complex calculus, Fourier transforms, special functions, and the principles of variational calculus. Applies these methods to computational simulation and modeling exercises. Introduces basic computational techniques and numerical analysis, such as Newton’s method, Monte Carlo integration, gradient descent, and least squares regression. Uses a simple programming language, such as MATLAB, for the exercises.
• Prerequisite: (a) PHYS 2303 and (b) MATH 2321 and (c) MATH 2341 or MATH 2351.
• Equivalent: PHYS 4606.
MATH 4681 Probability and Risks (4 SH)
Reviews main probability and statistics concepts from the point of view of decision risks in actuarial and biomedical contexts, including applications of normal approximation for evaluating statistical risks. Also examines new topics, such as distribution of extreme values and nonparametric statistics with examples. May be especially useful for students preparing for the first actuarial exam on probability and statistics.
• Prerequisite: MATH 3081.

MATH 4682 Theory of Interest and Basics of Life Insurance (4 SH)
Reviews basic financial instruments in the presence of interest rates, including the measurement of interest and problems in interest (equations of value, basic and more general annuities, yield rates, amortization schedules, bonds and other securities). Examines numerous practical applications. Also introduces problems of life insurance with examples. May be especially useful for students preparing for the second actuarial exam on theory of interest.
• Prerequisite: MATH 3081.

MATH 4683 Financial Derivatives (4 SH)
Presents the mathematical basis of actuarial models and their application to insurance and other financial risks. Includes but is not limited to financial derivatives such as options and futures. Techniques and applications may be useful for students preparing for actuarial Exam 3F (Society of Actuaries Exam MFE).
• Prerequisite: MATH 4681 and MATH 4682.

MATH 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: MATH 3081.
• Repeatability: May be repeated without limit.

MATH 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: MATH 4970.
• Repeatability: May be repeated without limit.

MATH 4972 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

MATH 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

MATH 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MATH 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those junior and senior mathematics majors who are using it to fulfill their experiential education requirement; for these students it may count as a mathematics elective, subject to approval by instructor and adviser.
• Prerequisite: Junior or senior standing; mathematics majors only.
• NU Core: Experiential learning.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MATH 5050 Advanced Engineering Calculus with Applications (4 SH)
Introduces methods of vector analysis. Expects students to master over thirty predefined types of problems. Topics include analytic geometry in three dimensions, geometric vectors and vector algebra, curves in three-space, linear approximations, the gradient, the chain rule, the Lagrange multiplier, iterated integrals, integrals in curvilinear coordinates, change of variables, vector fields, line integrals, conservative fields, surfaces and surface integrals, the flux and the circulation of a vector field, Green’s theorem, the divergence theorem, and Stokes’ theorem. Illustrates the material by real-world science and engineering applications using the above techniques.
• Prerequisite: Familiarity with single-variable calculus.
MATH 5101 Analysis 1: Functions of One Variable (4 SH)
Offers a rigorous, proof-based introduction to mathematical analysis and its applications. Topics include metric spaces, convergence, compactness, and connectedness; continuous and uniformly continuous functions; derivatives, the mean value theorem, and Taylor series; Riemann integration and the fundamental theorem of calculus; interchanging limit operations; sequences of functions and uniform convergence; Arzelà-Ascoli and Stone-Weierstrass theorems; inverse and implicit function theorems; successive approximations and existence/uniqueness for ordinary differential equations; linear operators on finite-dimensional vector spaces and applications to systems of ordinary differential equations. Provides a series of computer projects that further develop the connections between theory and applications.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5102 Analysis 2: Functions of Several Variables (4 SH)
Continues MATH 5101. Studies basics of analysis in several variables. Topics include derivative and partial derivatives; the contraction principle; the inverse function and implicit function theorems; derivatives of higher order; Taylor formula in several variables; differentiation of integrals depending on parameters; integration of functions of several variables; change of variables in integrals; differential forms and their integration over simplexes and chains; external multiplication of forms; differential of forms; Stokes' formula; set functions; Lebesgue measure; measure spaces; measurable functions; integration; comparison with the Riemann integral; L2 as a Hilbert space; and Parseval theorem and Riesz-Fischer theorem.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5104 Basics and Probability and Statistics (4 SH)
Introduces the ideas and the reasoning used in both finite and infinite probabilistic settings. Covers the concepts of sample space, event, and axioms. Studies discrete and continuous probability distributions for one or more random variables, conditional probability, Bayes's law, independence, and expectation and variance. Explores the use of moments, and the binomial, Poisson, and normal distributions. Examines the law of large numbers, the central limit theorem, and the use of probability in statistical inference including estimation of parameters, confidence interverval, and hypotheses testing. Requires a substantial project that connects the material in this course to the secondary school classroom.
• Prerequisite: MATH 5101; graduate standing or permission of instructor and head advisor.

MATH 5105 Basics of Statistics and Stochastic Processes (3 SH)
Focuses on the classical procedures of statistics including the t-test, linear regression, and the chi-square test. Introduces stochastic processes, with an emphasis on Markov chains, random walks, and Brownian motion, with applications to modeling. Requires a substantial project that connects the material in this course to the secondary school classroom.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5106 Basics of Complex Analysis (3 SH)
Introduces the analysis of functions of a complex variable. Starting with the algebra and geometry of complex numbers, basic derivative and contour integral properties are developed for elementary algebraic and transcendental functions, as well as for other analytic functions with isolated singularities. Gives Power and Laurent series representations. Studies classical integral theorems, residue theory, and conformal mapping properties. Presents applications of harmonic functions as time permits. Requires a substantial project that involves an application of ideas covered in the course.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5107 Basics of Number Theory (3 SH)
Introduces number theory. Topics include linear diophantine equations, congruencies, design of magic squares, Fermat’s little theorem, Euler’s formulas, Euler’s phi function, computing powers and roots in modular arithmetic, the RSA encryption scheme, primitive roots and indices, and the law of quadratic reciprocity. As time permits, additional topics may include diophantine approximation and Pell’s equation, elliptic curves, points on elliptic curves modulo, and elliptic curves and Fermat’s last theorem. Requires a substantial project that connects the material in this course to the secondary school classroom.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5108 Methods for Teaching Math (3 SH)
Explores mathematics teaching methods that are research based, experience based, and grounded in the contemporary theoretical frameworks influencing mathematics education. Emphasis is on issues related to teaching math in an urban school, problem solving, communication, connections, and integrating technology as well as issues of access and equity, assessment, and cross-content teaching strategies. Graduate students are required to demonstrate advanced levels of study and research.
• Prerequisite: Graduate standing or permission of instructor and head advisor.
MATH 5111 Algebra 1 (4 SH)
Covers vector spaces and linear maps. Topics include row and column operations and their application to normal form; eigenvalues and eigenvectors of an endomorphism; characteristic polynomial and Jordan canonical form; multilinear algebra that covers tensor products, symmetric and exterior powers of vector spaces, and their universal properties; quadratic forms, reduction to diagonal form, and Sylvester theorem; hyperbolic spaces and Witt theorem; the orthogonal group and isotropic subspaces; antisymmetric forms and their reduction to canonical form; the symplectic group; and Pfaffian and Affine geometry, and classification of conic sections.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5112 Algebra 2 (4 SH)
Continues MATH 5111. Topics include groups, such as subgroups, normal subgroups, homomorphism of groups, abelian groups, solvable groups, free groups, finite p-groups, Sylow theorem, permutation groups, and the sign homomorphism; rings, such as homomorphism, ideals, quotient rings, integral domains, extensions of rings, unique factorization domain, Chinese remainder theorem, and Gauss’s lemma; and modules, such as homomorphism, submodules, quotient modules, exact sequence, and structure of finitely generated modules over principal ideal domains. Examples include abelian groups and Jordan canonical form. Also covers representations of finite groups, group rings and irreducible representations, Frobenius reciprocity, Maschke theorem and characters of finite groups, and dual groups.
• Prerequisite: Graduate standing or permission of instructor and head advisor.

MATH 5121 Topology 1 (4 SH)
Provides an introduction to topology, starting with the basics of point set topology (topological space, continuous maps, homeomorphisms, compactness and connectedness, and identification spaces). Moves on to the basic notions of algebraic and combinatorial topology, such as homotopy equivalences, fundamental group, Seifert-VanKampen theorem, simplicial complexes, classification of surfaces, and covering space theory. Ends with a brief introduction to simplicial homology and knot theory.
• Prerequisite: MATH 5111; graduate standing or permission of instructor and head advisor.

MATH 5122 Geometry 1 (4 SH)
Covers differentiable manifolds, such as tangent bundles, tensor bundles, vector fields, Frobenius integrability theorem, differential forms, Stokes’ theorem, and de Rham cohomology; and curves and surfaces, such as elementary theory of curves and surfaces in R3, fundamental theorem of surfaces in R3, surfaces with constant Gaussian or mean curvature, and Gauss-Bonnet theorem for surfaces.
• Prerequisite: MATH 5101, MATH 5111, and graduate standing or permission of instructor and head advisor.

MATH 5131 Introduction to Mathematical Methods and Modeling (4 SH)
Presents mathematical methods emphasizing applications. Uses ordinary and partial differential equations to model the evolution of real-world processes. Topics chosen illustrate the power and versatility of mathematical methods in a variety of applied fields and include population dynamics, drug assimilation, epidemics, spread of pollutants in environmental systems, competing and cooperating species, and heat conduction. Requires students to complete a math-modeling project.
• Prerequisite: Undergraduate-level course work in ordinary and partial differential equations.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

MATH 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Graduate standing or permission of instructor or head advisor.
• Repeatability: May be repeated without limit.

MATH 5978 Independent Study (1 to 4 SH)
Offers independent study under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Graduate standing or permission of instructor or head advisor.
• Repeatability: May be repeated without limit.

MATH 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Graduate standing or permission of head advisor.
• Repeatability: May be repeated without limit.

MATH 6000 Introduction to Cooperative Education (0 SH)
Seeks to prepare students for the transition from college student to full-time employee.

MATH 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

MATH 6961 Internship (1 to 4 SH)
Offers students an opportunity for internship work.
• Repeatability: May be repeated without limit.

MATH 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.
MATH 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.

• Repeatability: May be repeated without limit.

MATH 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

MATH 7201 Ordinary Differential Equations (4 SH)
Covers the basics of ordinary differential equations including analytical, qualitative, and geometric methods. Topics include geometric interpretation of ordinary differential equations, such as direction fields, vector fields, and phase space; flow defined by a vector field; integral curves and phase curves; integrals of motion and their use in investigating properties of the flows; conservative systems with one degree of freedom and their phase portraits; linear systems and their properties; Wronskian exponents of matrices and their calculation; classification of singular points of first-order linear systems with constant coefficients in the plane; existence and uniqueness of solutions for ordinary differential equations and systems; notion of stability; investigating stability by linearization; Lyapunov functions in determining stability; second-order linear equations including Sturm theory for zeros of solutions; and asymptotics of solutions of second-order linear equations.

• Prerequisite: MATH 5102 and MATH 5111.

MATH 7202 Partial Differential Equations 1 (4 SH)
Introduces partial differential equations, their theoretical foundations, and their applications, which include optics, propagation of waves (light, sound, and water), electric field theory, and diffusion. Topics include first-order equations by the method of characteristics; linear, quasilinear, and nonlinear equations; applications to traffic flow and geometrical optics; principles for higher-order equations; power series and Cauchy-Kowalevski theorem; classification of second-order equations; linear equations and generalized solutions; wave equations in various space dimensions; domain of dependence and range of influence; Huygens’ principle; conservation of energy, dispersion, and dissipation; Laplace’s equation; mean values and the maximum principle; the fundamental solution, Green’s functions, and Poisson kernels; applications to physics; properties of harmonic functions; the heat equation; eigenfunction expansions; the maximum principle; Fourier transform and the Gaussian kernel; regularity of solutions; scale invariance and the similarity method; Sobolev spaces; and elliptic regularity.

MATH 7203 Numerical Analysis 1 (4 SH)
Introduces methods and techniques used in contemporary number crunching. Covers floating-point computations involving scalars, vectors, and matrices; solvers for sparse and dense linear systems; matrix decompositions; integration of functions and solutions of ordinary differential equations (ODEs); and Fast Fourier transform. Focuses on finding solutions to practical, real-world problems.

• Prerequisite: Knowledge of programming in Matlab is assumed. Knowledge of other programming languages would be good but not required.

MATH 7204 Complex Analysis (4 SH)
Introduces complex analysis in one complex variable. Topics include holomorphic functions of one complex variable and their basic properties; geometrical and hydrodynamical interpretations of holomorphic functions; hyperbolic plane and its group of automorphisms; Cauchy-Riemann equations; Cauchy integral formula; Taylor series of holomorphic functions; Weierstrass and Runge theorems; Laurent series and classification of singular points of holomorphic functions; meromorphic functions; residues and their applications to the calculation of integrals; analytic continuation and Riemann surfaces; maximum principle and Schwarz lemma; the Riemann mapping theorem; elements of the theory of elliptic functions; entire functions, their growth, and distribution of zeros; asymptotic expansions; and Laplace method and saddle point method for finding asymptotics of integrals.

• Prerequisite: MATH 5102 and MATH 5111.

MATH 7205 Numerical Analysis 2 (4 SH)
Covers advanced numerical methods, focusing on illustrating solutions to practical, real-world problems. Topics include principal component analysis and applications; types of partial differential equations (PDEs) and their numerical solution using finite-difference and finite-element methods; stability of PDE algorithms; expansion of functions using orthogonal functions and wavelets; parallel computing algorithms (scans, reductions, parallel prefix, and map-reduce); types and concepts in parallelism (Flynn’s taxonomy and data-parallel vs. task-parallel computing); parallel computing frameworks (MPI, OpenMP, and Hadoop); optimization of smooth functions (Newton and quasi-Newton methods); constrained optimization; linear and quadratic programming; pattern recognition and classification using machine learning algorithms; cryptography; and compression of data.

• Prerequisite: Programming experience with Matlab; experience with other programming languages (such as C or C++) helpful but not required.
MATH 7209 Numerical Analysis Workshop (0 SH)
Introduces students to mathematical methods of data analysis, including techniques for image analysis (filters, edge detection); Fourier analysis (discrete Fourier transform, high/low-pass filters); and numerical simulation of partial differential equations. Offers students an opportunity to gain hands-on experience through use of software packages and through teamwork on projects.

MATH 7213 Algebra 3: Galois Theory (4 SH)
Continues MATH 5112. Studies finite extensions of fields, automorphisms, structure of finite fields, normal and separable extensions, Galois group, fundamental theorem of Galois theory, cyclotomic fields, solvability of equations by radicals, and applications (for example, coding theory). Also includes Dedekind rings, integral closure of a Dedekind ring in a field extension, and ramification theory.
• Prerequisite: MATH 5112.

MATH 7221 Topology 2 (4 SH)
Continues MATH 5121. Introduces homology and cohomology theory. Studies singular homology, homological algebra (exact sequences, axioms), Mayer-Vietoris sequence, CW-complexes and cellular homology, calculation of homology of cellular spaces, and homology with coefficients. Moves on to cohomology theory, universal coefficients theorems, Bockstein homomorphism, Kunneth formula, cup and cap products, Hopf invariant, Borsuk-Ulam theorem, and Brouwer and Lefschetz-Hopf fixed-point theorems. Ends with a study of duality in manifolds including orientation bundle, Poincaré duality, Lefschetz duality, Alexander duality, Euler class, Lefschetz numbers, Gysin sequence, intersection form, and signature.

MATH 7222 Geometry 2 (4 SH)
Continues MATH 5122. Covers Riemannian metrics, such as geodesics, Levi-Civita connections, Riemann curvature tensor, covariant derivatives of tensor fields, hypersurfaces in Rn, completeness, Jacobi field theory, manifolds with constant curvatures, and manifolds with nonpositive curvature. Introduces Lie groups and Lie algebras.
• Prerequisite: MATH 5122.

MATH 7232 Combinatorial Analysis (4 SH)
Discusses some basic combinatorial concepts, with emphasis on enumerative combinatorics. Topics may include inclusion-exclusion principle, binomial and multinomial coefficients, linear recurrences, ordinary and exponential generating functions, Stirling numbers, integer partitions, permutation groups and Polya’s theorem, Ramsey theorems, Marriage theorem, graphs and colorability, trees, Steiner systems, posets and polyhedra, and other topics at instructor’s discretion.
• Prerequisite: MATH 5101 and MATH 5111.

MATH 7233 Graph Theory (4 SH)
Covers fundamental concepts in graph theory. Topics include adjacency and incidence matrices, paths and connectedness, and vertex degrees and counting; trees and distance including properties of trees, distance in graphs, spanning trees, minimum spanning trees, and shortest paths; matchings and factors including matchings in bipartite graphs, Hall’s matching condition, and min-max theorems; connectivity, such as vertex connectivity, edge connectivity, k-connected graphs, and Menger’s theorem; network flows including maximum network flow, and integral flows; vertex colorings, such as upper bounds, Brooks, theorem, graphs with large chromatic number, and critical graphs; Eulerian circuits and Hamiltonian cycles including Euler’s theorem, necessary conditions for Hamiltonian cycles, and sufficient conditions; planar graphs including embeddings and Euler’s formula, characterization of planar graphs (Kuratowski’s theorem); and Ramsey theory including Ramsey’s theorem, Ramsey numbers, and graph Ramsey theory.

MATH 7234 Optimization and Complexity (4 SH)
Offers theory and methods of maximizing and minimizing solutions to various types of problems. Studies combinatorial problems including mixed integer programming problems (MIP); pure integer programming problems (IP); Boolean programming problems; and linear programming problems (LP). Topics include convex subsets and polyhedral subsets of n-space; relationship between an LP problem and its dual LP problem, and the duality theorem; simplex algorithm, and Kuhn-Tucker conditions for optimality for nonlinear functions; and network problems, such as minimum cost and maximum flow-minimum cut. Also may cover complexity of algorithms; problem classes P (problems with polynomial-time algorithms) and NP (problems with nondeterministic polynomial-time algorithms); Turing machines; and NP-completeness of traveling salesman problem and other well-known problems.

MATH 7235 Discrete Geometry 1 (4 SH)
Discusses basic concepts in discrete and combinatorial geometry. Topics may include convex sets and their basic properties; theorems of Helly, Radon, and Carathéodory; separation theorems for convex bodies; convex polytopes; face vectors; Euler’s theorem and Dehn-Sommerville equations; upper bound theorem; symmetry groups; regular polytopes and tessellations; reflection groups and Coxeter groups; regular tessellations on surfaces; abstract regular and chiral polytopes; and other topics at instructor’s discretion.
• Equivalent: MATH 7231.
MATH 7241 Probability 1 (4 SH)
Offers an introductory course in probability theory, with an emphasis on problem solving and modeling. Starts with basic concepts of probability spaces and random variables, and moves on to the classification of Markov chains with applications. Other topics include the law of large numbers and the central limit theorem, with applications to the theory of random walks and Brownian motion.

MATH 7245 Statistics for Health Sciences (4 SH)
Designed as an introductory course in probability and statistics for students in health sciences. Includes descriptive and inferential statistics and discussion of various data’s origin, say, “random sample” from some population. Requires an understanding of probability, including the concept of the probability of an event; axioms of probability; concepts of random variables and their expectation; probability distributions; theoretical results of probability, such as the central limit theorem and its use to approximate deviations of the sample mean. Shows, in the statistics segment, how to use data to estimate parameters of interest and test statistical hypotheses. Introduces regression, analysis of variance, and goodness-of-fit tests, which can be used to test whether a proposed model is consistent with data. Also describes some nonparametric hypothesis tests.

MATH 7260 History of Mathematics (4 SH)
Studies mathematics as a living, changing entity through different historical eras and across a wide range of cultures. Topics considered in-depth in their historical-social context include prime numbers, limits infinite series, the notion of algorithm, the concept of function, and engineering applications.

MATH 7301 Functional Analysis (4 SH)
Provides an introduction to essential results of functional analysis and some of its applications. The main abstract facts can be understood independently. Proof of some important basic theorems about Hilbert and Banach spaces (Hahn-Banach theorem, open mapping theorem) are omitted, in order to allow more time for applications of the abstract techniques, such as compact operators; Peter-Weyl theorem for compact groups; spectral theory; Gelfand’s theory of commutative C*-algebras; mean ergodic theorem; Fourier transforms and Sobolev embedding theorems; and distributions and elliptic operators.
* Prerequisite: MATH 5102 and MATH 5111.

MATH 7302 Partial Differential Equations 2 (4 SH)
Continues MATH 7202. Comprises advanced topics in linear and nonlinear partial differential equations, with applications. Topics include pseudodifferential operators and regularity of solutions for elliptic equations; elements of microlocal analysis; propagation of singularities; elements of spectral theory of elliptic operators; properties of eigenvalues and eigenfunctions; variational principle for eigenvalues and its applications; the Schrödinger equation and its meaning in quantum mechanics; parabolic equations and their role in describing heat and diffusion processes; hyperbolic equations and propagation of waves; the Cauchy problem for hyperbolic equations and hyperbolic systems; elements of scattering theory; nonlinear elliptic equations in Riemannian geometry including the Yamabe problem, prescribed scalar curvature problem, and Einstein-Kähler metrics; the Navier-Stokes equations in hydrodynamics; simplest properties and open problem nonlinear hyperbolic equations and shock waves; the Korteweg-de Vries equation and its relation to inverse scattering problems; and solitons and algebra-geometric solutions.

MATH 7303 Complex Manifolds (4 SH)
Introduces complex manifolds. Discusses the elementary local theory in several variables including Cauchy’s integral formula, Hartog’s extension theorem, the Weierstrass preparation theorem, and Riemann’s extension theorem. The global theory includes the definition of complex manifolds, sheaf cohomology, line bundles and divisors, Kodaira’s vanishing theorem, Kodaira’s embedding theorem, and Chow’s theorem on complex subvarieties of projective space. Special examples of dimension one and two illustrate the general theory.

MATH 7311 Commutative Algebra (4 SH)
Introduces some of the main tools of commutative algebra, particularly those tools related to algebraic geometry. Topics include prime ideals, localization, and integral extensions; primary decomposition; Krull dimension; chain conditions, and Noetherian and Artinian modules; and additional topics from ring and module theory as time permits.

MATH 7312 Lie Theory (4 SH)
Examines Lie groups and Lie algebras, the exponential map, examples, basic structure theorems, representation theory, and applications. Additional topics vary with the instructor and may include infinite-dimensional Lie algebras, algebraic groups, finite groups of Lie type, geometry, and analysis of homogenous spaces.
* Prerequisite: MATH 5112.
MATH 7313 Representation Theory (4 SH)
Studies the representation theory of basic algebraic structures such as groups, associative algebras, Lie algebras, and quivers. Topics include general results on the classification of irreducible or indecomposable representations, computation of characters, and structure of derived categories. Examples considered may include symmetric groups, algebraic groups over different fields or Lie groups, semisimple Lie algebras or more general Kac-Moody algebras and their universal enveloping algebras, quantum groups or more general Hopf algebras, Dynkin quivers, and others.
• Prerequisite: MATH 5112.

MATH 7314 Algebraic Geometry 1 (4 SH)
Concentrates on the techniques of algebraic geometry arising from commutative and homological algebra, beginning with a discussion of the basic results for general algebraic varieties, and developing the necessary commutative algebra as needed. Considers affine and projective varieties, morphisms of algebraic varieties, regular and singular points, and normality. Discusses algebraic curves, with a closer look at the relations between the geometry, algebra, and function theories. Examines the Riemann-Roch theorem with its many applications to the study of the geometry of curves. Studies the singularities of curves.

MATH 7315 Algebraic Number Theory (4 SH)
Covers rings of integers, Dedekind domains, factorization of ideals, ramification, and the decomposition and inertia subgroups; units in rings of integers, Minkowski’s geometry of numbers, and Dirichlet’s unit theorem; and class groups, zeta functions, and density sets of primes.
• Prerequisite: MATH 7213.

MATH 7316 Lie Algebras (4 SH)

MATH 7317 Modern Representation Theory (4 SH)
Introduces students to modern techniques of representation theory, including those coming from geometry and mathematical physics. Covers applications of geometry to the representation theory of semisimple Lie algebras, algebraic groups and related algebraic objects, questions related to the representation theory of infinite dimensional Lie algebras, quantum groups, and p-adic groups, as well as category theory methods in representation theory.

MATH 7321 Topology 3 (4 SH)
Continues MATH 7221. Introduces homotopy theory. Topics include higher homotopy groups, cofibrations, fibrations, homotopy sequences, homotopy groups of Lie groups and homogeneous spaces, Hurewicz theorem, Whitehead theorem, Eilenberg-MacLane spaces, obstruction theory, Postnikov towers, and spectral sequences.
• Prerequisite: MATH 7221.

MATH 7322 Geometry 3 (4 SH)
• Prerequisite: MATH 7222.

MATH 7323 Differential Geometry 1 (4 SH)
Studies geometry and topology of surfaces in R3, with emphasis on the global aspects. Topics include minimal surfaces, constant mean curvature surfaces, and the Gauss-Bonnet theorem.
• Prerequisite: MATH 7222.

MATH 7324 Differential Geometry 2 (4 SH)
Continues MATH 7323. Covers principal bundles, vector bundles, connections on principal bundles and vector bundles, curvature, holonomy, and the Chern-Weil theory of characteristic classes.
• Prerequisite: MATH 7323.

MATH 7331 Algebraic Combinatorics (4 SH)
Discusses relationships between algebra and combinatorics. Topics may include enumeration methods; combinatorial sequences of special interest; partially ordered sets and lattices, their incidence algebras, and Möbius functions; permutations, statistics; Young tableaux and related combinatorial algorithms; matching theory with applications to assignment problems; graphs and their spectral properties; theory of partitions, and other topics at instructor’s discretion.
• Prerequisite: MATH 7324.

MATH 7335 Discrete Geometry 2 (4 SH)
Discusses fundamental concepts in discrete and combinatorial geometry. Topics may include basic convex geometry; convex bodies and polytopes; lattices and quadratic forms; Minkowski’s theorem and the geometry of numbers; Blichfeldt’s theorem; packing, covering, tiling of spaces; Voronoi diagrams; crystallographic groups and Bieberbach theorems; tilings and aperiodicity; packing and covering densities; Minkowski-Hlawka theorem; sphere packings and codes; polytopes and groups; and other topics at instructor’s discretion.
• Equivalent: MATH 7332.
MATH 7340 Statistics for Bioinformatics (4 SH)
Introduces the concepts of probability and statistics used in bioinformatics applications, particularly the analysis of microarray data. Uses statistical computation using the open-source R program. Topics include maximum likelihood; Monte Carlo simulations; false discovery rate adjustment; nonparametric methods, including bootstrap and permutation tests; correlation, regression, ANOVA, and generalized linear models; preprocessing of microarray data and gene filtering; visualization of multivariate data; and machine-learning techniques, such as clustering, principal components analysis, support vector machine, neural networks, and regression tree.
• Prerequisite: Bioinformatics majors only.

MATH 7341 Probability 2 (4 SH)
Continues MATH 7241. Studies probability theory, with an emphasis on its use in modeling and queueing theory. Starts with basic properties of exponential random variables, and then applies this to the study of the Poisson process. Queueing theory forms the bulk of the course, with analysis of single-server queues, multiserver queues, and networks of queues. Also includes material on continuous-time Markov processes, renewal theory, and Brownian motion.
• Prerequisite: MATH 7241 or IE 6200.

MATH 7342 Mathematical Statistics (4 SH)
Introduces mathematical statistics, emphasizing theory of point estimations. Topics include parametric estimations, minimum variance unbiased estimators, sufficiency and completeness, and Rao-Blackwell theorem; asymptotic (large sample) theory, maximum likelihood estimator (MLE), consistency of MLE, asymptotic theory of MLE, and Cramer-Rao bound; and hypothesis testing, Neyman-Pearson fundamental lemma, and likelihood ratio test.

MATH 7343 Applied Statistics (4 SH)
Designed as a basic introductory course in statistical methods for graduate students in mathematics as well as various applied sciences. Topics include descriptive statistics, inference for population means, analysis of variance, nonparametric methods, and linear regression. Studies how to use the computer package SPSS, doing statistical analysis and interpreting computer outputs.

MATH 7344 Regression, ANOVA, and Design (4 SH)
Discusses one-sample and two-sample tests; one-way ANOVA; factorial and nested designs; Cochran’s theorem; linear and nonlinear regression analysis and corresponding experimental design; analysis of covariance; and simultaneous confidence intervals.

MATH 7345 Nonparametric Methods in Statistics (4 SH)
Presents methods for analyzing data that is not necessarily normal. Emphasizes comparing two treatments (the Wilcoxon test, Kolmogorov-Smirnov test), comparison of several treatments (the Kruskal-Wallis test), randomized complete blocks, tests of randomness and independence, asymptotic methods (the delta method, Pitman efficiency), and bootstrapping.

MATH 7346 Time Series (4 SH)
Includes analysis of time series in the time domain, the frequency domain and the ARMA models, and Kalman filters.
• Prerequisite: MATH 7342 or MATH 7343.

MATH 7347 Statistical Decision Theory (4 SH)
Covers statistics as a game, loss and utility, subjective probability, priors, Bayesian statistics, minimaxity, admissibility and complete classes, James-Stein estimators, and empirical Bayes.
• Prerequisite: MATH 7342 or MATH 7343.

MATH 7348 Categorical Data Analysis (4 SH)
Focuses on the analysis of data in tables, that is, with cross-classified data. Comprises loglinear models (a generalization of analysis of variance methods) and logistic regression. Includes homework problems involving real data and sometimes focusing on theoretical issues.
• Prerequisite: MATH 7342 or MATH 7343.

MATH 7349 Stochastic Calculus and Introduction to No-Arbitrage Finance (4 SH)
Introduces no-arbitrage discounted contingent claims and methods of their optimization in discrete and continuous time for a finite fixed or random horizon. Establishes the relation of no-arbitrage to the martingale calculus. Introduces stochastic differential equations and corresponding PDE describing functionals of their solutions. Presents examples of contingent claims (such as options) evaluation including the Black-Scholes formula.
• Prerequisite: MATH 7342 or MATH 7343.

MATH 7350 Pseudodifferential Equations (4 SH)
Covers Sobolev spaces and pseudodifferential operators on manifolds, applications to the theory of elliptic operators, elliptic regularity, Fredholm property, analytic index, and Hodge theory.

MATH 7351 Mathematical Methods of Classical Mechanics (4 SH)
Overviews the mathematical formulation of classical mechanics. Topics include Hamilton’s principle and Lagrange’s equations; solution of the two-body central force problem; rigid body rotation and Euler’s equations; the spinning top; Hamilton’s equations; the Poisson bracket; Liouville’s theorem; and canonical transformations.
MATH 7352 Mathematical Methods of Quantum Mechanics (4 SH)
Introduces the basics of quantum mechanics for mathematicians. Introduces the von Neumann’s axiomatics of quantum mechanics with measurements in the first part of the course. Discusses the notions of observables and states, as well as the connections between the quantum and the classical mechanics. The second (larger) part is dedicated to some concrete quantum mechanical problems, such as harmonic oscillator, one-dimensional problems of quantum mechanics, radial Schrödinger equation, and the hydrogen atom. The third part deals with more advanced topics, such as perturbation theory, scattering theory, and spin.
• Prerequisite: MATH 5122 and MATH 7301.

MATH 7353 Atiyah-Singer Index Theory (4 SH)
Introduces the Atiyah-Singer index theorem, one of the most impressive achievements of mathematics of the twentieth century. Connects analysis, geometry, and topology, and has numerous applications in mathematical physics, such as a calculation of the dimensions of moduli spaces of instantons. Topics include elliptic operators in sections of vector bundles, their index, and heat-kernel invariants; the Atiyah-Bott formula and local expression for the index; Chern-Weil construction of characteristic classes; and invariants of representations of orthogonal and unitary groups with applications to the heat kernel invariants of Laplacians. Also covers index formulas for classical elliptic operators and elliptic complexes (Gauss-Bonnet theorem, Hirzebruch signature theorem, the Riemann-Roch-Hirzebruch theorem, and Lefschetz-type theorems). Studies elements of K-theory and index theorem for general elliptic operators.
• Prerequisite: Knowledge of pseudodifferential operators.

MATH 7354 Von Neumann Algebras and Applications (4 SH)
Introduces von Neumann algebras and their applications to analysis, geometry, and topology. Topics include algebras of operators in a Hilbert space; uniform, strong, and weak topology in the algebra of bounded linear operators in a Hilbert space; von Neumann algebras, traces, and von Neumann dimensions; ideals in von Neumann algebras; factors and their classification; von Neumann algebras and traces associated with actions of discrete groups on manifolds; trace class operators and Hilbert-Schmidt operators; tensor products of von Neumann algebras and traces; analytic expression of traces; elliptic operators; pseudodifferential operators and their Schwartz kernels; uniform Sobolev spaces; index theory in von Neumann algebras and Atiyah L2 index theorem on covering manifolds; von Neumann Betti numbers and Euler characteristics; heat kernel invariants and spectra-near-zero invariants, their interpretation as near-cohomology and homotopy invariance; Witten deformation and semiclassical asymptotics on covering manifolds with applications to L2 Morse inequalities; and L2 Riemann-Roch theorem for elliptic operators.
• Prerequisite: MATH 5122 and MATH 7301.

MATH 7355 Topics in Differential Equations (4 SH)
Offers various advanced topics in differential equations and dynamical systems. Intended to meet the needs and interests of students. Topics may include chaotic dynamical systems, delay equations, and dynamical systems on manifolds.
• Prerequisite: MATH 7221.
• Repeatability: May be repeated without limit.

MATH 7356 Complex Analysis in Several Variables (4 SH)
Introduces complex analysis in several complex variables. Topics include integral formulas, domains of holomorphy, pseudoconvexity and plurisubharmonicity, L2 estimates, and Steen manifolds and almost complex manifolds.

MATH 7357 Topics in Complex Analysis (4 SH)
Introduces complex analysis in one complex variable. Topics include holomorphic functions of one complex variable and their basic properties; geometrical and hydrodynamical interpretations of holomorphic functions; hyperbolic plane and its group of automorphisms; Cauchy-Riemann equations and Cauchy integral formula; Taylor series of holomorphic functions; Weierstrass and Runge theorems; Laurent series and classification of singular points of holomorphic functions; meromorphic functions; residues and their applications to the calculation of integrals; analytic continuation and Riemann surfaces; the maximum principle and Schwarz lemma; the Riemann mapping theorem; elements of the theory of elliptic functions; entire functions, their growth, and distribution of zeros; asymptotic expansions; and Laplace method and saddle point method for finding asymptotics of integrals.
• Repeatability: May be repeated up to 5 times.

MATH 7358 Potential Theory (4 SH)
Covers Laplace and Poisson equations in electrostatics, calculation of simplest potentials with applications, properties of classical potentials, capacity, equilibrium distribution of charges and its properties, and singularities of bounded harmonic functions. Also discusses the Dirichlet problem for the Laplace equation: classical methods of solving and Wiener solvability criterion, as well as applications of capacity in spectral theory of Schrödinger operators.

MATH 7361 Schemes (4 SH)
Studies some of the main tools and key objects of algebraic geometry; in particular, the Hilbert scheme that parametrizes subschemes of a projective variety. Topics include coherence of the higher direct images of coherent sheaves under a projective map, theorem on formal functions, Zariski’s main theorem and Zariski’s connectedness theorem, and the construction of the Hilbert and Picard schemes.
• Prerequisite: MATH 7314.
• Repeatability: May be repeated without limit.
MATH 7362 Topics in Algebra (4 SH)
Focuses on various advanced topics in algebra, the specific subject matter depending on the interests of the instructor and of the students. Topics may include homological algebra, commutative algebra, representation theory, or combinatorial aspects of commutative algebra.
• Repeatability: May be repeated without limit.

MATH 7363 Topics in Algebraic Geometry (4 SH)
Focuses on various advanced topics in algebraic geometry, the specific subject matter depending on the interests of the instructor and of the students. Topics may include cohomology theory of algebraic schemes, study of singularities, geometric invariant theory, and flag varieties and Schubert varieties.
• Repeatability: May be repeated without limit.

MATH 7364 Topics in Representation Theory (4 SH)
Offers topics in the representation theory of the classical groups, topics vary according to the interest of the instructor and students. Topics may include root systems, highest weight modules, Verma modules, Weyl character formula, Schur commutator lemma, Schur functors and symmetric functions, and Littlewood-Richardson rule.
• Repeatability: May be repeated up to 5 times.

MATH 7371 Morse Theory (4 SH)
Covers basic Morse theory for nondegenerate smooth functions, and applications to geodesics, Lie groups and symmetric spaces, Bott periodicity, Morse inequalities, and Witten deformation.
• Prerequisite: MATH 5122, MATH 7221, and MATH 7301.

MATH 7372 Characteristic Classes (4 SH)
Introduces fiber bundles and characteristic classes. Topics include construction of universal bundles, homotopy classification of principal bundles, bundles over spheres, cohomology of classifying spaces, Stiefel-Whitney classes, Gysin and Wang sequences, Thom isomorphism, Euler class, obstructions, Chern classes, Pontrjagin classes, vector fields on spheres, cobordism theory, Hirzebruch index formula, and exotic spheres.
• Prerequisite: MATH 7221.

MATH 7373 Topology of Complex Hypersurface (4 SH)
Introduces the topology of complex hypersurfaces and their singularities. Begins with the geometric content of the complex implicit function theorem, and moves quickly to the study of the Milnor fibration of a hypersurface singularity. Uses Brieskorn varieties and plane curves as fundamental examples of isolated singularities. The study of nonisolated singularities, such as the Whitney umbrella and discriminantal varieties, requires stratification theory. Covers the basics of stratified Morse theory and uses it as a tool throughout the course. The course supposes a certain familiarity with the basic objects of topology, algebra, and geometry, but reviews necessary notions as the need arises.

MATH 7374 Riemannian Geometry and General Relativity (4 SH)
Introduces Riemannian and pseudo-Riemannian geometry with applications to general relativity. Topics include Riemannian and pseudo-Riemannian metrics, connections, geodesics, curvature tensor, Ricci curvature and scalar curvature, Einstein’s law of gravitation, the gravitational red shift, the Schwarzschild solution and black holes, and Einstein equations in the presence of matter and electromagnetic field.

MATH 7375 Topics in Topology (4 SH)
Focuses on various advanced topics in algebraic and geometric topology, the subject matter depending on the interest of the instructor and students. Topics may include Morse theory, fiber bundles and characteristic classes, topology of complex hypersurfaces, knot theory and low-dimensional topology, K-theory, and rational homotopy theory.
• Repeatability: May be repeated without limit.

MATH 7376 Topics in Differential Geometry (4 SH)
Offers various advanced topics in differential geometry, the subject matter depending on the instructor and the students. Topics may include symplectic geometry, general relativity, gauge theory, and Kähler geometry.
• Prerequisite: MATH 5122 and MATH 7222.
• Repeatability: May be repeated without limit.

MATH 7377 Topics in Geometric Analysis (4 SH)
Focuses on various advanced topics in geometric analysis, the subject matter depending on the instructor and students. Topics may include geometric analysis and applications to general relativity. Topics include Riemannian and pseudo-Riemannian geometry, connections, geodesics, curvature tensor, Ricci curvature and scalar curvature, Einstein’s law of gravitation, the gravitational red shift, the Schwarzschild solution and black holes, and Einstein equations in the presence of matter and electromagnetic field.

MATH 7378 Topics in Combinatorics (4 SH)
Offers various advanced topics in combinatorics, the subject matter depending on the interest of the instructor and the students.
• Repeatability: May be repeated without limit.

MATH 7379 Topics in Probability (4 SH)
Focuses on various advanced topics in probability and related areas. The specific subject matter depends on the interest of the instructor and students.
• Repeatability: May be repeated up to 5 times.

MATH 7380 Topics in Statistics (4 SH)
Focuses on various advanced topics in statistics, the specific subject matter depending on the interest of the instructor and students. Topics may include multivariate statistics and clustering; biostatistics; Stein’s paradox and admissibility, foundation; nonparametric density and regression estimation; and probabilistic and inferential aspects of reliability theory.
• Repeatability: May be repeated without limit.

MATH 7381 Topics in Combinatorics (4 SH)
Offers various advanced topics in combinatorics, the subject matter depending on the instructor and the students.
• Prerequisite: MATH 5122 and MATH 7222.
• Repeatability: May be repeated without limit.

MATH 7382 Topics in Probability (4 SH)
Offers various advanced topics in probability and related areas. The specific subject matter depends on the interest of the instructor and students.
• Repeatability: May be repeated up to 5 times.

MATH 7390 Topics in Statistics (4 SH)
Focuses on various advanced topics in statistics, the specific subject matter depending on the interest of the instructor and students. Topics may include multivariate statistics and clustering; biostatistics; Stein’s paradox and admissibility, foundation; nonparametric density and regression estimation; and probabilistic and inferential aspects of reliability theory.
• Repeatability: May be repeated without limit.

MATH 7391 Topics in Statistics (4 SH)
Focuses on various advanced topics in statistics, the specific subject matter depending on the interest of the instructor and students. Topics may include multivariate statistics and clustering; biostatistics; Stein’s paradox and admissibility, foundation; nonparametric density and regression estimation; and probabilistic and inferential aspects of reliability theory.
• Repeatability: May be repeated up to 5 times.
MATH 7721 Readings in Topology (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7722 Readings in Algebraic Topology (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7723 Readings in Geometric Topology (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7725 Readings in Singularities (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7730 Readings in Combinatorics (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7731 Readings in Combinatorics and Algebra (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7732 Readings in Combinatorial Geometry (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7733 Readings in Graph Theory (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7734 Readings in Algebra (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7735 Readings in Algebraic Geometry (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7736 Readings in Discrete Geometry (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7737 Readings in Commutative Algebra (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Prerequisite: MATH 5112 and MATH 7311.
• Repeatability: May be repeated without limit.

MATH 7741 Readings in Probability and Statistics (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7751 Readings: Analysis (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7752 Readings in Real Analysis (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7753 Readings in Geometric Analysis (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7754 Readings in Ordinary Differential Equations (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 7755 Readings in Partial Differential Equations (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated up to 5 times.

MATH 7771 Readings in Geometry (4 SH)
Offers topics in geometry that are beyond the ordinary undergraduate topics. Topics include the regular polytopes in dimensions greater than three, straight-edge and compass constructions in hyperbolic geometry, Penrose tilings, the geometry and algebra of the wallpaper, and three-dimensional Euclidean groups.
• Repeatability: May be repeated without limit.

MATH 7772 Readings in Coding Theory (4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Prerequisite: MS and PhD math students only.
• Repeatability: May be repeated up to 5 times.

MATH 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated without limit.
MATH 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

MATH 7990 Thesis (1 to 4 SH)
Offers theoretical and experimental work conducted under the supervision of a departmental faculty.
• Repeatability: May be repeated without limit.

MATH 7996 Thesis Continuation (0 SH)
Continues research for the master’s degree.
• Prerequisite: MATH 7990.

MATH 8440 Mathematical Tapas Seminar (4 SH)
Intended for graduate students in mathematics who have completed their master’s degree and are just starting the PhD program but have not yet selected an area of specialization or a thesis adviser. Acquaints students with the areas of research that are represented by our faculty and what it means to be a mathematical scholar. Faculty members give expository lectures on their own work or areas in which they could supervise a doctoral candidate. Gives students the opportunity to read one or two mathematical research papers during the course of the seminar; students may be asked to give an oral presentation near the end of the course.
• Repeatability: May be repeated up to 3 times.

MATH 8450 Research Seminar in Mathematics (4 SH)
Introduces graduate students to current research in geometry, topology, mathematical physics, and in other areas of mathematics.
• Prerequisite: Status as graduate student in mathematics or permission of instructor.
• Repeatability: May be repeated without limit.

MATH 8662 Master’s Research (2 SH)
Offers research methods and their application to a specific problem under the direction of a graduate faculty member.

MATH 8664 Master’s Research (4 SH)
Offers research methods and their application to a specific problem under the direction of a graduate faculty member.

MATH 8948 Research Methods in Mathematics (4 SH)
Seeks to prepare students to do independent research beyond the topic of the dissertation. Offers students an opportunity to learn current trends in the area related to their dissertation. Discusses both technical methods and the ideas of how to find doable but interesting research problems.
• Repeatability: May be repeated once.

MATH 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

MATH 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

MATH 8982 Readings (1 to 4 SH)
Offers a reading course to be arranged between an individual student and instructor on a topic of their mutual choice.
• Repeatability: May be repeated without limit.

MATH 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

MATH 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

MATH 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

MATH 9948 Modern Mathematical Research (4 SH)
Offers students an opportunity to study the most recent developments in the area of their research, not necessarily directly related to the topic of their dissertation. Seeks to expand students’ horizons and to prepare them to understand talks at mathematical conferences in their area of research.
• Repeatability: May be repeated once.

MATH 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

MATH 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

MATH 9990 Dissertation (0 SH)
Offers dissertation supervision by members of the department.
• Repeatability: May be repeated once.

MATH 9996 Dissertation Continuation (0 SH)
Offers dissertation supervision by members of the department.
• Prerequisite: MATH 9990.
• Repeatability: May be repeated without limit.
MEIE 2000 Introduction to Engineering Co-op Education (1 SH)
Provides students preparation for the first co-op experience. Focuses on skills that provide a basis for successful co-op engagement including expectations and requirements, an introduction to professional credentials, résumé construction, self-assessment and goal setting, interviewing, professional and co-op ethics, issues of diversity in the workplace community, academic planning and decision making, and an introduction to career portfolios.
  • Prerequisite: GE 1000.

MEIE 3000 Professional Issues in Engineering (1 SH)
Provides students with an opportunity to reflect on both academic and co-op experiences in the context of planning for the senior year and beyond. Issues include professional and ethical issues, resolving ethical conflicts, awareness of engineers as professionals in a diverse world, strengthening decision-making skills, career portfolios, and lifelong learning needs, goals, and strategies. Students reflect upon issues of diversity from their experience in the University and in their cooperative education placements. Explores the role of different work and learning styles and diverse personal characteristics on the workplace and the classroom. Professional issues include impact of the cultural context, both in the United States and around the world, on the client, government relations, and the workplace.
  • Prerequisite: MEIE 2000 and junior or senior standing; engineering students only.
  • NU Core: Comparative study of cultures.

MEIE 3435 Introduction to Engineering Entrepreneurship (4 SH)
Designed for engineering and science students who have little or no experience in business topics and have a strong interest in technological innovation. Focuses on high-technology venture creation and leadership. Topics include the high-tech entrepreneurial leader, approaches to high-technology ventures, and the engineering design process and entrepreneurial engineering. Emphasizes identifying a market for a new technology-based idea, transforming a technology-based idea or venture into a product, understanding and protecting intellectual property, developing a business plan, and acquiring resources and setting up a company.
  • Prerequisite: Junior or senior standing.
  • Repeatability: May be repeated without limit.

MEIE 4701 Capstone Design 1 (1 SH)
Offers the first in a two-course sequence that culminates the student’s education and experience with the design process. Students form teams and are assigned their design project and faculty adviser. Projects can be industrially, departmentally, or externally sponsored. Students are expected to communicate with their faculty adviser, course coordinator, and sponsor using the Internet, teleconferencing, and other electronic methods. Topics include project management, ethics, cost analysis, Internet and library research methods, and engineering codes and standards. Students prepare written reports and make oral presentations. Students are expected to complete a thorough state-of-the-art report on their problem and a problem statement with specifications and requirements.
  • Prerequisite: (a) ME 4550 and ME 4570 or (b) IE 4510, IE 4515, IE 4516, and IE 4530; junior or senior standing only; mechanical and industrial engineering majors only.
  • NU Core: Capstone, experiential learning, writing intensive in the major.
  • NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.

MEIE 4702 Capstone Design 2 (5 SH)
Continues MEIE 4701. Students are expected to apply engineering principles acquired throughout their undergraduate academic and co-op experiences to the design of a system, component, or process. Each project includes the development and use of design methodology, formulation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, and detailed system descriptions. Projects include realistic constraints such as economic factors, safety, reliability, maintenance, aesthetics, ethics, and political and social impact. Students make oral presentations on their results in a series of design reviews. Students document their solutions using a written report that includes an executive summary. A working prototype or simulation, as appropriate, of their solution is required to complete the course.
  • Prerequisite: MEIE 4701 and senior standing.
  • NU Core: Capstone, experiential learning, writing intensive in the major.
  • NUpath: Exploring creative expression and innovation, writing intensive in the major, demonstrating thought and action in a capstone.
MEIE 6800 Technical Writing (0 SH)
Seeks to provide graduate students with guidelines, tools, and strategies for improving their technical writing. Uses short in-class assignments to reinforce class concepts. Homework assignments related to the students' research offer students an opportunity to practice their skills and receive feedback on their writing. It is hoped that the work students produce is of direct benefit to themselves and their advisors by allowing students to write up their own research to date and have it critiqued in an organized way.

- **Prerequisite:** Mechanical engineering, industrial engineering, operations research, engineering management, and computer systems engineering students only.

MEIE 6850 Research Seminar in Mechanical and Industrial Engineering (0 SH)
Offers a research seminar presenting topics of current interest in a variety of areas in mechanical and industrial engineering.

- **Prerequisite:** Engineering students only.
- **Repeatability:** May be repeated without limit.

ME 2315 Statistical and Economical Analyses in Engineering (4 SH)
Introduces engineering probability and statistics, as well as engineering economic analysis for project or design evaluation. Case studies are used to illustrate the integration of these areas in the design/system analysis process. Topics in engineering probability and statistics include descriptive statistics, expected value of random variables, and hypotheses testing. Introduces statistical process control and sampling methods as well as reliability methods for the analysis and improvement of system/design performance. Also covers fundamental concepts of time value of money and economic valuation of system designs. Effect of depreciation and taxes on comparing different alternatives are studied. Project management topics and optimization software applications are introduced. Provides students with evaluation tools for analyzing the design/manufacturing process.

- **Prerequisite:** MATH 1342.

ME 2340 Introduction to Material Science (4 SH)
Introduces the materials science field, which emphasizes the structure-processing property-performance relationships for various classes of materials including metals, ceramics, polymers, electronic materials, and magnetic materials. Topics include crystallography, structure of solids, imperfections in crystals, mechanical properties, dislocation theory, slip, strengthening mechanisms, phase equilibrium, phase transformations, diffusion, thermal and optical physical properties, and electrical and magnetic properties. Issues associated with materials selection, including economic and environmental consequences of materials choices, are also addressed. Laboratory experiments, with written memo and report submissions, are required. Includes individual and team-based projects.

- **Prerequisite:** (a) CHEM 1151 or CHEM 1211 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- **Corequisite:** ME 2341.
- **NU Core:** Writing intensive in the major.
- **NUpath:** Writing intensive in the major.

ME 2341 Lab for ME 2340 (1 SH)
Accompanies ME 2340. Covers topics from the course through various activities.

- **Corequisite:** ME 2340.

ME 2342 Recitation for ME 2340 (0 SH)
Offers small group discussion and problem solving for ME 2340.

ME 2350 Engineering Mechanics and Design (4 SH)
Introduces the vector representation of force and moment, the equivalent force systems, free body diagrams, and equations of equilibrium. Discusses centroids and center of gravity of rigid bodies. Applications to beams, trusses, and pin-connected frames and elementary concepts of friction are examined. The kinematics of particles and kinetics of particles are treated using force mass and acceleration. Energy and momentum methods for particles are also covered. Includes a design project that demonstrates the fundamental concepts of equilibrium.

- **Prerequisite:** (a) PHYS 1151 or PHYS 1161 and (b) MATH 1342.

ME 2355 Mechanics of Materials (4 SH)
Discusses concepts of stress and strain; transformation of stress and strain at a point; stress-strain relations material properties; second moments of cross-sectional areas; stresses and deformations in simple structural members due to axial torsional, and flexural loading for statically determinate and indeterminate cases; design of beams under combined loading; and stability of structures and buckling of columns with various supports. Laboratory experiments and written reports are required.

- **Prerequisite:** ME 2350 or CIVE 2221.
- **Corequisite:** ME 2356.
ME 2356 Lab for ME 2355 (1 SH)
Accompanies ME 2355. Covers topics from the course through various activities.
* Corequisite: ME 2355.

ME 2380 Thermodynamics (4 SH)
Defines and calculates thermodynamic properties such as energy, entropy, temperature, and pressure. Work and heat interactions are defined. The first and second laws of thermodynamics and concepts of thermodynamic equilibrium are introduced. Conservation of energy and mass and the entropy balance relation are discussed for open and closed systems. Irreversibility, energy, and the energy balance relation are introduced and applied in analyzing thermodynamic systems. Fundamentals of thermodynamics are used to model power generation and refrigeration systems. Covers thermodynamics of nonreacting gas mixtures with applications to air-water vapor mixtures for air-conditioning systems.
* Prerequisite: (a) MATH 2321 and (b) PHYS 1151 or PHYS 1161.

ME 3455 Dynamics and Vibrations (4 SH)
Covers kinematics of rigid bodies in general plane motion and mass moments of inertia. Examines kinetics of rigid bodies using force-mass-acceleration, work and energy, and impulse and momentum. Explores continued development of problem-solving ability in dynamics, free and forced vibration of undamped and damped on-degree-of-freedom systems. Topics include viscous and non-viscous damping, support motion, rotational unbalance, vibration isolation, vibration measuring instruments, general periodic excitation, and general excitation using numerical methods. Laboratory experiments and written reports are required.
* Prerequisite: ME 2350 or CIVE 2221.
* Corequisite: ME 3456.

ME 3456 Lab for ME 3455 (1 SH)
Accompanies ME 3455. Covers topics from the course through various activities.
* Corequisite: ME 3455.

ME 3475 Fluid Mechanics (4 SH)
Studies fundamental principles in fluid mechanics. Topics include hydrostatics (pressure distribution, forces on submerged surfaces and buoyancy); Newton’s law of viscosity; dimensional analysis; integral forms of basic laws (conservation of mass, momentum, and energy); pipe flow analysis; differential formulation of basic laws including Navier-Stokes equations; and the concept of boundary layer and drag coefficient. Includes a team-based independent project.
* Prerequisite: MATH 2321 and ME 2350.

ME 3480 International Applications of Fluid Mechanics (4 SH)
Studies fundamental principles in fluid mechanics in an international setting. Students have an opportunity to travel to a foreign locale to develop theoretical understanding while experiencing the issues that affect applications of fluids engineering in a culture and environment different from their own. Topics include hydrostatics (pressure distribution, forces on submerged surfaces, and buoyancy); Newton’s law of viscosity; dimensional analysis; integral forms of basic laws (conservation of mass, momentum, and energy); pipe flow analysis; differential formulation of basic laws including Navier-Stokes equations; and the concept of boundary layer and drag coefficient. Includes a team-based independent project that focuses on applications that allow students to delve into issues that affect engineering and technology development in their host country.
* Prerequisite: MATH 2321 and ME 2350.

ME 4505 Measurement and Analysis with Thermal Science Application (4 SH)
Introduces basic measurements and data analysis techniques. Offers students an opportunity to become familiar with various types of measurement systems and to set up and perform experiments according to a given procedure. Covers basic measurement methods of rotational frequency; temperature, pressure, and power; and analog-to-digital conversion techniques and data acquisition. Data analysis topics include statistical analysis of data, probability and inherent uncertainty, basic measurement techniques, primary and secondary standards, system response characteristics, and computerized data acquisition methods. Includes experiments in thermodynamics, fluid mechanics, and heat transfer. Topics include cycle performance, flow discharge coefficient and heat transfer coefficient measurements, and psychometric applications in the air-conditioning field.
* Prerequisite: ME 2380.
* Corequisite: ME 4506.
* NUpath: Analyzing and using data.

ME 4506 Lab for ME 4505 (1 SH)
Accompanies ME 4505. Covers topics from the course through various activities.
* Corequisite: ME 4505.

ME 4508 Mechanical Engineering Computation and Design (4 SH)
Highlights the role of finite element analysis in product development. Introduces the theory of finite elements in elastic/plastic, static, and transient problems. Emphasis is on solid modeling in design using available commercial finite element software. Also covers other numerical techniques such as finite difference schemes in the solution of systems of partial differential equations, and numerical solution to systems of linear and nonlinear equations.
* Prerequisite: ME 2355 and MATH 2341.
ME 4550 Mechanical Engineering Design (4 SH)
Explores development of the mechanical design process and its open-ended nature. Reviews fundamentals of stress and theories of failure including fatigue considerations in the analysis of various machine components. Treatment is given to shafts, springs, screws, connections, lubrications, bearings, gears, and tolerances. Includes team-based design projects that involve modeling and the design process.
• Prerequisite: ME 2355.

ME 4555 System Analysis and Control (4 SH)
Presents the theoretical backgrounds for the analysis and design of simple feedback control systems, differential equations, and Laplace transforms. Treats system modeling, linear approximations, transfer functions, and block diagrams; and transient and frequency response and stability-frequency domain and root locus methods. Other topics may include linear systems with time lag and relay servomechanisms with small nonlinearities.
• Prerequisite: ME 3455.

ME 4565 Introduction to Computational Fluid Dynamics (4 SH)
Introduces numerical methods applied to solve fluid flow problems. Includes basic mathematics and physics related to computational fluid dynamics (CFD), together with practical assignments that use commercial CFD packages. Emphasizes finite difference and finite volume methods. Other topics include mathematical properties of partial differential equations, accuracy and stability analysis of numerical solution, CFD verification and validation, application to variety of fluid dynamics problems, grid generation, and turbulence modeling.
• Prerequisite: GE 1111, MATH 2341, and ME 3475; engineering students only.

ME 4570 Thermal Systems Analysis and Design (4 SH)
Introduces theories of thermal energy transport, including conduction, convection, and thermal radiation, and the design of thermal systems. Solution methods are developed for steady-state and transient conduction problems including thermal circuit analogies, internal energy sources and extended surfaces. Convective heat transfer mechanisms are introduced and correlations to evaluate the heat transfer coefficient are discussed. Methodologies for calculating the thermal radiation heat transfer between surfaces are introduced. These theories are integrated with thermodynamics and fluid mechanics in the design of thermal systems, including heat exchangers. Includes an open-ended design project and students are expected to use computational methods throughout the course.
• Prerequisite: (a) ME 2380 and (b) ME 3475 or ME 3480.

ME 4640 Mechanical Behavior and Processing of Materials (4 SH)
Continues studies of the physical basis for the mechanical behavior of solid materials including elasticity, plasticity, viscoelasticity, fracture, fatigue, and creep properties. Also covers materials processing and includes casting, forming, joining, and machining.
• Prerequisite: ME 2340 and ME 2355.

ME 4660 Introduction to Microelectromechanical Systems (4 SH)
Introduces the design and manufacture of microelectromechanical systems (MEMS), including principles of MEMS sensing and actuation, microfabrication, and packaging. Covers electrical, thermal, and mechanical behavior of microsystems, the design of electromechanical and thermal sensors and actuators, MEMS microfabrication, and MEMS packaging techniques. Studies a variety of microscale sensors and actuators (e.g., electrical switches, pressure sensors, inertial sensors, and optical MEMS). Devotes the last third of the course largely to design projects, involving design of MEMS devices to specifications in a realistic fabrication process.
• Prerequisite: Junior or senior standing; engineering students only or permission of instructor.
• Cross-list: EECE 4660.
• Equivalent: EECE 4660.

ME 4670 Internal Combustion Engine (4 SH)
Presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer, and mechanics. Discusses the design and operating characteristics of conventional spark-ignition, compression-ignition, Wankel, and stratified charge. Explores the relationship between vehicle load and engine load through differential and transmission gear-ratio selections. Includes laboratory experiments.
• Prerequisite: ME 2380.

ME 4680 Energy Systems (4 SH)
Focuses on the design and operating characteristics of thermal energy systems such as steam power plants, gas turbines, fuel cells or heating, ventilation and air-conditioning systems. Reviews selected topics in thermofluids as needed, and introduces new topics such as reacting mixtures and combustion, chemical energy and chemical equilibrium, one-dimensional internal compressible flow through nozzles and diffusers, and normal shock waves. These topics are then applied to the energy systems under study.
• Prerequisite: ME 2380.

ME 4699 Special Topics in Mechanical Engineering (4 SH)
Focuses on an advanced mechanical engineering project agreed upon between the student and instructor.
• Repeatability: May be repeated without limit.
ME 4710 Mechanical Engineering Research 1 (4 SH)
Focuses on scientific research in mechanical engineering agreed upon between the student and instructor.
• Repeatability: May be repeated without limit.

ME 4711 Mechanical Engineering Research 2 (4 SH)
Focuses on in-depth scientific research in mechanical engineering agreed upon between the student and instructor.
• Prerequisite: ME 4710.
• Repeatability: May be repeated without limit.

ME 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

ME 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: ME 4970.
• Repeatability: May be repeated without limit.

ME 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

ME 4992 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

ME 4993 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

ME 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ME 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

ME 5240 Computer Aided Design and Manufacturing (4 SH)
Covers basic aspects of computer graphics and CAD/CAM. Topics include hardware and software concepts, generic structure of CAD/CAM software and its modules, and CAD/CAM database structure. Also covers the parametric representations of curves, surfaces, solids, and features that are widely used in existing commercial CAD/CAM systems. Discusses geometrical transformations, CAD/CAM data exchange formats, prototyping techniques, and PDM. Presents applications such as mass properties calculations, assemblies, mechanical tolerancing, simulation, finite element mesh generation, process planning and CAPP, CNC part programming, and Web-based CAD/CAM.
• Prerequisite: GE 1110 with a grade of B or graduate standing; engineering students only.
• Equivalent: CSYE 5240.

ME 5245 Mechatronic Systems (4 SH)
Covers integration of electronic/electrical engineering, computer technology, and control engineering with mechanical engineering to provide a self-contained, modern treatment of mixed systems along with their computer simulation and applications. Topics include mixed-systems integration; sensors, actuation systems; brief overview of dynamic systems modeling, response characterization, and closed-loop controllers; interfacing; data presentation systems and processes; microprocessors; real-time monitoring and control; and applications of mechatronic systems. The course also offers numerous MATLAB/Simulink examples of select mechatronic systems and devices along with open-ended design projects and assignments.
• Prerequisite: (a) ME 4555 or ME 5659 and (b) senior or graduate standing; engineering students only.

ME 5250 Robot Mechanics and Control (4 SH)
Covers kinematics and dynamics of robot manipulators, including the development of kinematics equations of manipulators, the inverse kinematics problem, and motion trajectories. Employs Lagrangian mechanics to cover dynamics of manipulators for the purpose of control. Covers control and programming of robots, steady state errors, calculations of servoparameters, robot vision systems and algorithms, as well as imaging techniques and the concept of mobile robots.
• Prerequisite: ME 4555 or graduate standing.
• Equivalent: CSYE 5250.

ME 5374 Special Topics in Mechanical Engineering (4 SH)
Offers topics of current interest in mechanical engineering.
• Prerequisite: Junior, senior, or graduate standing; engineering students only.
ME 5600 Materials Processing and Process Selection (4 SH)
Covers the fundamentals and usage of processes and techniques for bulk, thick film, thin film, and patterned structures. Covers techniques for improvement of mechanical or functional properties, for reliability, or for operation in harsh environments. Includes case studies for which processes are selected based on efficacy, material input, and cost. Systems studied include biocompatible implants and materials for the telecommunication, semiconductor, energy, and aerospace industries.

- Prerequisite: Junior, senior, or graduate standing; engineering students only.

ME 5645 Environmental Issues in Manufacturing and Product Use (4 SH)
Explores environmental and economic aspects of different materials used in products throughout the product life cycle. Introduces concepts of industrial ecology, life cycle analysis, and sustainable development. Students work in teams to analyze case studies of specific products fabricated using metals, ceramics, polymers, or paper. These case studies compare cost, energy, and resources used and emissions generated through the mining, refining, manufacture, use, and disposal stages of the product life cycle. Debates issues in legislation (extended product responsibility, recycling mandates, and eco-labeling) and in disposal strategies (landfill, incineration, reuse, and recycling). Discusses difficulties associated with environmental impact assessments and the development of decision analysis tools to weigh the tradeoffs in technical, economic, and environmental performance, and analyzes specific case studies.

- Prerequisite: Junior, senior, or graduate standing.
- Equivalent: ME 4645.

ME 5650 Advanced Mechanics of Materials (4 SH)
Covers stress, strain, and deformation analysis of simple structures including beams, plates, and shells. Topics include classical theory of circular and rectangular plates; combined effects of bending and in-plane forces; buckling of plates; effects of shear deformation and of large deflections; membrane theory of shells; analysis of cylindrical shells; introduction to energy methods with applications to beams, frames, and rings; Ritz method; and the concept of stability as applied to one and two degree-of-freedom systems buckling of bars, frames, and rings.

- Prerequisite: Graduate standing or permission of instructor.
- Equivalent: ME 4650.

ME 5655 Dynamics and Mechanical Vibration (4 SH)
Covers dynamic response of discrete and continuous media. Topics include work and energy, impulse and momentum, Lagrangian dynamics, free and forced response to periodic and transient excitations, vibration absorber, free and forced response of multiple degree-of-freedom systems with and without damping, method of modal analysis, vibrations of continuous media such as extensional, torsional, and bending vibrations of bars, and approximate methods of analysis.

- Prerequisite: Graduate standing or permission of instructor.
- Equivalent: ME 4655.

ME 5657 Finite Element Method (4 SH)
Focuses on numerical techniques for solving engineering problems. Topics include introduction to the finite element method; methods of approximations and variational methods; Rayleigh-Ritz method and Galerkin formulation; interpolation functions; truss, beam, plate, shell, and solid elements; stiffness matrix and assembly of element equations; application of finite element method in fluid and heat transfer problems; linear, nonlinear, and transient problems; numerical integration and methods of solving systems of equations for static and dynamic problems; and use of a finite element general-purpose commercial package.

- Prerequisite: Graduate standing or permission of instructor.
- Equivalent: ME 4657.

ME 5659 Control Systems Engineering (4 SH)
Covers concepts in design and control of dynamical systems. Topics include review of continuous-time system modeling and dynamic response; principles of feedback, classical and modern control analyses, and design techniques such as root locus, frequency response (e.g., Bode plots and Nyquist Criteria), and state-space feedback; dynamic analysis, design, and control of electromechanical systems; block diagram algebra or signal-flow graphs, effects of poles and zeros on system response characteristics; principles of controllability, observability, observer designs, and pole placement techniques; introduction to adaptive and learning control and digital implementation of control algorithms.

- Prerequisite: Graduate standing or permission of instructor.
- Equivalent: ME 4659.
ME 5665 Musculoskeletal Biomechanics (4 SH)
Using a three-part format, emphasizes the quantitative analysis of human musculoskeletal system statics and dynamics, including, in part I, gait analysis and estimation of the complex loads on human joint systems. Investigates how the form of connective tissue and bone is derived from function in part II, including a quantitative analysis of the material properties of bone, ligament, tendon, and cartilage. Working in groups in part III, students select and investigate a relevant, current topic in musculoskeletal biomechanics and present their findings to the class.
• Prerequisite: Graduate standing or permission of instructor.
• Equivalent: ME 4665.

ME 5667 Solid Mechanics of Cells and Tissues (4 SH)
Focuses on the multiscale mechanical behavior of biological tissues. The mechanical integrity of a single cell depends on the mechanical properties and geometrical arrangements of the fiber network in the extracellular matrix. Introduces the statistical concept of persistent length and entanglement of long-chain polymer molecules, linear elasticity and viscoelasticity, membrane undulations, stability of vesicles. Discusses the interatomic forces that cause cells to adhere and to form microscopic, mesoscopic, and macroscopic two-dimensional membranes and three-dimensional structures. Introduces experimental techniques and measurements involving atomic force microscope, surface force apparatus, optical tweezers, micropipette aspiration. Examples are given for specific physiological and path-physiological phenomena related to mechanical and adhesion behavior of cells and membranes.
• Prerequisite: Graduate standing or permission of instructor.

ME 5685 Solar Thermal Engineering (4 SH)
Develops a model for the hourly direct and diffuse radiation under a cover of scattered clouds and the transmission and absorption of this radiation by passive and active systems. Considers the design of air heating systems and the storage of the collected energy by a pebble bed, and considers elements of heat exchanger design. Makes a study of the economics of a domestic water and/or space heating system using $f$-chart analysis.
• Prerequisite: (a) ME 4570 or equivalent and (b) junior, senior, or graduate standing; engineering students only.
• Equivalent: ME 7320.

ME 5690 Gas Turbine Combustion (4 SH)
Offers students an opportunity to obtain an understanding of the basic physical, chemical, and aerodynamic processes associated with combustion in gas turbine engines and their relevance to combustor design and performance in applications ranging from aeronautical to power generation. Topics include the history and evolution of gas turbine engines, thermodynamic cycles, conventional and alternative aviation fuels, combustion fundamentals, fuel injection and atomization, advanced wall cooling techniques, mechanisms of combustion noise and approaches to noise control, and design and performance for ultra-low emissions.
• Prerequisite: (a) ME 4570 and junior or senior standing or (b) graduate standing; engineering students only.

ME 5695 Aerodynamics (4 SH)
Focuses on topics of practical importance in applications of fluid mechanics to external flows over bodies. Covers compressible flow analysis in order to use the concepts of sound speed and Mach number and to design subsonic and supersonic nozzles, diffusers, and airfoils. Introduces normal and oblique shock waves and the Prandtl-Meyer expansion applied to supersonic flows over bodies and surfaces. Discusses Rayleigh and Fanno flows. Studies and applies the Bernoulli equation and potential flow theory to external flow analyses and the theory of lift generation on airfoils.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: ME 4695.

ME 5976 Directed Study (1 to 4 SH)
Offers theoretical or experimental work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ME 5978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

ME 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
ME 6200 Mathematical Methods for Mechanical Engineers 1 (4 SH)
Focuses on ordinary differential equations (ODEs) with mechanical engineering applications, linear algebra, and vector analysis. Topics include Laplace transform, power series, Fourier series, numerical methods for ODEs, matrices, finite dimensional linear vector spaces, eigenvalue problems, applications to systems of ODEs, vector field theory, curvilinear coordinates, and integral theorems.
• Prerequisite: Engineering students only.

ME 6201 Mathematical Methods for Mechanical Engineers 2 (4 SH)
Focuses on partial differential equations with applications to mechanical engineering. Includes function spaces; Sturm-Liouville theory; eigenfunction expansions; special functions; potential theory; solution of elliptic, parabolic, and hyperbolic PDEs using separation of variables; eigenfunction expansions, transform methods, and numerical methods.
• Prerequisite: ME 6200.

ME 6260 Introduction to Microelectromechanical Systems (MEMS) (4 SH)
Provides an introduction to microelectromechanical systems including principles of sensing and actuation, microfabrication technology for MEMS, noise concepts, and packaging techniques. Covers a wide range of disciplines, from electronics to mechanics, material properties, microfabrication technology, electromagnetics, and optics. Studies several classes of devices including inertial measurement devices, pressure sensors, rf components, and optical MEMS. Devotes the last third of the semester largely to design projects, involving design of MEMS devices to specifications in a realistic fabrication process.
• Prerequisite: Engineering students only.
• Equivalent: EECE 7244.

ME 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

ME 6965 Co-op Work Experience Abroad (0 SH)
Offers eligible students an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

ME 7200 Boundary-Integral Methods in Engineering (4 SH)
Introduces boundary-integral equation methods for solving problems in solid mechanics, fluid mechanics, and electromagnetism. Begins with fundamentals such as the exact correspondence between partial-differential equation models and boundary-integral equations and the use of Green’s functions and Green’s theorem to convert between them. Illustrates boundary-integral theory and computation through applications including materials, nanotechnology, and biological systems. Offers students hands-on experience with state-of-the-art software and high-performance computing strategies, such as coupling boundary-integrals to traditional finite-element methods.
• Prerequisite: ME 6201.

ME 7205 Advanced Mathematical Methods for Mechanical Engineers (4 SH)
Covers applications to applied mechanics and thermal science problems in advanced engineering applications. Topics may include complex variables, analytic functions, Laurent and Taylor series, singularities, branch points, and contour integration. Additional topics may include generalized functions and integral transforms; variational calculus and applications; and approximate methods of engineering analysis, including asymptotic expansions, perturbation methods, and weighted residual methods.
• Prerequisite: ME 6200; engineering students only.

ME 7210 Elasticity and Plasticity (4 SH)
Covers stress and strain analysis in continuous media. Analyzes Cartesian tensors using indicial notation; stress and strain concepts; point stress and strain; relation to tensor concepts; equations of equilibrium and compatibility; constitutive laws for elastic, general, axisymmetric, plane stress, and plane strain formulations and solutions; the relation of elasticity to structural mechanics theories; physical basis of plastic/inelastic deformation of solids; and constitutive descriptions of plasticity including yielding, hardening rules, Prandtl-Reuss constitutive laws, and viscoplasticity.
• Prerequisite: Engineering students only.

ME 7220 Mechanics of Contact and Lubrication (4 SH)
Covers issues related to friction, wear, and lubrication of contacting surfaces. Topics include brief review of elasticity, fluid mechanics and probability theory, characterization of engineering surfaces, standard surface topography descriptors, Gaussian and fractal characterization of surface topography, surface profilers, contact mechanics, Hertzian contact, contact of rough surfaces, real area of contact, empirical contact formulas, rolling contact, friction of solids, wear mechanisms, theory of lubrication, compressible and incompressible Reynolds equation, effects of slip flow, classification of bearing types, elastohydrodynamic lubrication, foil bearings, and boundary lubrication.
• Prerequisite: ME 7210.
• Equivalent: ME 4656 and ME 5656.
ME 7232 Theory of Plates and Shells (4 SH)
Covers the mechanics of plates using classical theory (cylindrical bending, rectangular plates, and circular plates) and plate theory with shear deformation. Includes combined effects of bending and in-plane forces, buckling of plates, moderately large deflections, membrane theory of shells, analysis of thin cylindrical shells of revolution, and general theory of thin elastic shells.
  • Prerequisite: (a) ME 6200 or (b) ME 6200 and ME 6201.

ME 7238 Advanced Finite Element Method (4 SH)
Focuses on advanced techniques for solving engineering problems with the finite element method. Topics include review of finite element method; solution of linear and nonlinear algebraic problems; solution of dynamics problems; solution of contact problems using penalty and Lagrange multiplier methods; solution of nonlinear beams, plates, and shells; finite element formulations of solid continua including Lagrangian and updated Lagrangian formulations, material nonlinearities, and use of a commercially available finite element package.
  • Prerequisite: ME 5657 and ME 7210.

ME 7240 Composite Materials (4 SH)
Discusses the stress, strain and deformation, and failure analysis of composite structures. Topics include introduction to composite materials, constitutive relations and mechanical properties of particulate reinforced composites, anisotropic lamina and cellular composites, micromechanical models, laminated composites and effect of stacking sequence, application to structural response of beams and plates, and damage in composite materials.
  • Prerequisite: ME 7210.

ME 7245 Fracture Mechanics and Failure Analysis (4 SH)
  • Prerequisite: ME 7210.

ME 7247 Advanced Control Engineering (4 SH)
Reviews topics from modern control engineering and characteristics of nonlinear systems. Covers fundamentals of Lyapunov theory and stability analysis as well as nonlinear feedback control systems using the Lyapunov method. Includes an introduction to advanced topics: variable structure system control, adaptive control-system analysis and design, robust adaptive control, and optimal and digital control.
  • Prerequisite: ME 5659 or a graduate-level course in modern control; engineering students only.

ME 7253 Advanced Vibrations (4 SH)
Covers advanced concepts in mechanical vibration analysis. Topics include introduction to variational approach and energy methods applied to motions of deformable body in three dimensions; vibrations of distributed-parameters systems including strings, bars, shafts, beams, membranes, and plates. Covers approximate methods, Rayleigh’s Quotient, Rayleigh-Ritz method, method of functions expansion, Galerkin’s and assumed mode methods, design and analysis of a variety of vibration-control systems, and recent advances in vibration of micro- and nanoscale systems.
  • Prerequisite: ME 5655 or permission of instructor; engineering students only.

ME 7255 Continuum Mechanics (4 SH)
Covers the stresses, strains, and displacements in general continuous media. Topics include vector and tensor calculus; definitions of stress, strain, and deformation; kinematics of a continuous medium; material derivatives; rate of deformation tensor, finite strain, and deformation; Eulerian and Lagrangian formulations; geometric measures of strain; relative deformation gradient, rotation, and stretch tensors; compatibility conditions; general principles; conservation of mass; momentum principles; energy balance; and principle of virtual displacements.
  • Prerequisite: ME 7210.

ME 7262 Nanomanufacturing 1 (4 SH)
Provides an interdisciplinary nanomanufacturing course for a student population with diverse scientific and engineering backgrounds. Taught in segments focused in five areas: (1) directed self-assembly, (2) advanced micro- and nanofabrication techniques, (3) nanoscale polymer and composite processing, (4) environmentally benign nanomanufacturing and worker safety, and (5) related policy and ethical issues. Includes fundamental concepts in addition to more advanced topics in nanomanufacturing in each lecture segment.
ME 7270 General Thermodynamics (4 SH)
Examines fundamentals of equilibrium thermodynamics. Topics include work, energy, heat, temperature, available energy, entropy, first and second law of thermodynamics, simple systems, closed and open systems, availability loss and irreversibility, heat engines, multicomponent systems, mixtures of gases, chemical reactions, and chemical equilibrium.

• Prerequisite: Engineering students only.

ME 7275 Essentials of Fluid Dynamics (4 SH)
Offers a fundamental course in fluid dynamics designed to prepare the student for more advanced courses in the thermofluids curriculum while providing a strong background in fluid mechanics. Topics include Cartesian tensors; differential and integral formulation of the equations of conservation of mass, momentum, and energy; molecular and continuum transport phenomena; the Navier-Stokes equations; vorticity; inviscid incompressible flow, the velocity potential, and Bernoulli’s equation; viscous incompressible flow; the stream function; some exact solutions; energy equation including heat conduction and viscous dissipation, low Reynolds number flow, exact and approximate approaches to laminar boundary layers in high Reynolds number flows, stability of laminar flows and the transition to turbulence, and treatment of incompressible turbulent mean flow; and internal and external flows.

• Prerequisite: ME 6200; engineering students only.

ME 7280 Statistical Thermodynamics (4 SH)
Provides insight into the laws of classical thermodynamics and the behavior of substances. Topics include introduction to probability; ensemble theory, elementary kinetic theory of an ideal gas including the distribution of molecular velocities, and the mean free path treatment of transport properties; classical statistics of independent particles, equipartition of energy, the partition function, and laws of thermodynamics; some results from quantum mechanics, quantum statistics of independent particles; applications to gases; and systems of interacting particles.

• Prerequisite: ME 6200 and ME 7270.

ME 7285 Heat Conduction and Thermal Radiation (4 SH)
Emphasizes analytical techniques in conduction and radiative transfer. Topics include formulation of steady- and unsteady-state one-dimensional and multidimensional heat conduction problems, solution techniques for linear problems including the method of separation of variables, Laplace transforms and integral transforms, approximate analytical methods, phase change problems, and nonlinear problems. Offers an introduction to thermal radiation heat transfer including the electromagnetic background of radiation, nature of thermal radiation, radiation intensity, black body intensity, and radiation through nonparticipating media. Discusses the fundamentals of radiation in absorbing, emitting, and scattering media including the equation of radiative transfer with methods of solution, pure radiative transfer in participating media, and interaction of radiation with conduction and/or convection.

• Prerequisite: ME 6200 and undergraduate heat transfer.

ME 7290 Convective Heat Transfer (4 SH)
Focuses on the fundamental equations of convective heat transfer including heat transfer in incompressible external laminar boundary layers, integral boundary layer equations, laminar forced convection in internal flows, and turbulent forced convection in internal and external flows. Develops analogies between heat and momentum transfer including the Reynolds, Taylor, and Martinelli analogies. Covers natural convection, heat transfer in high-speed flow, and transient forced convection.

• Prerequisite: ME 7275.

ME 7295 Multiscale Flow and Transport Phenomena (4 SH)
Covers the fundamentals of flow and transport phenomena in multiscale systems. Begins with an overview of momentum, energy, and mass transport phenomena, emphasizing microscale phenomena such as the slip flow regime. Introduces other driving forces and transport processes relevant to microscale flows, such as surface tension (capillarity) and electrokinetics. These basic concepts provide the preamble for the presentation of the more complex multiphase and porous flow transport behavior. This course material is supplemented with class projects and presentations by the students.

• Prerequisite: Knowledge of thermodynamics, fluid mechanics, and heat transfer; engineering students only.

ME 7300 Combustion and Air Pollution (4 SH)
Deals with the formation of pollutants during combustion processes and their subsequent transformations in the atmosphere. Emphasis is on the effects of design and operating parameters of combustion devices on the nature and composition of exhaust gases, improvements, postcombustion treatment of effluent gases, atmospheric chemistry, and atmospheric transport of pollutants, smog formation, acid rain, ozone formation, and destruction.
ME 7305 Fundamentals of Combustion (4 SH)
Provides an advanced course that is a comprehensive treatment of the problems involved in the combustion of liquid, gaseous, and solid fuels in both laminar and turbulent flow. Discusses the fundamentals of chemical kinetics. Examines the equations for the transport of mass, momentum, and energy with chemically reacting gases. Topics include diffusion and premixed flames, combustion of droplets and sprays, and gasification and combustion of coal.
• Prerequisite: ME 7270.

ME 7310 Computational Fluid Dynamics with Heat Transfer (4 SH)
Offers an advanced course in numerical methods applied to fluid flows with heat transfer. Topics include finite difference and finite volume methods for solving partial differential equations, with particular emphasis on the equations of fluid dynamics and heat transfer. Other topics include mathematical properties of partial differential equations, accuracy and stability analysis of numerical solutions, applications to a variety of fluid dynamics and heat transfer problems, grid generation, and an introduction to turbulence modeling.
• Prerequisite: ME 7275 and knowledge of computer programming; engineering students only.

ME 7315 Heat Transfer Processes in Microelectronic Devices (4 SH)
Focuses on discussion and development of state-of-the-art methods used to predict the heat transfer rates from microelectronic devices and packages and to simulate transport phenomena in manufacturing processes associated with microelectronic devices. Topics may include use of latent heat reservoirs, boiling jet impingement cooling, control volume approaches to extended surfaces, calculation of thermal contact conductances, and natural convection in enclosures.
• Prerequisite: ME 6200.

ME 7325 Two Phase Flow (4 SH)
Covers the basic concepts of heat and mass transfer associated with phase change and multiphase flows. Topics include boiling heat transfer (nucleate boiling, film boiling, and bubble dynamics); evaporation and condensation; liquid-gas two-phase flow and gas-solid and liquid-solid two-phase flows.
• Prerequisite: ME 6200 and knowledge of heat transfer.

ME 7330 Turbulent Flow (4 SH)
Offers an advanced course dealing with flow and transport, with emphasis on engineering methods. Includes generation and dissipation of turbulence, fluctuations, and time-averaging; Reynolds stresses and turbulent fluxes; closure models for free and bounded shear flows; models employed for practical flows including k-epsilon and algebraic-stress models; an introduction to large eddy and direct simulation; and an introduction to numerical modeling of turbulent flows.
• Prerequisite: ME 7275.

ME 7335 Aerosol Mechanics (4 SH)
Studies the behavior of ultrafine particles from both microscopic and macroscopic viewpoints. Discusses the microscopic origins of aerosol transport phenomena including Brownian diffusion, drag, thermophoresis, condensation, and evaporation. Explores deposition processes for monodisperse aerosols, the distribution function for polydisperse aerosols, the general dynamic equation and methods of solution, homogeneous nucleation, and coagulation. Applications are introduced where appropriate.
• Prerequisite: ME 7285 and ME 7290.

ME 7340 Turbomachinery Design (4 SH)
Presents preliminary design methods and analytical tools applicable to turbomachinery. Discusses design criteria and performance characteristics at design and off-design operating conditions for several important types of turbomachinery. Studies axial flow compressors and turbines (gas and steam) including topics such as compressor surge, turbine blade cooling, and steam wetness effects. Also studies centrifugal compressors, radial inflow turbine, pumps, fans, and water turbines. Discusses turbomachinery mechanical design limitations. Examines the use of empirical data on blade cascade performance in blade selection. Presents numerical methods of analyzing two- and three-dimensional flows in turbomachinery (conformal transformation and streamline curvature). Two in-depth design projects are assigned.
• Prerequisite: Knowledge of fluid mechanics and thermodynamics; engineering students only.
ME 7440 Mechanical Engineering Leadership Challenge
Project 1 (4 SH)
Offers students an opportunity to develop and present a plan for the demonstration of a marketable technology product or prototype with a mechanical engineering focus. Constitutes the first half of a thesis-scale project in technology commercialization. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: Restricted to engineering leadership students in the following majors: computer systems engineering, engineering management, industrial engineering, interdisciplinary engineering, mechanical engineering, and operations research.

ME 7442 Mechanical Engineering Leadership Challenge
Project 2 (4 SH)
Continues ME 7440, a thesis-scale project in technology commercialization. Offers students an opportunity to demonstrate their development of a marketable technology product or prototype with a mechanical engineering focus and to produce a written documentary report on the project to the satisfaction of an advising committee. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: ME 7440; restricted to engineering leadership students in the following majors: computer systems engineering, engineering management, industrial engineering, interdisciplinary engineering, mechanical engineering, and operations research.

ME 7945 Master’s Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Prerequisite: Engineering students only.

ME 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision. An independent study must be petitioned and approved by the academic advisor. The petition must clearly state the reason for taking the course; a brief description of goals; as well as the expected outcomes, deliverables, and grading scheme. Master’s degree students in thesis or project options are not eligible to take independent study.

ME 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
• Repeatability: May be repeated without limit.

ME 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

ME 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.

ME 8960 Candidacy Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Mechanical engineering students only; intended for students who have completed all required PhD course work and have not yet achieved PhD candidacy; students who have not completed all required PhD course work are not allowed to register for this course.
• Repeatability: May be repeated once.

ME 8964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

ME 8986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

ME 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of program requirements for PhD candidacy.

ME 9986 Research (0 SH)
Offers students an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

ME 9990 Dissertation (0 SH)
Offers dissertation supervision under individual faculty supervision. May be taken twice for course credit.
• Prerequisite: PhD candidacy in mechanical engineering.
• Repeatability: May be repeated once.
ME 9996 Dissertation Continuation (0 SH)
Offers continuing dissertation supervision under individual faculty supervision.
- Prerequisite: ME 9990 completed twice; mechanical engineering students only.
- Repeatability: May be repeated without limit.

MEDIA AND SCREEN STUDIES (MSCR)

MSCR 1000 Media and Screen Studies at Northeastern (1 SH)
Intended for freshmen media and screen studies majors and combined majors. Introduces students to the liberal arts in general. Offers students an opportunity to become familiar with media and screen studies as a major discipline; to develop the academic skills necessary to succeed (analytical ability and critical thinking); to become grounded in the culture and values of the university community (including advising); and to develop interpersonal skills—in short, to become familiar with all the skills needed to become a successful university student.
- Prerequisite: Media and screen studies majors and combined majors only.

MSCR 1100 Film 101 (4 SH)
Provides an overview of film studies for nonmajors. Offers students an opportunity to watch films to learn about the basic elements of films (e.g., shot construction, sound, editing) and the production, marketing, and distribution of films.
- Prerequisite: Not open to media and screen studies majors or combined majors.
- NU Core: Arts level 1.

MSCR 1150 TV 101 (4 SH)
Provides an overview of television studies for nonmajors. Covers different ways to think about how to watch TV and the effect of changing technology and industry practices on television.
- Prerequisite: Not open to media and screen studies majors or combined majors.
- NU Core: Arts level 1.

MSCR 1220 Media, Culture, and Society (4 SH)
Surveys the various media of communication. Includes radio, television, film, newspapers, magazines, and electronic communication. Explores the impact media have on culture and society and addresses some of the key issues and debates that circulate about the media and media influence. Also discusses and develops an understanding of the process of media preproduction and production including storyboarding, budgeting, and the medium requirements.
- NU Core: Arts level 1.
- NUpath: Interpreting culture, understanding societies and institutions.
- Equivalent: COMM 1220.

MSCR 1230 Introduction to Film Production (4 SH)
Offers an introduction to production that blends theory and practice of film/video production through an examination of exemplary works, aesthetic strategies, production techniques, and the dynamic relationship between media makers, subjects, viewers, and technology. Offers students an opportunity to gain fundamental moving-image fluency using widely accessible media production tools including camcorders, mobile phones, and digital single-lens-reflex cameras.
- Prerequisite: MSCR 1220 (may be taken concurrently).
- NUpath: Exploring creative expression and innovation, interpreting culture.

MSCR 1310 Introduction to Digital Media Culture (4 SH)
Outlines the history and theory of digital media from aesthetic, cultural, and political perspectives. Analyzes digital media as layered objects emerging at the intersection of technological innovation, social experimentation, and power relations.
- Prerequisite: MSCR 1220 (which may be taken concurrently).
- NUpath: Interpreting culture, understanding societies and institutions.
- Equivalent: MSCR 2310.

MSCR 1320 Understanding Media and Film (4 SH)
Introduces how media works—stylistically, socially, and culturally. Topics include genre, narrative, cinematography, ideology, and representation. Offers students an opportunity to learn how to analyze media by acquiring skills associated with research and writing.
- Prerequisite: MSCR 1220 (may be taken concurrently).
- NU Core: Writing intensive in the major.
- NUpath: Interpreting culture, writing intensive in the major.

MSCR 2220 Understanding Media and Film (4 SH)
Introduces how media works—stylistically, socially, and culturally. Topics include genre, narrative, cinematography, ideology, and representation. Offers students an opportunity to learn how to analyze media by acquiring skills associated with research and writing.
- Prerequisite: MSCR 1220 (may be taken concurrently).
- NU Core: Writing intensive in the major.
- NUpath: Interpreting culture, writing intensive in the major.

MSCR 2302 Advertising and Promotional Culture (4 SH)
Investigates our promotional culture through a close study of advertising’s history and contemporary industry. By analyzing advertising’s production of meaning from storyboard to the complete campaign, the course develops an understanding of the interlinkages among advertising, publicity, promotion, and publications.
- Prerequisite: Sophomore standing or above.
- NUpath: Interpreting culture.
- Equivalent: COMM 2302.

MSCR 2305 Digital Media Culture (4 SH)
Investigates the emerging media technologies such as the Internet, the World Wide Web, and video and computer games. Studies media and technological convergence. Offers students an opportunity to obtain the critical skills both to comprehend these new forms of communication and intervene in their use and production.
- Prerequisite: Sophomore standing or above.
- Equivalent: COMM 4622.
MSCR 2325 Global Media (4 SH)
Covers global dynamics of media and media systems. Specifically seeks to introduce students to the nuances of globalization and cultural performance through media structures. Introduces a wide variety of topics that fall in the intersection between globalization and media and the ways in which they operate socially and culturally. The course focuses broadly on understanding—in both theoretical and practical ways—how and why global media function as they do and how they contribute to knowledge formation and social justice within various cultural contexts.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: COMM 2325.

MSCR 2500 Digital Media Research (4 SH)
Examines the growing centrality of what has been variously labeled as the “social web,” “Web 2.0,” “participatory culture,” and “convergence culture.” Does so by situating blogs, social network sites, Wikis, image boards, and other types of participatory media in broader social, economic, and political contexts. Examines how the development of social media is infused with gendered, racial, cultural, and subcultural values. Offers students an opportunity to examine key dimensions of cultural life that make up our (online) selves—including friendship, privacy, labor, celebrity, power, gender, race, and activism—by conducting original research.
• Prerequisite: (a) MSCR 1220 or COMM 1220 and (b) sophomore standing or above.

MSCR 2505 Digital Feminisms (4 SH)
Explores the unique ways that feminist activism and theory are impacted by the increasing digital nature of our world. From hashtags to Tumblr, feminists are using digital tools and platforms to aid in the pursuit of social justice. Offers students an opportunity to develop a timeline that traces feminists’ engagement with the Internet, new media, and technological innovations from the late seventies to the present. Examines the strengths and challenges that the digital world creates for feminist engagement.
• Cross-list: WMNS 2505.
• NUpath: Exploring creative expression and innovation, interpreting culture.
• Equivalent: WMNS 2505.

MSCR 2895 Film Analysis (4 SH)
Introduces the languages, aesthetics, and cultures of film. Topics include film genre, film history, and film theory; basic elements (e.g., shot construction and sound editing); narrative cinema, nonnarrative or experimental work, and documentaries; and the marketing and distribution of film.
• Prerequisite: MSCR 2220.

MSCR 3210 Special Topics in Media and Screen Studies (4 SH)
Addresses issues in communication and media as well as developments in the production of television and video. Course content may vary from year to year.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• Repeatability: May be repeated up to 4 times.
• Equivalent: COMM 3210 and COMM 5210.

MSCR 3300 Media Activism (4 SH)
Explores media activism and tactical media as practices emerging at the intersection of political activism, the heritage of the twentieth-century avant-gardes, and technological innovation. By examining social movements media, avant-garde techniques, and critical media theories, offers students an opportunity to acquire the theoretical foundations necessary for a critical understanding of contemporary media activism and tactical media. Couples such historical examination with the review of a variety of contemporary tactical media interventions.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.

MSCR 3385 Video: Story and Sequence (4 SH)
Explores narrative structure and the construction of cinematic sequences in a variety of film/video genres. Examines the codes and conventions film/video artists express in narrative, documentary, and experimental forms and how they are expressed through directing, cinematography, editing, and sound design. Offers students an opportunity to apply cinematic language to their work in video, design, animation, or inter-related media forms.
• Prerequisite: (a) ARTD 2380 or MSCR 1230 and (b) sophomore standing or above.
• NUpath: Exploring creative expression and innovation, interpreting culture.

MSCR 3402 Television and Society (4 SH)
Offers a critical approach to television and society by approaching television as an institution, industry, and cultural form. Course readings use television to analyze cultural and social issues as well as addressing the political and social consequences of television in a historical and contemporary context. Therefore, rather than analyzing television programs as texts, television is used to address a range of topics that may include identity, globalization, citizenship, neoliberalism, interactivity, nationalism, and technology.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• Equivalent: COMM 2323.
MSCR 3422 Media Audiences (4 SH)
Explores how mass media audiences interpret and actively use media messages and products as listeners, readers, and consumers. Examines the different stages of ethnographic research, audience meanings and interpretations, pleasure and fanship, the role of media in everyday life, and the use of ethnographic research methods in communication studies.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• Equivalent: COMM 3422.

MSCR 3423 Twentieth-Century Media (4 SH)
Surveys the emergence of U.S. media from a social and cultural perspective. Analyzes the development of media in the United States in the twentieth century in terms of debates about nationality, class, race, and gender, as well as industry practices. Readings address a range of media technology including radio, television, and the early development of the Internet.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• Equivalent: COMM 3423.

MSCR 3426 Popular Music as Media Form (4 SH)
Analyzes the social forces, technological advances, and cultural influences that have contributed to the development of U.S. popular music, from early Tin Pan Alley to the present. Popular music is treated as a facet of commercial mass culture, as a profoundly influential communicative medium, and as an indicator and amplifier of broader social changes.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• Equivalent: COMM 3426.

MSCR 3428 Television Studies (4 SH)
Introduces students to critical television studies. Topics include visual language (use of image, music, graphics, editing, and sound); narrative structure; and genre. Specific critical approaches include semiotics, narrative and genre analysis, feminist analysis, and ideological analysis of representation.
• Prerequisite: MSCR 1220.

MSCR 3435 Media Industries (4 SH)
Offers an overview of media industries studies. Uses a critically informed approach to media industries that offers students an opportunity to learn to identify and analyze the variety of companies that collaborate to produce, distribute, and market media texts. Explores different approaches to studying the life cycle of media, considering such factors as ownership, regulation, marketing, branding, and the impact of new technologies.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.
• NUpath: Understanding societies and institutions.
• Equivalent: COMM 3435.

MSCR 3437 Media and Identity (4 SH)
Examines representations of identity (race, gender, sexuality, and class) in the media, investigates their influences, and considers their repercussions. The class especially focuses on understanding identity as a construction, rather than as inherently "natural." Broadly, we discuss the relationship between identity and media representations; more specifically, we look at cultural texts, sites, and practices where the existing racial categories mix, merge, and/or rub up against each other in ways that problematize the naturalness of essentialized identities.
• Prerequisite: (a) MSCR 1220 or permission of instructor (b) sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Engaging difference and diversity.
• Equivalent: COMM 3437.

MSCR 3438 Celebrity Culture (4 SH)
Explores the relationships between media, and celebrity, stardom and fame. Focuses on the structures and industries that produce celebrities and ideas of fame and stardom. In asking why celebrity culture has become so important to twenty-first century culture, media, and capitalism, this course also examines how audiences respond to celebrities.
• Prerequisite: MSCR 1220 and sophomore standing or above.
• Equivalent: COMM 5215.

MSCR 3500 Documentary Storytelling (4 SH)
Explores documentary storytelling. Offers each student an opportunity to complete a short documentary. Project assignments mimic professional milestones and practices. Guest filmmakers visit to provide additional insight into how their respective area of professional specialization contributes to storytelling and to give feedback and support to student work-in-progress. Analyzes a wide range of creative storytelling techniques and styles through screenings of documentaries.
• Prerequisite: CINE 3446 and sophomore standing or above.
• NU Core: Experiential learning.
• NUpath: Exploring creative expression and innovation.

MSCR 4206 Age, Media, and Representation (4 SH)
Offers students an opportunity to engage with emerging social and critical theory by encompassing elements of the developing area of critical age studies as well as subcultural theory. Readings include those by Dick Hebdige, Henry Giroux, Margaret Morganroth Gullette.
• Prerequisite: (a) MSCR 3435 and MSCR 3437 or permission of instructor and (b) junior or senior standing or permission of instructor.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: COMM 5212.
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MSCR 4208 TV History (4 SH)
Examines the history of television in the United States. Possible topics include style, genre, aesthetics, and television specificity; the audience; and industrial and technological conditions of production.

- **Prerequisite:** (a) MSCR 3435 and MSCR 3437 or permission of instructor and (b) junior or senior standing or permission of instructor.
- **Equivalent:** COMM 5220.

MSCR 4602 Media and Democracy (4 SH)
Introduces the role of the media in democratic societies. Explores a number of important questions, including what is democracy? What types of information do citizens of a democracy need in order to participate in the governance of their lives? In our increasingly digital world, where do political discussions happen? Are the media responsible for keeping the public informed? Who constitutes the “public”? Are we citizens? Consumers? Producers? Who decides? In order to address these questions, students have the opportunity to become conversant in a variety of modern and contemporary theoretical and critical perspectives on the relationship between the media, democracy, and what has come to be known as the public sphere.

- **Prerequisite:** (a) MSCR 3423, MSCR 3435, MSCR 3437, or permission of instructor and (b) junior or senior standing.
- **NUpath:** Understanding societies and institutions, employing ethical reasoning.
- **Equivalent:** COMM 3436.

MSCR 4610 The Networked Self (4 SH)
Analyzes online participatory culture. With their emphasis on constant sharing and updating, social network sites, blogging platforms, and photo- and video-sharing services are reshaping contemporary culture by providing virtually infinite opportunities for self-expression and conversation. Explores what kind of subjectivity is set in motion by media that demand that users display their network of social relationships and provide constant updates, or conversely, to obliterate their individual selves. Offers students an opportunity to test critical and theoretical problems by analyzing a variety of Web-based phenomena.

- **Prerequisite:** (a) MSCR 3435 and MSCR 3437 or permission of instructor and (b) junior or senior standing.
- **NUpath:** Interpreting culture.
- **Equivalent:** COMM 3436.

MSCR 4622 Special Topics in Media and Screen Studies (4 SH)
Addresses issues in communication and media as well as developments in the production of television and video. Course content may vary from year to year.

- **Prerequisite:** (a) MSCR 3435 and MSCR 3437 or permission of instructor and (b) junior or senior standing or permission of instructor.
- **Repeatability:** May be repeated up to 2 times.
- **Equivalent:** COMM 3210 and COMM 5210.

MSCR 4623 Theories of Media and Culture (4 SH)
Overviews key conceptual approaches that have developed for the study of the media. Investigates theories that address the role of media in culture and focuses on how cultural studies can inform our reading of both media and culture.

- **Prerequisite:** (a) COMM 1220 or MSCR 1220 and (b) junior or senior standing.
- **NU Core:** Capstone, writing intensive in the major.
- **NUpath:** Writing intensive in the major, demonstrating thought and action in a capstone.
- **Equivalent:** COMM 4623.

MSCR 4685 Interactive Documentary (4 SH)
Introduces the historical context, evolving aesthetics, and contemporary production practice of interactive documentary, an emerging genre that brings together interrelated media forms. Topics include documentary storytelling, content architecture, and interface design. Builds on a variety of production methods: photography, audio production/editing, video production/editing, animation, graphic design, interaction design, information visualization, writing, archival research, etc. Seeks to weave individual contributions into a cohesive experience suitable for online publication at the conclusion of the course.

- **Prerequisite:** (a) ARTD 2380 or MSCR 1230 and (b) junior or senior standing.
- **NUpath:** Exploring creative expression and innovation, interpreting culture.

MSCR 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.

- **Repeatability:** May be repeated without limit.

MSCR 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.

- **Prerequisite:** MSCR 4970.
- **Repeatability:** May be repeated without limit.

MSCR 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.

- **NUpath:** Integrating knowledge and skills through experience.

MSCR 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

- **Repeatability:** May be repeated without limit.
MSCR 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

MSCR 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MSCR 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MEDIA, CINEMA STUDIES (CINE)

CINE 1200 Exploring the Humanities through Film (4 SH)
Investigates the ways in which the methods of the humanities can expand one’s awareness of the sources, statements, and meanings of popular films. Presents films for evaluation in the light of reading, various approaches presented by faculty members from a number of humanistic disciplines, and student’s own experiences.
• NU Core: Humanities level 1.
• Equivalent: IDSC 1120.

CINE 2160 Narrative Filmmaking (4 SH)
Introduces narrative filmmaking without synch sound. Offers students an opportunity to create several short projects without dialogue. The successful student leaves the course with a portfolio of work, a basic knowledge of video cameras, and one editing software program (either Avid or Final Cut Pro). Focuses on storytelling through visuals.
• NUpath: Exploring creative expression and innovation.
• Equivalent: CINE 4650.

CINE 2161 Video Software Tools (1 SH)
Offers a technology workshop introducing intermediate skills and software used in capturing, manipulating, and editing video and audio.

CINE 2336 American Film and Culture (4 SH)
Surveys the rise of American film from the late nineteenth century to the present. Examines key films, directors, major themes, and film forms and techniques. Includes lectures, screenings, and discussions.
• Prerequisite: (a) MSCR 1220 or permission of instructor and (b) sophomore standing or above.

CINE 2350 History of Film (4 SH)
Surveys major international developments in film from the late nineteenth century to the present. Examines national movements, technological and aesthetic innovations, important figures, and significant films. Includes films, lectures, and discussions.

CINE 2394 Modern Film and Global Culture (4 SH)
Studies a selection of major modern films from around the world from a thematic, cultural, and historical perspective. Special attention is given to political, social, ethical, and psychological issues, as well as to the way common human themes emerge in quite diverse cultures. Also covers the basic procedures of film interpretation.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Comparative study of cultures.
• Equivalent: ENGL 2394.

CINE 3370 Contemporary Directions in Cinema (4 SH)
Provides a comparative study of major international film movements from 1960 to the present. Studies selected films by representative contemporary directors. Includes lectures, screenings, and discussions.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Equivalent: CLTR 3370.

CINE 3389 Screenwriting (4 SH)
Approaches the unique narrative form of the dramatic short film, with the goal of having students produce a short film screenplay (under twenty minutes in length) which could eventually be shot. Takes students through the storytelling process, from conception to visualization, dramatization, characterization, and dialogue, ending in a project which should reflect the student’s own personal voice and unique vision. Offers students an opportunity to work on many writing exercises involving free association, visualizations, and character explorations, and to evaluate and critique each other’s work in a workshop setting.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• NU Core: Writing intensive in the major.
• NUpath: Exploring creative expression and innovation, writing intensive in the major.
• Repeatability: May be repeated up to 2 times.
• Equivalent: ENGL 3389.
CINE 3392 Gender and Film (4 SH)
Examines the representation of gender in film. Uses concepts and research from film and media studies to investigate the influences and consequences of gender representations in film.
• Prerequisite: CINE 1895, MSCR 1220, or permission of instructor; sophomore standing or above.
• Cross-list: WMNS 3392.
• Equivalent: WMNS 3392.

CINE 3446 Topics in Documentary Production (4 SH)
Offers a hands-on documentary production course. Provides an historical retrospective of the documentary. Explores a variety of filmmaking styles. After instruction in cameras and digital editing, students have an opportunity to produce their own documentaries from concept to finished product.
• Prerequisite: Sophomore standing or above.
• NU Core: Experiential learning.
• NUpath: Exploring creative expression and innovation.
• Repeatability: May be repeated up to 2 times.
• Equivalent: IDSC 3446.

CINE 3500 Film Theory (4 SH)
Explores the movement from modernist concern with the art object to postmodern concerns with subjectivity and spectatorship, race, and gender. Requires a paper using formalist analysis and later revision using cultural analysis, psychoanalysis, philosophy of perception, race studies. Also offers students an opportunity to learn research methods in cinema studies and perform a metacritical review of their own work and to present their findings from film journals, databases, Web sites, blogs. Presents the relation of perception to reality; levels of representational realness; reception theory; digitalization in its relation to movement and meaning. Seeks to enable students to recognize structures and problems for analysis in a film and to apply appropriate theoretical models to analyze these structures.
• Prerequisite: (a) CINE 1200, CINE 1895, CINE 2150, COMM 3425, MSCR 1300, MSCR 2220, or MSCR 2895 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) sophomore standing or above; College of Arts, Media and Design; College of Science; and College of Social Sciences and Humanities students only.
• NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.

CINE 3515 Film Theory (4 SH)
Explores the movement from modernist concern with the art object to postmodern concerns with subjectivity and spectatorship, race, and gender. Requires a paper using formalist analysis and later revision using cultural analysis, psychoanalysis, philosophy of perception, race studies. Also offers students an opportunity to learn research methods in cinema studies and perform a metacritical review of their own work and to present their findings from film journals, databases, Web sites, blogs. Presents the relation of perception to reality; levels of representational realness; reception theory; digitalization in its relation to movement and meaning. Seeks to enable students to recognize structures and problems for analysis in a film and to apply appropriate theoretical models to analyze these structures.
• Prerequisite: (a) CINE 1200, CINE 1895, CINE 2150, COMM 3425, MSCR 1300, MSCR 2220, or MSCR 2895 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) sophomore standing or above; College of Arts, Media and Design; College of Science; and College of Social Sciences and Humanities students only.
• NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major.

CINE 3851 Film Festivals: Exhibition and Distribution (4 SH)
Examines the actual workings of an array of film festivals from the boutique, short, and independent showcases to the large international festivals. (a) MSCR 1230 or permission of instructor and (b) sophomore standing or above.
• Equivalent: CINE 4851.

CINE 3900 Film and Psychoanalysis (4 SH)
Explores one of the most influential approaches to the study of film. Readings introduce students to key concepts in the psychoanalytic approach to film analysis.
• Prerequisite: (a) MSCR 2895 or permission of instructor and (b) sophomore standing or above.

CINE 3920 Topics in Film Studies (4 SH)
Focuses on a specific issue and topic in film studies. Course content varies from semester to semester.
• Prerequisite: MSCR 1220 or permission of instructor.
• Repeatability: May be repeated up to 3 times.

CINE 4500 Modernism/Modernity and Film (4 SH)
Offers an interdisciplinary course that traces the modernist impulse in literature, film, art, and architecture from the early twentieth century to the multifaceted development of postmodernism at the end of the century. Emphasizes the relationship of art to society, and studies the way in which modernism’s revolutionary strategies required constant innovation and renewal in the face of such challenges as fascism, the Cold War, and postcolonial struggles for national identity. Students complete individual projects (creative or research paper) and also contribute to the Web site Boston modernism (http://www.atsweb.neu.edu/bostonmodernism). Counts as a capstone course for the cinema studies combined major.
• Prerequisite: CINE 3500 and junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major, demonstrating thought and action in a capstone.

CINE 4550 Cinema Studies Seminar (4 SH)
Encourages students to reflect on their undergraduate experience as well as to make the transition to the next stage of their career. Students are asked to complete an individual creative project (the experiential component) that reflects a significant engagement with the world beyond the academic setting. They are also asked to complete a research paper that draws together aspects of their combined major and the world of work and/or graduate study. Classes consist of screenings and lectures, guest lectures and field trips, and student presentations. This junior/senior seminar is a capstone course in the cinema studies combined major.
• Prerequisite: CINE 3500 and junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Interpreting culture, writing intensive in the major, demonstrating thought and action in a capstone.
CINE 4560 Directing the Short Fiction Film (4 SH)
Offers a directing workshop in which students have an opportunity to create short films with dialogue and to prepare a larger and more ambitious project. Students have an opportunity to become familiar with a broad range of production techniques as well as screenwriting and storytelling, both in the field and through class discussions, and to work both individually and in groups.
• Prerequisite: Junior or senior standing.
• NU Core: Experiential learning.

CINE 5239 Media and History (4 SH)
Introduces students to the variety of chemical and electronic media, and the appropriate uses of these media for teaching, preservation, outreach, and primary research documents. Each student engages in research related to the selection and evaluation of existing media, and on the deconstruction, analysis, evaluation, and assembly of documentary presentations. Students then form research and production teams for the creation of media production, which takes place during the semester. Topics include media preservation, production budgeting, marketing, and intellectual property.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: HIST 5239.

MUSIC (MUSC)

MUSC 1000 Music at Northeastern (1 SH)
Intended for freshmen in the College of Arts and Sciences. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills- in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Music majors only.

MUSC 1001 Music in Everyday Life (4 SH)
Dedicated to exploring, expanding, and exploding traditional meanings of what music is; of what it means to be a composer, performer, and audience member; and of what it means to listen. The overarching goal is to provide students with the tools and opportunities necessary for determining for themselves what place music holds in everyday life.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1011 Introduction to Music (4 SH)
Offers an introduction to selected works of our Western musical heritage, from earliest to contemporary styles. Consists primarily of a survey and listening format, with emphasis on styles, basic theory, forms, and the historical, social, and artistic periods that these works represent.
• NU Core: Arts level 1.

MUSC 1103 Music as a Social Expression (4 SH)
Examines the processes of music making and the perceptions of music’s functions in human culture. Considers what is music, why we have it, what kinds of music are made, and what kinds of music are made to be meaningful. Identifies various styles and genres of music and examines them within an ever-shifting context of aesthetics, social history, and cultural heritage.
• NU Core: Arts level 1.

MUSC 1104 Survey of African-American Music (4 SH)
Explores the various musical traditions of African Americans, with a specific focus on the United States. Examines the impact of African, European, and Native American traditions on African-American music as well as the role of music as an expression of African-American aesthetics, traditions, and life. Considers historical and contemporary forms of African-American music, with selected video presentations.
• Prerequisite: Not open to students who have taken AFAM 1104.
• NU Core: Arts level 1, comparative study of cultures.
• Equivalent: AFAM 1104.

MUSC 1105 Music of the USA (4 SH)
Examines American music from the time of Puritan psalm singing to the present. Covers a wide variety of music including concert music, traditional folk music, jazz, and contemporary styles.
• NU Core: Arts level 1.
• NUpath: Interpreting culture, engaging difference and diversity.

MUSC 1106 Women in Music (4 SH)
Examines the multifaceted role of women in music from the Renaissance to the present. Discusses the fact that for centuries women have been active and influential patrons, composers, teachers, conductors, and performers in Europe and the United States. Examines their contributions to classical and popular music and to jazz, with emphasis on such widely varying figures as Elizabeth Jacquet de la Guerre, Fanny Mendelssohn Hensel, Clara Schumann, Amy Beach, Germaine Tailleferre, Billie Holiday, Carla Bley, Ruth Crawford Seeger, Pauline Oliveros, Sarah Caldwell, Antonia Brico, and Nadia Boulanger.
• NU Core: Arts level 1, comparative study of cultures.
MUSC 1108 Music and Poetry (4 SH)
Examines the art of setting words to music. Confronts the aesthetic problems encountered in a synthesis of two different art forms. Examines that synthesis in selected songs, choral works, tone poems, and operas of diverse periods and styles (classical, folk, and popular).
• NU Core: Arts level 1.

MUSC 1109 Introduction to Art, Drama, and Music (4 SH)
Offers an interdisciplinary approach to music and other arts including painting, film, and theatre. Examines works of art from various periods in the context of the cultures that produced them. Supplements regular classes with visits to art museums or attendance at concerts and theatrical performances.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1110 Music in Popular Culture (4 SH)
Explores the nature of music composed for the mass market. Discusses techniques of recording and merchandising music. Selected songs are analyzed for their musical content. Traces the evolution of various styles including ragtime, jazz, blues, rock, and music for the media.
• NU Core: Arts level 1.
• NUpath: Interpreting culture, understanding societies and institutions.

MUSC 1111 Rock Music (4 SH)
Examines the development of rock-and-roll and its relationship to blues, rhythm and blues, country, folk, and other styles of music. Considers themes such as the role of rock as youth music, the reflections of social realities in rock songs, the relationship of rock to the recording industry and the mass media, and the changing styles of rock. Emphasizes listening skills.
• NU Core: Arts level 1.

MUSC 1112 Jazz (4 SH)
Examines the evolution of the creative improvisational musical styles commonly called jazz, from its African-American roots to its status as one of America’s classical musics and an internationally valued art form. Explores the contributions of African and European musical traditions and African-American spirituals, work songs, and blues. Examines major contributors and stylistic development and change through selected audio and audio-visual presentations. Also considers the sociocultural dynamics that have affected musical evolution and acceptance.
• NU Core: Arts level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: AFAM 1112.

MUSC 1113 Film Music (4 SH)
Emphasizes the various ways that music is used in film, including music depicted on-screen and musical scores. Music is a crucial element of meaning in film, yet its presence is easy to ignore. Offers students an opportunity to learn basic approaches to the analysis of music and sound in film, to develop the ability to think critically about film, and to become knowledgeable about key historical developments in film music and sound. No musical background is necessary.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation, interpreting culture.
• Equivalent: CINE 1113.

MUSC 1114 Mozart (4 SH)
Traces Mozart’s musical development from child prodigy to mature artist through personal letters and biographies. Analyzes many of his major compositions including symphonies, concertos, operas, and chamber works.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1115 Debussy and the Music of Paris (4 SH)
Recognizes that Claude Debussy, impressionist in sound, composed music that marked a turning point toward modern trends. Covers much of his music for piano, orchestra, and voice, including Suite Pour le Piano, Suite Bergamasque, Images (for piano and orchestra), Nocturnes, La Mer, and Pelleas et Melisande. Discusses the music of Satie, Ravel, and Fauré as it relates to that of Debussy.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1116 Beethoven (4 SH)
Analyzes the complex personality and art of Beethoven, his relation to the turbulent times in which he lived, and his role in classical and romantic music.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1117 George Gershwin (4 SH)
Studies the life and works of George Gershwin (1898-1937) including popular song, musical comedy, opera, and orchestral compositions. Explores the relationship of George Gershwin to his times, both musically and historically. Takes as a critical starting point Gershwin’s famous statement, “My people are American; my time is today.”
• NU Core: Arts level 1.
**MUSC 1118 Music Therapy 1 (4 SH)**
Examines the application of music as a therapeutic vehicle to release suppressed emotions, to encourage self-expression in psychiatric patients, and to treat a wide variety of disorders. Examines music therapy, in a modern approach to health services, as a supplement to other treatments.

- **NU Core: Arts level 1.**

**MUSC 1119 Fundamentals of Western Music Theory (4 SH)**
Introduces students with little or no musical experience to all the major and minor key signatures and the following scales: major, natural minor, harmonic minor, and melodic minor. Topics include how to read music in treble clef, bass clef, and various C-clefs; how to identify and construct intervals, triads, and seventh chords; how melody and harmony work together to create a piece of music; roman numeral analyses; and various small forms. Short excerpts are analyzed, and students are required to write musical compositions.

- **NU Core: Arts level 1.**

**MUSC 1121 Medieval and Renaissance Music (4 SH)**
Offers an introduction to European music from the sixth through the sixteenth centuries. Covers a wide variety of music, ranging from the serene elegance of sacred Gregorian chant and the plaintive love songs of the medieval troubadours to the lively dances and humanistic vocal music of the Renaissance. Examines representative works by composers such as Machaut, Landini, Josquin, Palestrina, and Dowland.

**MUSC 1122 Music of the Baroque Era (4 SH)**
Focuses on music of the seventeenth and early eighteenth centuries in Italy, Germany, France, and England. Discusses the emergence of important new genres (such as opera, sonata, and concerto) and examines representative works of major composers (such as Bach, Handel, Corelli, Vivaldi, Rameau, and Purcell).

- **NU Core: Arts level 1.**

**MUSC 1123 Music of the Classical Era (4 SH)**
Focuses on crucial developments in musical styles and forms of the late eighteenth century and on emerging genres, such as the symphony, the concerto, and the string quartet. Emphasizes the vocal and instrumental works of Haydn and Mozart and the early works of Beethoven.

**MUSC 1124 Music of the Romantic Era (4 SH)**
Focuses on romantic realism and idealism as expressed in the music of the nineteenth century. Emphasizes historical, nationalistic, and literary influences. Includes composers such as Beethoven, Schumann, Schubert, Berlioz, Liszt, Verdi, Wagner, Brahms, Tchaikovsky, and Mahler.

- **NU Core: Arts level 1.**

**MUSC 1125 Twentieth-Century Music (4 SH)**
Focuses on developments in music from 1900 to 2000. Examines a broad range of musical styles including expressionism, neoclassicism, and other major trends in music of the twentieth century.

- **NU Core: Arts level 1.**

**MUSC 1126 New Directions in Music (4 SH)**
Recognizes that music from 1950 to the present has changed more radically than during any other era in history. Examines new elements in classical and popular music and focuses on the relationship between the two styles.

**MUSC 1127 Introduction to World Music (4 SH)**
Introduces musical traditions from around the world using ethnomusicological approaches to examine the role of music in culture. Focuses on various world music from the perspectives of the people who create the music and compares these perspectives with our own.

- **NU Core: Arts level 1.**

**MUSC 1128 Music of Africa (4 SH)**
Uses ethnomusicological frameworks and concepts to examine some of the many music cultures on the continent of Africa. Selected cultures are studied through their musical, social, historical, and political heritage. Musical focus includes various vocal and instrumental performance characteristics as well as dance. Covers traditional and contemporary African music.

- **Prerequisite: Not open to students who have taken AFRS 1128.**
- **NU Core: Arts level 1, comparative study of cultures.**
- **Equivalent: AFRS 1128.**

**MUSC 1129 Music of the Middle East (4 SH)**
Presents an introduction to the music of selected Near Eastern and Arab cultures (such as Persian in the East and Ethiopic and Berber in Africa). Includes the cantillation styles and practices of various chants of the Hebrew, Christian, and Islamic traditions.

- **NU Core: Arts level 1.**
MUSC 1130 Music of Asia (4 SH)
Offers students an introduction to the musical heritage of a variety of music-cultures in Southeast, Far East, and Central Asia, highlighting the importance of music as a human activity and a creative expressive form. Exposure to aesthetic preferences different from the West expands students’ notions of what sounds, pleasing, pleasurable, or proper. Offers students an opportunity to learn cultural theories that frame the conceptual, behavioral, and musical aspects of performance in a number of contrasting music-cultures. Offers students an opportunity to discuss and write about features of the music-cultures under study, investigate how music constructs meaning for listeners, and develop critical listening skills. Learning about local and global forces that shape music engages students to argue for the positive or negative effects each have on processes of musical change.
* NU Core: Arts level 1, comparative study of cultures.
* NUpath: Interpreting culture, engaging difference and diversity.
* Equivalent: MUSC 2130.

MUSC 1131 Music of Latin America and the Caribbean (4 SH)
Examines the highly diverse and unique musical practices of South America, Latin America, and the Caribbean. Focuses on the traditions of native, African, and European heritage in these geographical areas. Provides exposure to musical repertories, ideas about music, the relationship of music to culture, musical instruments, musical contexts, and musical syncretism.
* NU Core: Arts level 1, comparative study of cultures.
* Equivalent: AFAM 1131.

MUSC 1132 Music of the Jewish People (4 SH)
Investigates the role that music has played in Jewish life from ancient to modern times. Topics include music in the time of the Bible, rabbinc attitudes toward music, music and mysticism, the development of the modes for prayer and scriptural cantillation, church and synagogue music compared, music of the holidays and the life cycle, folk and popular music in the Diaspora, the development of art music in the modern era, and music in modern Israel. Prior knowledge of music is not required.
* NU Core: Arts level 1, comparative study of cultures.
* NUpath: Engaging difference and diversity.

MUSC 1133 Voice Class (4 SH)
Gives students the opportunity to learn the basic vocal production required for fine singing. Chooses repertoire, both classical and contemporary, for each student to learn and perform in lessons and before the entire class. Topics include diction, the physiology of singing, resonance, registers, and interpretation. Also studies the basics of music reading and sight-singing. Discusses some interpretation, and plays recordings of the greatest vocal artists for class analysis.

MUSC 1134 Guitar Class (4 SH)
Provides an introduction to the fundamentals of classical guitar playing for those with or without prior knowledge of the guitar. Covers music reading and theory. Requires students to perform alone and in ensemble with other members of the class. Augments the syllabus by live performances from outside professional and student classical guitarists. Bases final grades on several written examinations and student performance.
* NU Core: Arts level 1.
* NUpath: Exploring creative expression and innovation.

MUSC 1135 Coltrane (4 SH)
Studies the life of John Coltrane, recognized as one of the greatest musicians of all time. Presents, in a chronological sequence, his growing up in a Black North Carolina community during the era of U.S. apartheid to becoming a world-class artist whose music touched the hearts and souls of listeners all around the globe. His advanced and innovative conceptions (melodic, rhythmic, and harmonic) and stylistic contributions in and to the realm of African-American creative improvisation changed the way to play the music forever. Emphasizes his immense impact on jazz and other improvisational music and expressive art forms, as well as his spiritual legacy, which focused on using music as a force for the improvement of humanity. His musical and spiritual legacy continue as major influences in current times.
* Prerequisite: Not open to students who have taken AFAM 1135.
* NU Core: Arts level 1.
* Equivalent: AFAM 1135.

MUSC 1136 What’s Playing at Symphony? (4 SH)
Offers students an opportunity to attend several performances of the Boston Symphony Orchestra (BSO) at Symphony Hall. Discusses each piece of music from a variety of perspectives, including the history of a given composer and his or her relationship to music history and the history of a given composition and its relevance to the symphonic repertoire. Analyzes program pieces in order to provide a deeper appreciation for their musical construction; however, no musical background is required to participate in this course—it is designed for nonmusic majors and music majors alike. Requires students to purchase BSO College Cards (for a nominal fee) for the current BSO concert season.
* NU Core: Arts level 1.
* NUpath: Interpreting culture.
MUSC 1139 Popular Music, Sexuality, and the New Global Order (4 SH)
Introduces critical debates on the role of sexuality, focusing on a number of popular music or artists from around the globe—the transgendered pop of Saida Sultan/Danna International; dance and the body politics in post-Suharto Indonesia; and the intersection of sex, nation, and religion in Turkey—to explore the continuously changing categories of gender and sexuality in the processes of globalization. Sexuality is central to popular music because of the way in which it is enacted and embodied by performers and also interpreted by the audience. Although conventions and customs of local cultures and/or societies continue to inform popular music, globalization has opened up spaces in which it is possible to rearticulate gender and sexual identities.
• NU Core: Arts level 1, comparative study of cultures.

MUSC 1140 Global Pop Music (4 SH)
Introduces and studies popular music from around the world within the framework of popular culture and the impact of globalization. Seeks to answer three major questions using readings, musical listenings, and discussions of materials for the course: What do we mean by music as popular culture? What do we mean by global perspective? What is the mutual impact between global forces and local musics? Explores important issues surrounding popular music in regard to specific genres, styles, and practices using readings gleaned from the fields of anthropology, sociology, and ethnomusicology. Requires students both to respond to and to build on the work of various scholars in their writing assignments, final project, and final exam.
• NU Core: Arts level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.

MUSC 1141 Wired for Sound (4 SH)
Explores the use of electronics in music of various styles and genres from a historical perspective, beginning in the early twentieth century and moving to the present. Examines the methods and means of electronic sound production. Throughout history, technological innovations have influenced music. Starting in the early twentieth century, electricity and, later, electronics, became a key motivating force in music, both in composing and performing and even in listening. Covers the social and cultural conditions under which electric sound was able to evolve.
• Prerequisite: Not open to music technology students.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

MUSC 1142 Pop, Jazz, and Rock Singing (4 SH)
Focuses on singing techniques used in pop, rock, and jazz. Techniques taught, discussed, and applied in class include breathing, tone and vowel production, singing with power without strain, developing range, improvising, and creating one’s own style. Offers students an opportunity to apply these techniques in class, learning through vocal demonstrations in class and through the study of recordings. Singers/songwriters are encouraged to enroll.
• Prerequisite: All levels of singers are welcome; students who enroll should already have the ability to sing generally in tune.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

MUSC 1143 Music in Culture (4 SH)
Studies ethnomusicology—a field of study that places music centrally within cultures and societies. The field’s history, definitions, and scope provide a basis for understanding frameworks used to study music cultures and how musical concepts, behavior, and performance interrelate. Focuses on a number of ethnomusicological studies to illustrate the variety of research approaches used to emphasize particular aspects of music making and musical meaning and to uncover the role and function of music, ranging from ritual to play. Offers students an opportunity to learn about fieldwork methods for collecting data so essential to research. Other topics include comparing music cultures, the challenges of being an outsider in studying music cultures, the impact of new technologies, and processes of musical change.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: MUSC 3350.

MUSC 1201 Music Theory 1 (4 SH)
Introduces melodic and harmonic practices in tonal music with additional work in chord and melody construction. Develops ear training and sight-singing skills.
• Prerequisite: MUSC 1119 or permission of instructor.
• NU Core: Arts level 1.

MUSC 1202 Music Theory 2 (4 SH)
Continues MUSC 1201. Focuses on harmonic practices in tonal music. Examines the role and function of harmony through analysis of musical examples and composition of four-voice chorales. Introduces study of advanced harmony. Further develops ear training and sight-singing skills.
• Prerequisite: MUSC 1201.
• NU Core: Arts level 1.

MUSC 1241 Musicianship 1 (1 SH)
Develops ear training, sight-singing skills, rhythmic skills, and keyboard skills.
• Prerequisite: Music majors, combined majors, and performance certificate students only.
MUSC 1242 Musicianship 2 (1 SH)
Continues MUSC 1241. Develops ear training, sight-singing skills, rhythmic skills, and keyboard skills.
- Prerequisite: MUSC 1241; music majors, combined majors, and performance certificate students only.

MUSC 1250 Instrumentation and Orchestration (4 SH)
Introduces the individual abilities of the instruments of the orchestra as well as the fundamental techniques of orchestration.
- Prerequisite: MUSC 1201 and MUSC 1241.

MUSC 1901 Music Lessons 1 (1 SH)
Offers private instruction in voice or in an instrument. Arranges weekly lessons on a half-hour basis. Contact the music department for arrangements. Requires lab fee.
- Repeatability: May be repeated without limit.

MUSC 1902 Music Lessons 2 (1 SH)
Offers private instruction in voice or in an instrument. Arranges weekly lessons on a half-hour basis. Contact the music department for arrangements. Requires lab fee.
- Repeatability: May be repeated without limit.

MUSC 1903 Composition Lessons (1 SH)
Offers private instruction in music composition. Contact the music department for arrangements. Requires lab fee.
- Repeatability: May be repeated without limit.

MUSC 1904 Chorus (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1905 Band (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1906 Orchestra (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1907 Wind Ensemble (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1911 Jazz Ensemble (1 SH)
Designed to serve both music majors and nonmajors, this is a performance/theory/history offering of the varied styles and techniques of performance in the jazz tradition of African-American music. Students are drawn from all segments of the University. Repertory is taken from the standard jazz literature as well as investigations of new works. Improvisational and interpretational technique are the core content of the course. Both the NU Jazz Ensemble and the NU Jazz Combo are represented together in this course.
- Repeatability: May be repeated without limit.
- Equivalent: AFAM 4911.

MUSC 1912 Rock Ensemble (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1913 Blues/Rock Ensemble (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1914 Create Your Own Music (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Prerequisite: Music majors, combined majors, and performance certificate students only.
- Repeatability: May be repeated without limit.

MUSC 1915 Chamber Ensemble (1 SH)
Allows students to participate as performers in one or more ensembles under the direction of a faculty conductor.
- Repeatability: May be repeated without limit.

MUSC 1916 Contemporary Music Ensemble (1 SH)
Offers students an opportunity to participate as performers in an ensemble under the direction of a faculty conductor. Under faculty supervision, students have an opportunity to identify repertory, including original compositions by members of the ensemble.
- Repeatability: May be repeated without limit.

MUSC 1917 Jazz Choir and Combo (1 SH)
Designed to give students who sing jazz and blues the opportunity to rehearse and perform in a small vocal group. Offers students an opportunity to work on singing in harmony and be featured in solos. The group is also accompanied by a student jazz combo. Members of the combo may register for the course for credit.
- Prerequisite: Requires audition.
- Repeatability: May be repeated without limit.
MUSC 1918 World Music Ensemble (1 SH)
Explores music-making traditions from selected world cultures through performance on percussion, voice, and other instruments. No previous music-making experience required.
• **Repeatability:** May be repeated up to 8 times.

MUSC 1919 Fusion Ensemble (1 SH)
Offers students an opportunity to participate as performers in one or more ensembles under the direction of a faculty conductor. Focuses on instrumental rock, blues, funk, and jazz repertoire.
• **Repeatability:** May be repeated up to 8 times.

MUSC 1920 Pep Band (1 SH)
Offers students an opportunity to participate as performers in one or more ensembles under the direction of a faculty supervisor. The pep band performs at sporting events and other university functions.
• **Repeatability:** May be repeated up to 8 times.

MUSC 1921 World Fusion Ensemble (1 SH)
Offers students an opportunity to participate as performers in one or more ensembles under the direction of a faculty conductor. Designed for more advanced students seeking to explore a variety of world music.
• **Repeatability:** May be repeated up to 8 times.

MUSC 2101 Black Popular Music (4 SH)
Surveys, investigates, and analyzes the role and function of Black popular music from the end of World War II to the present. Explores issues of representation, identity, values, and aesthetics, paying close attention to social commentary, political critique, economic inference, cultural formation, explications of religious and spiritual beliefs, and the like. Emphasizes the creative processes developed over the decades of Black popular music, as well as the role of the music industry, as a major impetus for creation and mechanism of dissemination. Challenges students to rethink and reexamine the intent and impact of Black popular culture as a method and means of expression and communication.

MUSC 2107 Introduction to Opera (4 SH)
Offers an historical, social, political, economic, and artistic overview of the evolution of opera from its beginnings to the present day. Examines basic musical concepts (harmony, melody, and orchestration), structures of opera (aria, ensemble, and recitative), vocal categories and schools, and the relationship between literature, history, and librettos. Offers close study of selected operas in various styles (bel canto, verismo, and so on) by Mozart, Rossini, Verdi, Puccini, Tchaikovsky, Wagner, and others.
• **Equivalent:** MUSC 1107.

MUSC 2111 Algebra and Geometry of Music (4 SH)
Engages mathematical thinking in music with regard to its symbolic (how we represent music using numbers and signs); sonic (how mathematical thinking might create insights into musical sound); and grammatical (the logic by which music proceeds from one time to the next) expressions. Music and mathematics both contain objects that exhibit similar properties, such as circularity, similarity, objecthood, spatial dimensionality, dynamics, and processuality. Draws upon various branches of mathematics, including number theory, set theory, algebra, geometry, and statistics. Such representations highlight fundamental musical principles invoked in the process of improvisation, performance, and composition. As such, musical listening is a key component of the course.
• **Prerequisite:** Ability to read musical notation or musical experience preferred.
• **NU Core:** Mathematical/analytical thinking level 2.
• **NUpath:** Exploring creative expression and innovation, conducting formal and quantitative reasoning.

MUSC 2130 Music of Asia (4 SH)
Focuses on music from the mid-eighteenth century to the mid-nineteenth century. Covers specific genres as well as specific works by major central European composers.

MUSC 2137 Viennese School 1 (4 SH)
MUSC 2208 Jazz Improvisation (4 SH)
Focuses on repertory as well as performance. Examines the great improvisational artists in American music, such as Charlie Parker, Miles Davis, and John Coltrane. Approaches analysis from a theoretical as well as a practical perspective. Explores the use of rhythm, chords, scales, and modes in the creative improvisation process.
  * Equivalent: AFAM 1208.

MUSC 2209 Conducting (4 SH)
Provides instruction in the basic gestures used in conducting vocal and instrumental ensembles. Topics include beat patterns, conveying phrasing and articulation, cueing, controlling tempo and dynamics, score study, and rehearsal techniques. Provides an opportunity for students to constitute a laboratory ensemble for regular practicum.

MUSC 2210 Songwriting 1 (4 SH)
Offers an opportunity to learn to construct songs with forward motion and memorable “hooks.” Topics include time-proven song forms, melody writing, harmonic tools, lyric writing, collaboration, and production techniques. Emphasizes the craft of writing songs for use in film and television.
  * NUpath: Exploring creative expression and innovation.

MUSC 2211 Songwriting 2 (4 SH)
Builds on the skills covered in MUSC 2210. Seeks to advance the student’s songwriting toolbox via a combination of analysis/transcription, writing, production, critiquing, and analysis. In order to maximize the amount of professional opportunities afforded to the songwriters, this course is highly collaborative in order to model the writing processes most commonly used in the industry.
  * Prerequisite: MUSC 1119 and MUSC 2210.
  * NUpath: Exploring creative expression and innovation.

MUSC 2303 Tonal Form (4 SH)
Continues MUSC 1202. Examines representative examples of structural principles governing the melodic, harmonic, rhythmic, and formal components of music. Focuses on music from the sixteenth to the mid-nineteenth centuries. Further develops ear training and sight-singing skills.
  * Prerequisite: MUSC 1202.
  * NUpath: Exploring creative expression and innovation.

MUSC 2304 Music Theory 4 (4 SH)
Continues MUSC 2303. Examines works from the late nineteenth century to the present. Includes selected readings by prominent twentieth-century theorists. Further develops ear training and sight-singing skills.
  * Prerequisite: MUSC 2303.

MUSC 2308 Principles of Music Literature (4 SH)
Examines the evolution and application of each major structural element of music through an historical perspective. Also links larger categories of music such as classical, popular, and non-Western by examining their common elements.
  * Prerequisite: MUSC 1201 or MUSI 1203; music majors and combined majors only.
  * NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major.

MUSC 2311 Historical Traditions: America (4 SH)
Provides an overview of music in the United States in cultural and stylistic contexts. Introduces historical methods of music. Studies a broad range of styles including folk, popular, and classical music.
  * Prerequisite: (a) MUSC 2308 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  * NU Core: Writing intensive in the major.
  * NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major.

MUSC 2312 Historical Traditions: Classical (4 SH)
Provides an overview of eighteenth-, nineteenth-, and early twentieth-century Western music in cultural and stylistic contexts. Covers some of the best-known figures in classical music: Bach, Mozart, Beethoven, Wagner, and Stravinsky. Considers why and how the great tradition of tonal music defines classical music even today. Uses scores to help understand the different ways music can be written and the different aesthetic definitions of beauty, pleasure, and meaning in sound.
  * Prerequisite: (a) MUSC 2308 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
  * NU Core: Writing intensive in the major.
  * NUpath: Writing intensive in the major.
MUSC 2313 Historical Traditions: World (4 SH)
Studies music from around the globe. Analyzes the different meanings music holds and the cultural preferences for sound that distinguish cultures and subcultures. Students read and write about cultural theories that guide them in linking the conceptual, behavioral, and musical aspects of performance in a number of contrasting music cultures. Investigates how music constructs meaning for listeners. Offers students an opportunity to develop critical listening skills, learn about local and global forces that shape music, and to argue for the positive or negative effects each have on processes of musical change. Expects students to complete a final research paper, applying cultural theories and integrating data about musical sound, behavior, and concepts in their writing.

- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Comparative study of cultures, writing intensive in the major.
- NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major.

MUSC 2316 Historical Traditions: History of the Music Industry (4 SH)
Offers students an opportunity to obtain a thorough grounding in the history of the music industry. Following intensive study of the electronic and print tools available to those interested in researching the music industry, the course initiates historical work in the nineteenth century, when many aspects of the modern music industry took root and blossomed. The remainder of the course is organized around topics drawn from the twentieth and twenty-first centuries, including record companies and marketing, television and the music industry, and the Internet and the music industry. Each unit is accompanied by the most recent and cutting-edge research in the field.

- Prerequisite: (a) MUSC 2308 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

MUSC 2319 Korean Pop Music and the Music Business (4 SH)
Covers the history of Korean pop music (K-pop) from 1970 to the present, focusing on its rapid growth over the last ten years. Discusses the history of Korean pop music, major K-pop artists, and the K-pop music business. Discussions are coupled with site visits to provide context. Excursions may include visits to recording studios to observe producers and pop artists at work and to K-pop concerts to study stage settings, the flow of concerts, and musical arrangements; TV stations; and classes given by K-pop artists. Taught in Korea.

MUSC 2343 Musicianship 3 (1 SH)
Continues MUSC 1242. Develops ear training, sight-singing skills, rhythmic skills, and keyboard skills.

- Prerequisite: MUSC 1242; music majors and combined majors only.

MUSC 2344 Musicianship 4 (1 SH)
Continues MUSC 2343. Develops ear training, sight-singing skills, rhythmic skills, and keyboard skills.

- Prerequisite: MUSC 2343; music majors and combined majors only.

MUSC 2420 Music Composition Seminar 1 (4 SH)
Exposes students to the basic methods of music composition. Analyzes examples from music literature to gain an understanding of the methods employed; students complete several compositions of their own.

- Prerequisite: MUST 1301.
- NU Core: Exploring creative expression and innovation, interpreting culture.
- NUpath: Exploring creative expression and innovation, interpreting culture.
- Equivalent: MUST 3420.

MUSC 2540 Special Topics in Music (4 SH)
Focuses on various topics related to music.

MUSC 3337 Writing about Music (4 SH)
Provides an overview of various types of musical journalism including criticism, reviews, feature articles, program notes, promotional material, and so on. Offers students significant opportunity to develop their own skills in writing, editing, research, and interview techniques as they apply to writing about music and the music industry.

- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

MUSC 3410 Recital 1 (1 SH)
Offers preparation for and performance of a minirecital (twenty to thirty minutes of music) under the guidance of the student’s primary instrumental or vocal instructor. Minirecitals are usually shared by more than one student. Students take MUSC 3410 in place of MUSC 4992.

- NU Core: Experiential learning.
MUSC 3470 War and Music (4 SH)
Offers an interdisciplinary and comparative exploration of the diverse ways in which composers, artists, novelists, poets, and dramatists have depicted the excitement, glory, agony, and sacrifice of war both at the dawn of modern gunpowder-based warfare in the seventeenth and eighteenth centuries, and as the full impacts of “industrialized killing” became visible in the twentieth. Drawing on artistic and literary artifacts and the massive cultural outpourings that the slaughter and destruction of the two World Wars of the twentieth century elicited, students will investigate how artists’ interactions with the experience and meaning(s) of war have developed and changed in the modern world and how those changes have affected our own understanding of its impact and significance.

- Equivalent: IDSC 3470.

MUSC 3501 Modernizing Tradition in Balinese Performing Arts (4 SH)
Explores music, dance, and theatre in Bali, examining their history and how they have been adapted to fit within the daily religious, personal, and community activities in modern Balinese society. Focuses on various Balinese gamelan traditions and examines how global influences have been incorporated into ancient traditional arts as a means of maintaining dynamic cultural expressions that reflect contemporary Balinese society. Also covers fundamentals of ethnographic field research and requires a final project as the culmination of a directed-research study.

- NU Core: Comparative study of cultures, experiential learning.

MUSC 3540 Special Topics in Music Analysis (4 SH)
Focuses on advanced topics in theory and analysis. Topics vary with each offering.

- Prerequisite: MUSC 2304 and MUSC 2344.
- Repeatability: May be repeated without limit.

MUSC 3541 Music Analysis Seminar (4 SH)
Exposes students to advanced methods of musical analysis. Focuses on techniques for analyzing large musical forms from the baroque period to the present day.

- Prerequisite: MUSC 2304 and MUSC 2344.

MUSC 3550 Historical Traditions: Special Topics (4 SH)
Provides an advanced seminar examining topics and issues surrounding musical cultures and histories. Topics vary with each offering.

- Prerequisite: MUSC 2311, MUSC 2312, or MUSC 2313.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.
- Repeatability: May be repeated without limit.

MUSC 3560 Historical Traditions: Music since 1900 (4 SH)
Offers an intensive overview of music from 1900 to the present day. Covers the works of the best-known figures of the twentieth and twenty-first centuries and draws on a variety of repertoires including American and European “classical” music, jazz, and the music of non-Western cultures. Includes analysis of scores as well as thorough investigations into the social milieus from which the music emerged.

- Prerequisite: MUSC 2312 and sophomore standing or above.

MUSC 4621 Seminar in Performance Practice (4 SH)
Provides students with the opportunity to reflect on their research as it applies to their performances. Students present written reports to be discussed at the seminar. Students are also expected to research and write the program notes for their performances. Fulfills the college’s experiential education requirement for literature and performance majors.

- Prerequisite: (a) MUSC 2311, MUSC 2312, or MUSC 2313 and (b) junior or senior standing; music majors and combined majors only.

MUSC 4622 Recital 2 (1 SH)
Offers preparation for and performance of a senior recital (forty to sixty minutes of music) under the guidance of the student’s primary instrumental or vocal instructor.

- Prerequisite: MUSC 3410 and senior standing.
- NU Core: Experiential learning.

MUSC 4631 Music History and Analysis Capstone (4 SH)
Offers students an opportunity to complete a culminating written project for the music history and analysis major. Projects might include writing program notes, reviews of concerts, and/or completing a research project that explores a particular area of music history and analysis.

- Prerequisite: (a) MUSC 2311, MUSC 2312, or MUSC 2313 and (b) junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

MUSC 4641 Seminar in Ethnomusicology: Issues in Fieldwork and Methodology (4 SH)
Offers a practice-oriented course, the goal of which is to apply theories and paradigms covered in MUSC 3350. Requires a final paper/research proposal and presentation. The research project necessitates fieldwork, reading relevant literature (including research methodology, research techniques, and proposal writing), and reflecting about questions in which students are interested and methods of addressing them through ethnography. Focuses on critical aspects of proposal and project development, including data analysis, audiovisual techniques, methodology, and ethics of ethnomusicology.

- Prerequisite: MUSC 3350 and junior or senior standing.
- NUpath: Interpreting culture, engaging difference and diversity.
MUSC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

MUSC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: MUSC 4970.
• Repeatability: May be repeated without limit.

MUSC 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

MUSC 4992 Directed Study (1 to 4 SH)
Focuses on independent work in a selected area of music under the direction of a member of the department. Enrollment is limited to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.
• Repeatability: May be repeated without limit.

MUSC 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

MUSC 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MUSC 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MUSIC INDUSTRY (MUSI)

MUSI 1203 Music Theory for Music Industry 1 (4 SH)
Provides basic instruction in reading and writing music. Introduces melodic and harmonic practices, concentrating in popular music styles. Develops ear training and sight-singing skills.
• Prerequisite: MUSC 1119 or permission of instructor; music majors and performance certificate students only.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

MUSI 1204 Analyzing Popular Genres (4 SH)
Continues MUSI 1203. Examines the role and function of various musical elements by analyzing examples from popular music. Examines structure, lyrics, and instrumentation in popular music. Offers students an opportunity to further develop ear training and sight-singing skills.
• Prerequisite: MUSI 1203.
• NU Core: Arts level 1.

MUSI 1230 Introduction to Music Industry (4 SH)
Examines business-related areas of the music industry. Topics include music publishing, copyright, the function of performing rights organizations (ASCAP and BMI), talent agents, artist management, concert promotion, and royalties and contracts.

MUSI 1231 Music Industry 2 (4 SH)
Continues MUSI 1230. Topics include the music products industry, theatrical production, arts administration, the recording industry, music in broadcasting, music in advertising, and royalties and contracts.
• Prerequisite: MUSI 1230; music majors only.

MUSI 2101 Demo Production for Songwriters (4 SH)
Offers students an opportunity to learn the necessary techniques to utilize current Musical Instrument Digital Interface (MIDI) and audio technology in the production of professional-quality song demos, including intermediate to advanced skills and concepts of MIDI, synthesis, multitrack recording, mixing, and sound processing. Covers musical approaches to the effective assembly and arranging of sound materials using professional digital audio workstations (DAWs). Focuses on techniques to import and export both MIDI and audio data to greater facilitate collaboration within the virtual classroom as well as using external collaborators (across a variety of DAWs and platforms). Songwriting skills are also critiqued.
• NUpath: Exploring creative expression and innovation.
MUSI 2231 Music Licensing for Media (4 SH)
Examines a variety of music usages in film, advertisements, TV shows, and other media types or venues that require music licensing. Offers students an opportunity to examine licenses and agreements in an effort to enable them to customize boilerplate forms to reflect accurately the needed licenses with any and all customized terms. Stresses teamwork, defining roles within a team, and assertiveness in an effort to enable students to function at their highest level for the demanding team-based final project. The final project stresses resourcefulness, meeting deadlines, creative excellence, along with open and sustained communication between the production side and the creative side.
• Prerequisite: MUSI 1230.
• NUpath: Exploring creative expression and innovation.

MUSI 2232 Music Recording 1 (4 SH)
Introduces the history and practice of recording music. Covers recording apparatus; microphones; monophonic, stereophonic, and digital theory and techniques; field recording; studio terminology; basic sound theory; and development of rudimentary editing skills. Also examines the role of the producer vs. that of the technician, preparation for recording sessions, and basic legal regulations regarding copyrights and compensation.
• Prerequisite: Music majors and minors and music recording minors only.

MUSI 2233 Music in the Online and Mobile Environment (4 SH)
Offers an overview of the music and radio industries as related to the world of Internet radio. Analog radio has historically been resilient in the face of previous technological advances (FM, TV, satellite radio, HD radio) but now faces pressures from online, mobile, and social media platforms. Introduces conceptual frameworks of innovation theory, scans the current music/radio ecosystem, studies real-world examples, and examines processes to facilitate the reimagining of industry practices. Offers students an opportunity to learn basic concepts and vocabulary for Internet-based music services, to learn and to apply theories of innovation to identify optimum opportunities, to draft a plan for an Internet radio/music service, and to create an audio demo of the idea.
• Prerequisite: MUSI 1230.

MUSI 2330 Performing Arts Administration (4 SH)
Introduces music management including the structure of nonprofit organizations (such as arts service organizations, arts centers, symphony orchestras, chamber orchestras, ensembles, opera companies, and university arts programs) and the structure of for-profit enterprises. Examines financial management, funding, and audience development.
• Prerequisite: MUSI 1230.

MUSI 2331 Music Recording 2 (4 SH)
Offers students the opportunity to learn additional skills in the recording process, such as material marketing and distribution, contracts and negotiations, and establishing distribution channels. Includes hands-on studio production of record-quality material.
• Prerequisite: MUSI 2232; music majors and minors and music recording minors only.
• NUpath: Exploring creative expression and innovation.

MUSI 2332 Music Publishing and Royalties (4 SH)
Focuses on music publishing, which plays a pivotal role in the music industry. Not only does this field generate billions of dollars worldwide in revenue, but it has become an essential part of the recording, live performance, and merchandising sectors of the music industry. Examines the concepts and current issues of music publishing as it pertains to recording, film, television, print, and other media. Topics include licensing, royalty collection, and the art of negotiating music copyrights.
• Prerequisite: MUSI 1230.

MUSI 2341 Music Supervision 1 (4 SH)
Covers the field of music supervision, which has become an in-demand field due to the increased use of songs in TV shows, films, live events, advertisements, websites, and other forums. Discusses the whole process, from choosing the perfect song/lyric to strategies for securing licensing with artists and publishers. Offers students a hands-on opportunity to make music selections fit a variety of media and also to structure licensing/contract deals for composers, publishers, and record companies. Final project involves networking with Green Line Records and external rights holders to license and place music into a series of scenes and advertisements.
• Prerequisite: MUSI 1230.
• NUpath: Exploring creative expression and innovation.

MUSI 2540 Special Topics in Music Industry (1 to 4 SH)
Focuses on various topics related to the music industry.
• Prerequisite: MUSI 1230.
• Repeatability: May be repeated without limit.

MUSI 3332 Artist Management (4 SH)
Provides an in-depth investigation of the field of musical artist management. Explores the artist-manager relationship, the management contract, artist evaluation, image formulation, the artist’s development team, achieving a recording contract, merchandising, endorsements, sponsorships, touring, and financial management.
• Prerequisite: MUSI 1230.
MUSI 3333 The Record Industry (4 SH)
Examines the domestic and international record industry. Topics include industry structure, business and legal affairs, the recording contract, royalties, manufacturing, distribution, promotion, publicity, advertising, licensing, and piracy. Offers students the opportunity to explore major record labels and independent labels. Addresses the past, present, and future.
• Prerequisite: MUSI 1230.
• NUpath: Exploring creative expression and innovation.

MUSI 3334 Music Products Industry (4 SH)
Provides a thorough examination of business organization, marketing, distribution, and sales techniques in the diverse field of the music products industry. Investigates market sectors such as musical instruments; professional, semiprofessional, and home audio equipment; the recording industry; and print music.
• Prerequisite: MUSI 1230.

MUSI 3335 Copyright Law for Musicians (4 SH)
Explores the unique character of music-related copyright issues. Investigates common law copyright; statutory copyright; ownership, duration, and transfer of copyright; fair use; works for hire; infringements and remedies; public domain works; and international copyright. Also examines related legal aspects of the music industry.
• Prerequisite: MUSI 1230.
• NUpath: Understanding societies and institutions.

MUSI 3338 Music Industry Marketing and Promotion (4 SH)
Provides a thorough examination of the principles and applications of marketing and promotion within the music industry. Students explore how music companies successfully conduct product, pricing, distribution, and communication management. Approaches music marketing issues using readings, specific music marketing case studies, lectures, guest speakers, and projects.
• Prerequisite: MUSI 1230.

MUSI 3340 Concert Promotion and Venue Management (4 SH)
Provides an in-depth exploration of the principles and practices of concert promotion and venue management. Focuses on areas such as concert promotion, venue advertising, talent buying, contractual requirements, insurance, government regulation, American Society of Composers, Authors, and Publishers (ASCAP)/BMI licenses, personnel management, and concert production and administration.
• Prerequisite: MUSI 1230.
• NUpath: Exploring creative expression and innovation, analyzing and using data.

MUSI 3341 Music Recording 3—Mixing and Mastering (4 SH)
Covers specific topics relating to the final stages in music recording—mixing and mastering. Discusses criteria for making decisions about levels, equalization, dynamics, time-based effects, and spatial positioning. In-depth listening and analysis are designed to augment hands-on practice using both students’ current recordings and professional recordings from the past forty years.
• Prerequisite: MUSI 2331; music majors and minors and music recording minors only.
• NUpath: Exploring creative expression and innovation.

MUSI 3342 Music Supervision 2 (4 SH)
Builds on the basic skills covered in MUSI 2341. Digs deeper into supporting visual media through the use of songs, sound design, and underscore. Offers students hands-on opportunities to make music selections fit a variety of media by developing skills in music editing, critical listening, “pitching” to a producer, negotiating with rights owners, working with “temped” music, staying within budgets, and working with a production team as well as working individually. Includes exclusive interviews and guest lecturers in their respective fields. The final project entails collaboration between a variety of on-campus and off-campus resources, serving as both a preparation to the field of work and as a career networking opportunity.
• Prerequisite: MUSI 2341.
• NUpath: Exploring creative expression and innovation.

MUSI 3401 Hip Hop in the Music Industry (4 SH)
Seeks to prepare and challenge music industry students to analyze Hip-Hop culture through a variety of lenses (musical, social, political, economical, cultural, and religious/spiritual) in order to uncover the impact (positive, negative, and/or neutral) on society. Focuses on the role of the music/entertainment industry within the influence, exposure, and dissemination of Hip-Hop culture. Also addresses a number of topics including Hip-Hop production; sampling and intellectual property; packaging and marketing Hip-Hop; and musicality, authenticity, and integrity. Analyzes Hip-Hop culture’s contributions to ongoing dialogues on gender, sexuality, sensuality, race, ethnicity, class, justice, and equality.
• Prerequisite: MUSI 1230.
• NU Core: Comparative study of cultures.

MUSI 4530 Music Entrepreneurship (4 SH)
Designed to provide students with the knowledge, skills, and abilities necessary to plan, finance, develop, and operate a new music venture. Topics include attributes of music entrepreneurs and entrepreneurial careers, evaluating opportunities, writing business plans, financing the venture, and long-term management and planning.
• Prerequisite: (a) MUSI 1230 and (b) ECON 1116 and (c) ACCT 1201 or ACCT 1209.
MUSI 4601 Seminar in Music Industry (4 SH)
Presents a capstone course for music industry students. Offers advanced students the opportunity to explore contemporary events and issues in the music industry. Allows students to reflect upon, distill, and apply knowledge accumulated in prior courses and previous experiential learning. This reflection and application occurs through substantial writing assignments and classroom discussion. Fulfills the college’s experiential education requirement for music industry majors.
- Prerequisite: MUSI 1230 and senior standing; music majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Understanding societies and institutions, writing intensive in the major, demonstrating thought and action in a capstone.

MUSI 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.

MUSI 4992 Directed Study (1 to 4 SH)
Focuses on independent work in a selected area of music under the direction of a member of the department. Enrollment is limited to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.
- Repeatability: May be repeated without limit.

MUSI 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated without limit.

MUSI 4994 Internship (4 SH)
Offers students an opportunity for internship work.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

MUSI 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
- NU Core: Experiential learning.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

MUSI 6000 Management of Music Organizations (3 SH)
Examines approaches used to manage and oversee various music organizations, including managing change, decision making, negotiation and presentation skills, and assessing management style. Successful music industry leaders must be well grounded in traditional management knowledge and practices, yet at the same time appreciate the unique aspects of the creative industries.
- Prerequisite: Music industry leadership students only.

MUSI 6100 Music Industry Research Methodology (3 SH)
Offers students an opportunity to develop and enhance their research skills. Success as a music industry manager often hinges on the ability to find solutions effectively and efficiently. Many business mistakes can be directly traced to inaccurate information, inappropriate data, or invalid interpretation. All of these are due to inappropriate research. In an increasingly diversified music industry, managers must be functional in both qualitative and quantitative research methods and data analysis and must develop sensitivity to the target market or subjects of interest. This course is designed to help students understand how good research enables managers to make informed decisions. Requires students to complete written research reports.
- Prerequisite: Music industry leadership students only.

MUSI 6200 Financial Management in the Music Industry (3 SH)
Examines financial reporting and decision making in the music industry. Offers students an opportunity to become proficient in analyzing financial statements to predict the future performance and growth of a firm.
- Prerequisite: Music industry leadership students only.

MUSI 6300 Intellectual Property for Music Management (3 SH)
Focuses on the regulatory frameworks and converging media law. Topics include contracts, licensing, standards, and best practices in intellectual property both at a national and international level.
- Prerequisite: Music industry leadership students only.

MUSI 6400 Marketing Strategies in the Music Industry (3 SH)
Examines the role of strategic planning in developing effective marketing programs that enhance the overall performance of a music organization. Specific topics include consumer behavior, market segmentation, targeting, customer equity, brand equity, brand positioning, marketing research, product policy, pricing strategy, distribution channels, marketing communications, global branding, new product development, and social marketing.
- Prerequisite: Music industry leadership students only.
MUSI 6500 Leadership of Music Organizations (2 to 4 SH)
Examines the role and function of leaders within the music industry. Seeks to extract lessons and insights that can be applied to students’ own approaches to leadership. The readings cover leaders from the music and entertainment industries and other fields as they lead in a variety of contexts. It is an eclectic group who face diverse challenges. Discusses the key elements of leadership, and a framework for thinking about leadership provides the focus for discussions. Offers students an opportunity to develop a coherent and consistent perspective on leadership within the creative industries.
• Prerequisite: Music students only.

MUSI 6540 Special Topics in Music Industry Leadership (1 to 4 SH)
Focuses on various topics related to the music industry.
• Prerequisite: Music industry leadership students only.
• Repeatability: May be repeated up to 11 times for up to 12 total semester hours.

MUSI 6600 Music Industry Negotiation (2 SH)
Immerses students in a variety of negotiations that cover typical music industry agreements within the pop and classical world. Being a leader in the music industry requires one to possess solid negotiating skills for building sustainable businesses or networks of long-term relationships. Covers “interest-based negotiation,” by which the parties “expand the pie” and unearth options for mutual gain for both parties. Offers students an opportunity to role-play multiparty/multi-issue negotiations, heightening the realism of industry scenarios, which often have several stakeholders. Addresses ethics, assertiveness, hardball tactics, presentation, and gender to offer students an opportunity to improve their effectiveness as negotiators.
• Prerequisite: Music students only.

MUSI 6700 Advanced Licensing Techniques for Music Management (2 to 4 SH)
Identifies and explores advanced licensing strategies, techniques, and transactions for various intellectual properties, including music publishing, sound recordings, trademarks/service marks, and likeness/publicity rights. Examines complex or hybrid licenses that cover more than one aspect of IP in the same license and approaches, strategies, and tactics (both successful and unsuccessful) that have been applied to licensing. Offers students an opportunity to develop a dynamic and effective licensing methodology and practice.
• Prerequisite: Music industry leadership students only.

MUSI 6800 Music and Mobile Technologies (3 SH)
Examines the mobile music landscape and the major underlying technical, legal, economic, and creative principles in play. The music mobile space is a hotbed of innovation, new content, and novel monetization approaches. The technology, telecommunications, and creative sectors are undergoing rapid changes at the point of their intersection, and this is particularly true for the music industry. Examines this arena from the points of view of artists, businesses, and consumers.
• Prerequisite: Music industry leadership students only.

MUSI 6964 Co-op Work Experience (0 SH)
Offers eligible students an opportunity for work experience.
• Prerequisite: Music industry leadership students only.

MUSI 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Music industry students only.

MUSI 7980 Capstone (4 SH)
Offers students an opportunity to integrate their course work, knowledge, and experiences into a capstone project. Offers students an opportunity to work in partnership with local, state, or national leaders to produce an operational music company. This is a faculty-guided project for students completing course work in music industry leadership studies.
• Prerequisite: Music industry leadership students only.

MUSI 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Students are expected to present original research on a topic that has received approval from the music industry graduate academic committee.
• Prerequisite: Music industry leadership students only.
• Repeatability: May be repeated without limit.

MUSI 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Prerequisite: Music industry leadership students only.

MUST 1220 Introduction to Music Technology (4 SH)
Provides students with instruction in the use of a computer for composing original music. Topics include MIDI sequencing, digital audio processing, and sound synthesis. Students use music hardware and software to complete a variety of projects.
• Equivalent: IM 3200.
MUST 1301 Introduction to Composition (4 SH)
Designed as the first step in the education of a student composer. The art and craft of composing music is grounded in knowledge of fundamental concepts and hands-on experience. Offers students an opportunity to acquire competence in the notation and layout of a score; develop basic compositional skills (control of melody, harmony, rhythm); and obtain a wide and deep knowledge of the musical repertory.
• Prerequisite: MUSC 1201.

MUST 2315 History of Electronic Music (4 SH)
Exposes students to the history of electronic music from its conception in the late 1800s to the present day. Requires extensive listening and analysis of representative works to ensure students have the opportunity to acquire a clear understanding of the music in question. Studies technical innovations that affected the creation of electronic compositions.
• Prerequisite: MUST 1220 with a grade of C.

MUST 2320 Sound Design (4 SH)
Instructs students in the art of producing and designing musical accompaniments for a variety of media including film, TV commercials, industrial video, animation, games, theatre, and radio drama. Focuses on abstract thinking regarding sound theory and practice and includes hands-on skills.
• NUpath: Exploring creative expression and innovation.

MUST 3420 Music Composition Seminar 1 (4 SH)
Exposes students to the basic methods of music composition. Analyzes examples from music literature to gain an understanding of the methods employed; students complete several compositions of their own.
• Prerequisite: MUST 1301.
• NUpath: Exploring creative expression and innovation, interpreting culture.
• Equivalent: MUSC 2420.

MUST 3421 Digital Audio Processing (4 SH)
Comprises the theory and application of digital audio processing techniques. Includes multitrack digital recording, sampling and sample processing, and encoding audio for various delivery formats.
• Prerequisite: MUST 1220 with a grade of C.
• NUpath: Exploring creative expression and innovation.

MUST 3422 Music Composition Seminar 2 (4 SH)
Exposes students to methods of musical composition. Requires students to compose several short pieces and one piece in a large form on their own. Analyzes examples from the literature to facilitate understanding the methods employed.
• Prerequisite: MUSC 2420 or MUST 3420; music majors and combined majors only.

MUST 3540 Special Topics in Music Technology (1 to 4 SH)
Focuses on topics related to current trends in the area of music technology. Topics vary with each offering.
• Prerequisite: MUST 1220 with a grade of C.
• Repeatability: May be repeated without limit.
• Equivalent: MUST 2540.

MUST 4520 Interactive Real-Time Performance (4 SH)
Focuses on three high-end skills: advanced software-based synthesis and production, abstract reasoning and computer programming, and performing live with electronic instruments in an interactive human-computer environment. Utilizes the MAX programming language, enhanced with MSP, a set of extensions to the MAX graphical programming environment that provides for real-time synthesis and signal processing with a PowerPC Mac OS computer.
• Prerequisite: MUST 2304 with a grade of C, MUSC 2420 or MUST 3420 with a grade of C, and MUST 3421 with a grade of C.
• NUpath: Exploring creative expression and innovation, conducting formal and quantitative reasoning.

MUST 4610 Composition for Electronic Instruments (4 SH)
Instructs students in the composition of original music for electronic and computer-based instrumentation. Students create music to accompany video, animation, and film, and study suitable methods for creating original music for the Internet. Also surveys examples of music written for similar contexts.
• Prerequisite: MUST 3422.
• NUpath: Exploring creative expression and innovation, interpreting culture.

MUST 4611 Music Technology Capstone/Senior Recital (4 SH)
Instructs students in the preparation and presentation of their senior recital. Fulfills the college’s experiential education requirement for music technology concentrators.
• Prerequisite: MUST 4610 and senior standing; music majors and combined majors only.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

MUST 4992 Directed Study (1 to 4 SH)
Focuses on independent work in a selected area of music under the direction of a member of the department. Enrollment is limited to qualified students by special arrangement with the supervising faculty member and with the approval of the department chair.
• Repeatability: May be repeated without limit.

MUST 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
MUST 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

MUST 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

NANOMEDICINE (NNMD)

NNMD 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

NNMD 5270 Introduction to Nanomedicine Science and Technology (3 SH)
Provides an overview of the distinctive features of nanotechnology and their application to biomedical problems. Includes active participation of students in the classroom through in-depth discussion sessions, presentations, and a group project. Taught by Northeastern faculty and guest speakers.
• Prerequisite: Senior or graduate standing.
• Equivalent: IDSC 7270 and NNMD 7270.

NNMD 5272 Nanomedicine General Seminar (1 SH)
Offers an opportunity to prepare and present a research seminar focused on applications of nanosystems in biology and medicine.
• Prerequisite: Senior or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: IDSC 7272 and NNMD 7272.

NNMD 5274 Nanomedicine Advanced Seminar (1 SH)
Continues NNMD 5272 with advanced scientific findings and innovations in the field of nanomedicine by leading researchers and clinicians.
• Prerequisite: NNMD 5272 and junior, senior, or graduate standing.
• Repeatability: May be repeated up to 2 times.

NNMD 5370 Nanomedicine Research Techniques (4 SH)
Offers an in-depth look at laboratory methods and tools for studying nanomaterials used in biology and medicine. Includes hands-on sessions with experts in research techniques, including nanoparticle synthesis, TEM, SEM, AFM, MRI, optical microscopy, etc.
• Prerequisite: NNMD 5270 and senior or graduate standing; restricted to students in the Bouvé College of Health Sciences, the College of Engineering, and the College of Science.
• Equivalent: IDSC 7370 and NNMD 7370.

NNMD 5470 Nano- and Biomedical Commercialization: From Concept to Market (3 SH)
Offers a comprehensive overview of key elements involved in commercialization of biomedical technologies. Discusses fundamental concepts around various business models, protection of intellectual property (IP), capital and financing, and mathematical modeling of business valuation and transactions. Also covers regulatory process for technical and clinical validation of biomedical solutions, as well as mechanisms for raising capital to support product development. Requires each student to complete an individual project and a team project, which are selected from ongoing research activities at Northeastern University and other leading research centers and are designed to apply concepts learned throughout the course.
• Prerequisite: Senior or graduate standing; restricted to students in the D’Amore-McKim School of Business, the College of Engineering, the Bouvé College of Health Sciences, and the College of Science.

NAVY ROTC (NAVY)

NAVY 1001 Naval Science Laboratory (0 SH)
Focuses on either drill instruction or practical work to complement classroom instruction. Must be taken in each class semester by all NROTC nursing students.
• Prerequisite: ROTC students only.

NAVY 1101 Introduction to Naval Science (2 SH)
Presents a general introduction to the naval profession and the concepts of sea power. Emphasizes the mission, organization, and warfare components of the United States Navy and Marine Corps. Includes an overview of officer and enlisted ranks and rates, training and education, and career patterns. Also covers naval courtesy and customs, military justice, leadership, and nomenclature. Exposes the student to the professional competencies required to become a naval officer.
• Prerequisite: ROTC students only.
NAVY 2102 Naval Ships Systems (3 SH)
Offers an overview of the engineering plants that propel and power U.S. Navy warships. Covers the basic engineering principles relating to thermodynamics, steam propulsion (conventional and nuclear), gas turbine propulsion, internal combustion engines, electricity generation and distribution, and various support systems. Also discusses ship design, stability, damage control, and some engineering-related ethical issues. At the conclusion of the course, the successful student should have a basic understanding of the engineering systems that naval personnel operate in the fleet.
• Prerequisite: ROTC students only.

NAVY 2201 Naval Weapon Systems (3 SH)
Covers laser fundamentals, applications, side-looking radar, and radar holography. Includes selected readings on naval weapons and fire control systems.
• Prerequisite: ROTC students only.

NAVY 2202 Sea Power and Maritime Affairs (3 SH)
Offers a historical study of the U.S. Navy from the American Revolution to the modern era. Traces the U.S. Navy’s rise from a coastal defense force into the world’s premier naval power. Major themes include wars, events, people, technology, strategy, tactics, and diplomacy that shaped naval history and America’s role in the world.
• Prerequisite: ROTC students only.

NAVY 2840 History of War (4 SH)
Traces five centuries of war to uncover depths of depravity and cruelty and heights of sacrifice and suffering. Why do we make war? Nothing else so engages the human genius for creative destruction.
• Prerequisite: ROTC students only.

NAVY 3702 Leadership and Ethics (3 SH)
Provides a foundation of leadership principles and management tools and skills to prepare and motivate students to assume the responsibilities of a commissioned officer in the United States Navy confidently. Reinforces leadership principles through leadership case studies with emphasis on core values, responsibility, accountability, loyalty, and professional ethics. Provides a basic background in the responsibilities of a junior division officer and watch officer, with emphasis on training, counseling, career development, military law, and special programs. This is the capstone course of Naval Science.
• Prerequisite: ROTC students only.

NAVY 4101 Naval Operations and Seamanship (3 SH)
Offers a capstone course for senior midshipmen in advanced navigation, communications, naval operations, and naval warfare. Offers students an opportunity to learn through simulation in a computer classroom.
• Prerequisite: ROTC students only.

NAVY 4501 Leadership and Management (2 SH)
Studies at an advanced level organizational behavior and management in the context of the naval organization. Topics include the management functions of planning, organizing, and controlling; individual and group behavior in organization; and motivation and leadership. Explores major behavioral theories in detail. Investigates practical applications by the use of experiential exercises, case studies, and lab discussions. Develops other topics including decision making, communication, responsibility, authority, and accountability.
• Prerequisite: ROTC students only.

NETS 7341 Network Economics (4 SH)
Effective Spring 2017
Covers seminal works in the economics of information and networks, including Akerlof, Arrow, Spence, Stiglitz, and von Hayek. Proceeds through concepts of information, its value, and measurement; search and choice under uncertainty; signaling, screening, and how rational actors use information for private advantage; strategy-given network effects; two-sided (or multisided) network effects, organizational information processing, learning, and social networks; and other micro- and macroeconomic effects such as matching markets. Although primarily a theory course, it may be of interest to any student applying information economics and network economics in academic, commercial, or government policy contexts. Expect students to produce a major paper suitable for publication or inclusion in a thesis.
• Prerequisite: Graduate course in microeconomics and mathematics at the level of introductory calculus and statistics.

NETS 7983 Topics (4 SH)
Covers various topics in network science.
• Repeatability: May be repeated up to 2 times for up to 12 total semester hours.

NETS 8984 Research (1 to 4 SH)
Offers advanced students an opportunity to work with an individual instructor on a topic related to current research. Instructor and student negotiate a written agreement as to what topic(s) are covered and what written or laboratory work forms the basis for the grade. Viewed as a lead-in to dissertation research.
• Repeatability: May be repeated without limit.

NETS 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.
NETS 9990 Dissertation (0 SH)
Offers experimental and theoretical work for PhD candidates.
Requires written dissertation and final oral exam.
• Repeatability: May be repeated once.

NETS 9996 Dissertation Continuation (0 SH)
Offers experimental and theoretical work for PhD candidates.
Requires written dissertation and final oral exam.
• Prerequisite: NETS 9990.
• Repeatability: May be repeated without limit.

NURSING (NRSG)

NRSG 1000 College: An Introduction (1 SH)
Provides an introduction to the University, college, and health professions to enhance students’ understanding of self and the decisions they make academically and socially as members of the University’s diverse, multicultural community. Group activities and individual assignments along with active participation in a learning community help students adjust to life on an urban campus, develop a better understanding of the learning process, acquire essential academic skills, and make connections with the faculty and students in the college.

NRSG 1205 Wellness (4 SH)
Explores the concept of wellness and examines behaviors and lifestyle choices that lead to a high level of physical, emotional, and spiritual well-being. Topics include health risk, behavioral change, lifestyle analysis, the life cycle, and stress management through self-analysis.

NRSG 1206 Wellness Abroad (4 SH)
Explores wellness as both a concept and a self-care experience. Introduces theories and models of holism, wellness, stress, health promotion, health belief, and change as frameworks by which the student may learn to reflect upon personal behaviors and lifestyle choices that influence health and well-being. Topics include lifestyle analysis, health risk, behavioral change, and stress/stress-reduction comparisons across cultures.
• Repeatability: May be repeated without limit.

NRSG 2000 Professional Development for Co-op (1 SH)
Introduces the Bouvé Cooperative Education Program. Offers students an opportunity to develop job-search and career-management skills. Students perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Offers students an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Familiarizes students with workplace issues relative to their field of study and presents the MyNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.
• Prerequisite: Nursing majors only.

NRSG 2206 Global Perspectives in the Science and Practice of Mindfulness (4 SH)
Offers students an opportunity to explore theoretical, practical, and clinical applications of mindfulness in a variety of situations. Presents the theoretical underpinnings through text as well as through dialogue with peers, practitioners, and clinicians in the field. Practice includes a daily exploration of embodied learning experiences. Clinical site visits seek to deepen the student’s comprehension of the practice applications of mindfulness in health, illness, and healing. Reflection and reflexivity frame inquiry into the inner and outer worlds of the student’s lived experience as a global citizen. Major topics include stress reduction, focused attention, cultural intelligence, and intercultural communication. Taught abroad.
• Repeatability: May be repeated without limit.

NRSG 2210 Influences on Health and Illness: A Nursing Perspective (3 SH)
Offers a context within which students have an opportunity to begin to understand, develop, and nurture a professional nursing identity. Through situated learning within a model of whole-person care, the student may utilize clinical imagination and reasoning to explore culturally mediated behaviors and meanings that are ascribed to health and illness experiences across the life span. Empirical, personal, ethical, and aesthetic ways of knowing create a framework for personal reflection and reflexivity. Integrated learning strategies guide the beginner’s study of communication and relationships with patients, families, and providers. Guiding course principles include foundations of the nursing profession, nursing self-care and well-being, compassionate care, social justice, and quality and safety.
• Prerequisite: (a) BIOL 1117 and BIOL 1121 or (b) graduate standing; nursing majors only.
• NU Core: Comparative study of cultures.
• NUpath: Exploring creative expression and innovation, engaging difference and diversity.
• Equivalent: NRSG 0860.
NRSG 2220 Nursing Interventions, Assessment, and Community Care (4 SH)
Introduces the concepts of wellness and caring and application of the nursing process as the framework for providing holistic and quality nursing care to clients. Explores with students the professional role of the nurse and ethical, cultural, spiritual, social, psychological, developmental, gender, community-based, and physical considerations in meeting client health needs and promotion of health. Develops health-assessment and nursing skills through nursing theory, rationales, critical thinking, and evidence-based knowledge.
- Prerequisite: (a) BIOL 1119, BIOL 1121, and either CHEM 1101 or CHEM 1211, each with a grade of C; or (b) graduate standing; nursing majors only.
- Corequisite: NRSG 2221.
- Equivalent: NRSG 1101, NRSG 1102, NRSG 1103, and NRSG 1104.

NRSG 2221 Lab for NRSG 2220 (1 SH)
Introduces and facilitates the student foundation and mastery of beginning assessment techniques and nursing skills for application to nursing practice and delivery of safe care of clients. Offers students an opportunity to engage in learning through demonstration and supervised practice of skills. Additional opportunities for students to enhance quality care practice, communication techniques, and critical thinking and reasoning skills are delivered in a center for simulation client care experiences. The Electronic Medical Record systems enables students to gain knowledge and practice in documentation of client health care, effective communication, and interprofessional collaboration for improved client outcomes.
- Prerequisite: Nursing majors only.
- Corequisite: NRSG 2220.
- NU Core: Experiential learning.
- Equivalent: NRSG 1101, NRSG 1102, NRSG 1103, and NRSG 1104.

NRSG 2300 Pathophysiology (3 SH)
Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological functions, endocrine functions, and skin integrity. Explores how the human body uses its adaptive powers to maintain equilibrium and how alterations affect normal processes. Examines disease processes and implications for nursing practice.
- Prerequisite: BIOL 1119.
- Equivalent: NRSG 0870.

NRSG 2306 Nursing with Acutely Ill Adults and Families (4 SH)
Focuses on the therapeutic nursing interventions used to restore health to adults who are experiencing acute and/or complex health problems. Analyzes deviations from health with attention to the implications for the individual and the family in coping with health problems. Analyzes the client's healthcare needs and the resources to meet them, in collaboration with the client and health providers. Discusses ethical and legal dimensions of nursing care of adults. Emphasizes discharge planning and teaching. Includes clinical learning experiences in a variety of settings.
- Prerequisite: NRSG 3302.
- Corequisite: NRSG 2307.

NRSG 2307 Clinical for NRSG 2306 (4 SH)
Accompanies NRSG 2306. Covers topics from the course through various activities.
- Corequisite: NRSG 2306.

NRSG 2310 Nursing Adults in the Community (1 SH)
Emphasizes the promotion of health in adults and includes common health problems of adults at critical life stages, from the young adult to the frail, elderly years. Analyzes potential and actual health-risk factors and the discovery of risk-reduction strategies by applying the nursing process to the care of adults living within families and communities. Enables students to use health education and teaching methods in assessing and intervening therapeutically to meet the primary healthcare needs of adults. Assesses the role of the nurse in partnership with the family and community in disease prevention. Includes clinical learning experiences in a variety of settings.
- Prerequisite: NRSG 3302.
- Corequisite: NRSG 2311.

NRSG 2311 Clinical for NRSG 2310 (1 SH)
Accompanies NRSG 2310. Covers topics from the course through various activities.
- Corequisite: NRSG 2310.

NRSG 2312 Pathophysiology (4 SH)
Reviews human physiology related to oxygenation, nutrition, elimination, protective mechanisms, neurological function, endocrine function, and skin integrity. Explores how the human body uses its adaptive powers to maintain a steady state and how alterations affect normal processes. Examines disease process and implications for nursing practice.
- Prerequisite: BIOL 1119 with a grade of C; nursing majors only.
- Equivalent: NRSG 2300.
NRSG 3302 Nursing with Women and Families (3 SH)
Emphasizes the promotion of health for childbearing women and their families. The nursing process provides the framework for students to assess and therapeutically intervene in promoting healthy childbearing and health during the life span. Self-care and empowerment are an integral focus in examining women’s health from a developmental perspective. Examines the nursing role of the professional nurse in the context of concepts of human development of individual, family, and community. Discusses the effects of cultural, social, economic, and ethical influences and the impact of healthcare technology.
• Prerequisite: (a) NRSG 2220, NRSG 2312, PHSC 4340, and undergraduate standing or (b) NRSG 2220, NRSG 5117, NRSG 5126 (all may be taken concurrently) and graduate standing; nursing students only.
• Corequisite: NRSG 3303.
• Equivalent: NRSG 0880.

NRSG 3303 Clinical for NRSG 3302 (2 SH)
Focuses on applying the theories, principles, and concepts studied in NRSG 3302 to providing nursing care for women and their families with a focus on the childbearing family.
• Prerequisite: Nursing majors only.
• Corequisite: NRSG 3302.
• NU Core: Experiential learning.
• Equivalent: NRSG 1200.

NRSG 3320 Nursing Care of Adults 1 (4 SH)
Focuses on the care of adults experiencing common health problems. Builds on the conceptual foundation learned in sciences, nursing practice, physical assessment, pharmacology, nutrition, and growth and development. Emphasizes the acute care of adults and application of the nursing process. Explores expanding concepts of health and illness, including management of patients transitioning from acute care to the home or rehabilitation settings.
• Prerequisite: (a) NRSG 2210, NRSG 2220, NRSG 2221, NRSG 2312, NRSG 3323 (may be taken concurrently), NRSG 3324 (may be taken concurrently), PHSC 4340, and undergraduate standing or (b) NRSG 2210 (may be taken concurrently), NRSG 2220, NRSG 2221, NRSG 5117, NRSG 3323 (may be taken concurrently), NRSG 3324 (may be taken concurrently), NRSG 5126, and graduate standing; nursing students only.
• Corequisite: NRSG 3321.
• Equivalent: NRSG 1200.

NRSG 3321 Clinical for NRSG 3320 (2 SH)
Emphasizes clinical skills that focus on the application of knowledge learned in NRSG 3320.
• Prerequisite: Nursing majors only.
• Corequisite: NRSG 3320.
• NU Core: Experiential learning.
• Equivalent: NRSG 1201.

NRSG 3323 Intermediate Interventions and Assessment (1 SH)
Focuses on principles and concepts that support nursing assessment and the performance of advanced nursing skills in the adult patient. Discusses health assessment, nursing interventions, and communication techniques that support clinical decision making within the nursing process framework. Emphasizes critical analysis of the appropriateness and accurate performance of nursing interventions to ensure the provision of safe quality care. Covers the delivery of culturally competent care and the professional development of the nurse as an interprofessional team member.
• Prerequisite: NRSG 2220, NRSG 2221, and either NRSG 2312 or NRSG 5126; nursing students only.
• Equivalent: NRSG 0330 and NRSG 2322.

NRSG 3324 Lab for NRSG 3323 (1 SH)
Introduces the practice and application of advanced nursing skills, health assessment, and communication techniques studied in NRSG 3323. Offers students an opportunity to develop and master advanced assessment and intervention skills by supervised practice and demonstration. Participation in simulated patient care experiences is designed to enable the student to engage in clinical reasoning based on patient interaction and assessment that leads to the identification of appropriate nursing interventions.
• Prerequisite: Nursing majors only.
• Corequisite: NRSG 3323.
• Equivalent: NRSG 0340 and NRSG 2322.

NRSG 3400 Nursing and the Promotion of Mental Health (3 SH)
Focuses on primary, secondary, and tertiary prevention as it relates to individuals with mental health issues. Incorporates principles of communication, with particular focus on individuals with altered patterns of communication. Helps students provide nursing care to individuals, families, and groups with a variety of mental health and mental illness-related issues. Provides students information about the spectrum of mental illnesses and about factors that predispose people to developing mental health problems. Critical thinking skills are employed to explore the legal and ethical issues of providing nursing care for mentally ill persons. Use of psychotropic drugs is integrated throughout the course as it applies to specific psychiatric illnesses. In patient and community settings are utilized as learning arenas to assist students to meet the course objectives.
• Prerequisite:
• Prerequisite: (a) NRSG 2220 with a grade of C and (b) PSYC 3404 (may be taken concurrently) with a grade of C or graduate standing; nursing majors only.
• Corequisite: NRSG 3401.
• Equivalent: NRSG 0920.
NRSG 3401 Clinical for NRSG 3400 (2 SH)
Focuses on applying the theories, principles, and concepts learned in NRSG 3400 in providing psychiatric mental health (PMH) nursing care.
• Prerequisite: Nursing majors only.
• Corequisite: NRSG 3400.
• NU Core: Experiential learning.
• Equivalent: NRSG 0930.

NRSG 3420 Nursing Care of Adults 2 (4 SH)
Focuses on the care of adults and their families experiencing complex physiological insults across the lifespan. Builds on the conceptual foundation established in NRSG 3320. Offers students an opportunity to improve their organizational skills through the expanding complexity of patient acuity levels and workloads in an advanced health care setting. Emphasis is on complex decision and critical thinking through collaboration and the use of evidence-based practices in high acuity and critical care settings. Seeks to help the student to conceptualize care of the ill patient from admission to discharge and beyond, as a means of holistic practice that demonstrates knowledge of prevention, promotion, maintenance, and restoration of the clients with complex health problems.
• Prerequisite: NRSG 3320, NRSG 3321, NRSG 3323, and NRSG 3324; nursing majors only.
• Corequisite: NRSG 3421.
• Equivalent: NRSG 2306.

NRSG 3421 Clinical for NRSG 3420 (2 SH)
Focuses on applying the theories, principles, and concepts covered in NRSG 3420 in providing nursing care to adults in increasingly complex situations. Builds upon clinical skills established in NRSG 3321.
• Prerequisite: Nursing majors only.
• Corequisite: NRSG 3420.
• NU Core: Experiential learning.
• Equivalent: NRSG 2307.

NRSG 4502 Nursing Care of the Child (4 SH)
Builds on developmental and family theory. Focuses on the principles of nursing care of children experiencing acute and/or complex, chronic health problems and their families. The complex health issues are analyzed within the context of the individual, family, and community. Offers students an opportunity to explore evidenced-based practices within the framework of the nursing process. The therapeutic role is addressed in partnership with the family and resources available within a collaborative and interdisciplinary environment.
• Prerequisite: NRSG 3420, 3421, and junior, senior, or graduate standing; nursing majors only.
• Corequisite: NRSG 4503.
• Equivalent: NRSG 4500.

NRSG 4503 Clinical for NRSG 4502 (2 SH)
Focuses on applying the theories, principles, and concepts learned in NRSG 4502 in providing nursing care for acutely and/or chronically ill children and their families in a pediatric clinical setting.
• Prerequisite: Junior, senior, or graduate standing; nursing majors only.
• Corequisite: NRSG 4502.
• Equivalent: NRSG 4501.

NRSG 4602 Nursing with Vulnerable Populations Abroad (3 SH)
Focuses on therapeutic interventions for the community in this study-abroad course. Analyzes care of populations, individuals, and families from a nursing process, epidemiological, and prevention framework. Emphasizes the role of the public health nurse in multiple arenas of practice in the United States and countries abroad. Examines factors that contribute to vulnerability in different population groups in selected countries and costs associated with levels of prevention. Designed to enable students to understand the value and use of assessment from the point of view of human biology; maturation and aging; physiologic function; physical, psychological, and social environment; and lifestyle. Examines community-based strategies for underserved populations that live in a variety of communities, both urban and suburban, in the United States and countries abroad.
• Corequisite: NRSG 4603.

NRSG 4603 Clinical for NRSG 4602 (2 SH)
Accompanies NRSG 4602. Covers topics from the course through various activities in this faculty-led study abroad.
• Prerequisite: NRSG 3420.
• Corequisite: NRSG 4602.
• Equivalent: NRSG 4601.

NRSG 4604 Public Health Community Nursing (3 SH)
Introduces population-focused nursing and applies the nursing process to the community as client. Examines evidence-based health-promotion strategies in a variety of community settings. Addresses core functions and essential services of public health, and introduces epidemiological and economic concepts and models. Emphasizes the involvement of the community/public health nurse in ethical issues and health policy, focusing on vulnerable populations in giving cultural and linguistic-competent care. Examines community-based strategies and interprofessional collaboration to care for underserved populations in both urban and suburban communities. Emphasizes the community/public health nurse as a population-focused care provider, case manager, deliverer of quality nursing care, care coordinator, critical thinker, liaison between agencies, and nursing researcher.
• Prerequisite: NRSG 3400, NRSG 3401, and junior, senior, or graduate standing; nursing students only.
• Corequisite: NRSG 4605.
• NUpath: Interpreting culture.
NRSG 4605 Clinical for NRSG 4604 (2 SH)
Seeks to facilitate the student’s socialization to population-focused nursing and to plan care for the community as client. Emphasizes the application of knowledge when addressing core functions and essential services of public health, epidemiology, and economic concepts and models. Students engage in cultural and linguistically-appropriate health assessment, health promotion, and illness-prevention strategies in a variety of community settings. This may include acting as a community/public health nurse for ethical issues, health policy, coordination of care, interprofessional collaboration, liaison between agencies, and facilitation of healthcare research. Examines and evaluates types of community-based strategies used to serve underserved and vulnerable populations to ensure quality care for those living in both urban and suburban communities.
• Prerequisite: Junior, senior, or graduate standing; nursing students only.
• Corequisite: NRSG 4604.
• NUpath: Integrating knowledge and skills through experience.

NRSG 4610 Managing and Leading in Healthcare (4 SH)
Introduces various theoretical frameworks that support principles of leadership and management in nursing in all types of organizational settings. Emphasizes developing, enhancing, and demonstrating leadership skills, competencies, and aptitudes. Exposes students to practical situations in the management of current and practical patient care in diverse healthcare settings. Integrates organizational structure; methods of nursing care delivery; comparison of management and nursing processes; decision making; change; communication skills; interprofessional collaboration; team building; ethical considerations; interpersonal skills of effective nursing leadership and management; and organizational issues related to the quality of client, family, and personal outcomes.
• Prerequisite: NRSG 3420 and senior or graduate standing; nursing students only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

NRSG 4611 Managing and Leading in Healthcare—An International Perspective (4 SH)
Focuses on the knowledge and skills related to the delivery of health services within a nursing management context. Presents theories, concepts, and models—such as managed care, organization and management, authority, delegation, resource allocation, budgeting, leadership and empowerment, change, motivation, environmental safety, quality improvement, collective bargaining, and conflict resolution—to give students an understanding of the knowledge base for the management role of the baccalaureate nurse. Provides the opportunity to apply principles and practice skills in planning and delegating nursing care using different organizational models and approaches. Discusses the developing creative role for managing and leading in nursing. Includes case-based educational learning experiences and projects. Exposes students to practical situations in various healthcare settings in the United States and the country of study. Provides a context for comparing and contrasting healthcare issues in the U.S. and the country of study.
• NU Core: Capstone, writing intensive in the major.
• Repeatability: May be repeated without limit.

NRSG 4620 Innovations in Nursing Practice (4 SH)
Offers the student an opportunity to demonstrate professional competency and integrate the critical thinking knowledge required in nursing practice. The student has an opportunity to identify, develop, and complete a project that is mutually acceptable to faculty and an agency. The project must demonstrate the role of the professional nurse in relation to professional responsibility in a selected health context, which can be any type of healthcare setting, and must focus on leadership responsibilities to improve the quality of care and/or improve the work environment.
• Prerequisite: HLTH 5450 (which may be taken concurrently), NRSG 4610, NRSG 5100, NRSG 5101, NRSG 5118 (which may be taken concurrently), NRSG 5120, and senior standing; RN-to-BSN students only.
• NU Core: Capstone.

NRSG 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

NRSG 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: NRSG 4970.
• Repeatability: May be repeated without limit.
NRSG 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

NRSG 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

NRSG 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

NRSG 4995 Comprehensive Nursing Practicum (5 SH)
Seeks to prepare students to synthesize nursing knowledge, skills, and experience and facilitate their transition to professional nursing practice and case management of clients with health problems. Seeks to assist students demonstrate leadership and collaborative skills in working with other members of the healthcare team through a weekly precepted relationship with an RN. Includes clinical learning experiences within hospital and community settings. Classwork includes a review of professional domains in all previous clinical courses in the nursing curriculum to help prepare students for licensure.
• Prerequisite: NRSG 3420, NRSG 3421, NRSG 4502, NRSG 4503, and senior or graduate standing; nursing majors only.

NRSG 5000 Advanced Perspectives in Wellness (4 SH)
Offers students an opportunity to explore wellness through both theoretical and experiential pathways. Introduces theories and models of holism, wellness, stress, health promotion, health belief, and change as operational frameworks by which the student has an opportunity to reflect upon personal history, health and risk-taking behaviors, and lifestyle choices that influence health and well-being. Studies the art and science of self-care through both the emic and etic perspectives. Course topics include holistic lifestyle and health analysis, behavioral change, decision making, and stress/stress reduction. Embodied learning methodologies inform course delivery.
• Prerequisite: Junior, senior, or graduate standing.

NRSG 5100 Professional Development and Scientific Basis (4 SH)
Surveys current developments in the scientific basis of nursing practice. Examines physiological, psychological, sociological, and cultural perspectives that influence behavior and health responses. Emphasizes critical thinking and analysis of both lay and scientific publications. Students are encouraged to develop an individual portfolio based on core studies drawn from their professional practice. Emphasizes principles of adult learning, formulating career goals, and planning learning experiences. Encourages critical thinking, writing skills, and understanding of group processes.
• Prerequisite: Junior, senior, or graduate standing.

NRSG 5101 Computer and Nursing Informatics (3 SH)
Focuses on information and knowledge development concepts, data processing, and use of micro-, mini-, and mainframe computers in nursing practice. Introduces technologies used in nursing practice, such as hospital and nursing information system applications and decision support systems. Discusses the impact of computers and informatics on the future direction of nursing practice. Includes demonstration of computer-aided instruction, physiological monitoring devices, and applications of various software packages related to nursing practice, and the opportunity to practice computer skills.
• Prerequisite: Junior, senior, or graduate standing.

NRSG 5102 Public Health Nursing (4 SH)
Focuses on the knowledge, skills and attitudes necessary for advanced nursing practice in a variety of community-based settings. Introduces biostatistics, epidemiology, and demography as the foundation sciences of public health. Examines definitions of health and illness, considering local, regional, national, and international communities. Explores nursing roles that affect the public health in the home, at work, and especially in the community. Expands the focus of intervention from the individual to the family and the community. Provides opportunities in the field for experiential learning in the community.
• Prerequisite: NRSG 5100 and junior, senior, or graduate standing.

NRSG 5103 Cultural Diversity in Nursing Practice (3 SH)
Provides an opportunity to explore the implications of cultural diversity in advanced nursing practice. Examines and critiques selected theoretical perspectives including medical anthropology and sociology and ethnomethodological analysis. Considers the epidemiology of folk illnesses and ethnic differences in morbidity and mortality. Students examine their own cultural health/illness perceptions as a basis for comparing the perceptions of selected groups and those of the Western allopathic medical model.
• Prerequisite: NRSG 5100 and junior, senior, or graduate standing.
NRSG 5117 Advanced Pharmacology (2 SH)
Focuses on principles of pharmacology and the major drug classifications in relation to the treatment of health problems across the life span. Examines the effects of selected medications on pathophysiology and psychopathology. Emphasizes dose response, side effects/drug interactions, route of administration, and place in clinical therapy.
• Prerequisite: Junior, senior, or graduate standing.

NRSG 5118 Healthcare System and Professional Role Development (3 SH)
Examines the role of the advanced practice nurse within the context of today’s healthcare system. Focuses discussion on dimensions of the advanced practice nursing role, including intra/interdisciplinary collaboration, consultation, leadership, diversity, and accountability for quality care. Examines the healthcare system with special focus on social, political, economic, ethical, regulatory, research, and legal trends. Students are expected to evaluate the interaction between healthcare system issues and advanced practice role dimensions.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: NRSG 5110.

NRSG 5120 Statistics for Health Science (3 SH)
Focuses on applying formal reasoning to understand the underlying principles of statistics; how to select and conduct statistical tests; and how to interpret and use the results of data analysis in relation to research questions and research hypotheses.
• Prerequisite: Junior, senior, or graduate standing.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.

NRSG 5121 Epidemiology and Population Health (3 SH)
Examines the theoretical basis for identification and analysis of the distribution and determinants of health problems at community, national, and international population levels. Considers health disparities that exist among specific populations and the role of government in setting policies for health promotion and disease prevention. Covers three topical areas: basic principles and population measures of epidemiology; epidemiologic study methods; and application of epidemiologic tools in interdisciplinary settings. Complements planned topics with current examples of population health issues. The goal is to understand the principles and practice of monitoring population health. Skills acquired assist advanced practice nurses, other clinicians, or administrators in critically evaluating new epidemiologic literature and in using the basic tools of epidemiology to assess population health and develop strategies for monitoring health improvement.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: NRSG 5111 and NRSG 5127.

NRSG 5126 Pathophysiology for Advanced Practice (3 SH)
Covers content that provides current understanding of major disease processes across the life span. Builds on the knowledge of anatomy, physiology, biochemistry, microbiology, and immunology. Focuses on physiologic dysfunction; physiologic adaptation in maintaining the internal environment; and feedback mechanisms at the cellular, organ, and systems level. Seeks to provide students with a way of thinking about disease for each body system. Provides a comprehensive study of underlying concepts common to major pathophysiologic processes of the body, including specific diseases affecting the cardiovascular, endocrine, gastrointestinal, hematological, immunological, nervous, pulmonary, and renal systems.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: NRSG 5116.

NRSG 5127 Scientific Inquiry and Epidemiological Concepts (3 SH)
Emphasizes methods of scientific inquiry and epidemiological concepts relative to individual and population health. Addresses multiculturalism concepts relative to health and illness. Stresses theoretical frameworks, methods of inquiry, and appropriate use of selected statistical analyses. Offers students an opportunity to analyze data to improve healthcare delivery for individuals and populations. Examines threats to internal and external validity. Emphasizes critical appraisal of literature as evidence as a basis for translation into practice. Explores strategies and tools for retrieval, compilation, critical appraisal, and application of empirical and practice-based information.
• Prerequisite: USAGPAN students only.
• Equivalent: NRSG 5111 and NRSG 5121.

NRSG 5170 Statistics in Nursing (2 SH)
Part of the USAGPAN program. This course provides students the opportunity to understand biostatistics and their application in scientific research. Students conduct a systematic inquiry relative to an identified anesthesia problem, conduct a research study, and apply the appropriate statistical measurement to analyze the data. In addition, the statistical foundation obtained from this course will enable students to critically analyze scientific literature.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.

NRSG 5172 Clinical Anatomy and Physiology 1 for Nurse Anesthesia (6 SH)
Part of the USAGPAN program. This course provides students the opportunity to study the anatomy and physiology of the cell, muscle, nervous, and cardiovascular systems with particular reference to their applicability to anesthesia and acute care management. Students engage in critical thinking regarding the effects of anesthetics on physiological processes and its relation to their client’s state of health/wellness as it interacts with culturally diverse populations in the 21st century.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.
NRSG 5174 Clinical Anatomy and Physiology 2 for Nurse Anesthesia (5 SH)
Part of the USAGPAN program. This course provides students the opportunity to build upon their knowledge of the anatomy and physiology of the endocrine, respiratory, and renal systems with particular reference to anesthesia, respiratory, and acute care management. Students engage in critical thinking regarding the effects of anesthesia on the normal physiological processes of the respiratory, endocrine, and renal systems.
• Prerequisite: NRSG 5172 with a grade of B; junior, senior, or graduate standing; USAGPAN students only.

NRSG 5176 Theoretical and Research Applications in Nurse Anesthesia (3 SH)
Part of the USAGPAN program. This course investigates the philosophical and theoretical bases underlying concepts and operations inherent in nursing. Theories from behavioral, natural, applied, and nursing sciences are examined. Theoretical frameworks and concepts are explored as a foundation for research relative to practice of nursing anesthesia. This course focuses on the research process from problem formulation to analysis and interpretation. Emphasizes is on research designs, methods, and appropriate use of selected statistical analyses. Critique of research is also explored. Students have the opportunity to input and analyze data using SPSS.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.

NRSG 5178 Information Systems in Advanced Nursing Practice (2 SH)
Part of the USAGPAN program. This course focuses on the methods and tools of information handling relative to selected aspects of anesthesia nursing, healthcare, education, and research. The process of organizing, collecting, processing, and analyzing of data is explored as a basis for clinical decision-making. Automation of communication, manuscript/proposal preparation, databases, and budgeting are emphasized. The integration of Word, SPSS, Excel, Access, and PowerPoint are explored. Computer-based resources including word processing, presentation software, bibliographic software, search engines and databases are used to assist in acquisition, maintenance, and presentation of information in a scholarly format. Research findings in the use of informatics are addressed.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.

NRSG 5180 Evaluation and Application of Research in Advanced Nursing Practice (4 SH)
Part of the USAGPAN program. This course provides students the opportunity to integrate theory, research and practice. Students conduct a systematic inquiry relative to an identified anesthesia problem. Specifically, the students design and implement a research protocol. This process provides experience in research design, implementation, and evaluation. Students submit a manuscript of the research to a refereed journal and present either a podium or a poster presentation at national meeting.
• Prerequisite: NRSG 5176 and NRSG 5178 and junior, senior, or graduate standing; USAGPAN students only.

NRSG 5182 Physical Examination and Differential Diagnosis (4 SH)
Part of the USAGPAN program. This course provides students the opportunity to refine and specialize their assessment skills with an emphasis on assessing for the presence and quantifying the severity of problems with significant implications for anesthesia care. Particular attention is paid to the importance of consulting appropriately for preoperative optimization and the development of plans for anesthesia care that minimize anesthesia related risk.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.

NRSG 5184 Biochemistry for Nurse Anesthesia (4 SH)
Part of the USAGPAN program. A graduate level course which provides the student an opportunity to correlate biochemical principles as they apply to the physiology, pathophysiology, and pharmacology of anesthesia nursing. Major topics covered include: (1) structure and function of DNA, RNA and proteins; (2) basic medical genetics; (3) protein structure and function; (4) common metabolic pathways of carbohydrates, lipids, and amino acids; and (5) special topics including clinical chemistry. Lectures are supplemented by case studies and clinical correlate presentations related to anesthesia.
• Prerequisite: Junior, senior, or graduate standing; USAGPAN students only.

NRSG 5976 Directed Study (1 to 4 SH)
Allows student to develop an individualized plan to attain specific knowledge and skills related to professional goals. May consist of library study and reading, individual instruction, research, practicum, or other appropriate activity as approved by instructor and academic adviser.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

NRSG 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
NRSG 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • Prerequisite: Junior, senior, or graduate standing.
  • Repeatability: May be repeated without limit.

NRSG 6115 Health Assessment (3 SH)
Focuses on human physiology and the development of advanced health assessment knowledge and skills related to performing regional and comprehensive examinations of the client across the life span. Includes variables among cultural groups. Students synthesize knowledge from nursing, physical, social, and health sciences as they analyze data collected in the assessment process. Focuses on interviewing skills and systematic performance, analysis and documentation of health assessment process. Differentiation of normal and abnormal findings is emphasized utilizing critical thinking. Introduces the student to diagnostic reasoning within the scope of practice of the nurse in the advanced practice role. Nursing degree students only.
  • Equivalent: NRSG 5115.

NRSG 6116 Advanced Health Assessment of the Neonate and Infant (3 SH)
Focuses on human physiology and the development of advanced health assessment skills to build a knowledge base with which to perform a thorough assessment and examination of the neonate and infant. Offers students an opportunity to learn to evaluate family history through chart review and direct interviewing to gain knowledge of the neonate and to anticipate certain findings based on information gained through a thorough assessment and physical examination. Emphasizes identifying normal from abnormal findings through critical thinking, introducing the student to diagnostic reasoning, which is the basis of the advance practice nurse role.
  • Prerequisite: Nursing students only.

NRSG 6122 Theory and Practice of Nursing Research (4 SH)
Addresses the development of nursing science. Emphasizes the relationship between theory building and research for the discipline and advanced nursing practice. Requires students to complete an in-depth analysis of the research process and apply this analysis in the evaluation of published research reports related to healthcare. Topics include evidence-based practice, knowledge development and the scientific method, ethics, literature reviews, qualitative and quantitative approaches to research, research designs, sampling, data collection methods, reliability and validity of data-gathering procedures, computer utilization and data processing, statistical applications, analysis of findings, and utilization of research results. Aims course activities at assisting students to develop skills as an active participant of a clinically based research project and as a leader in the utilization of research to improve nursing practice.
  • Prerequisite: Knowledge of statistics; nursing degree students only.
  • Equivalent: NRSG 5112 and NRSG 5122.

NRSG 6124 Research Applications (1 SH)
Provides the opportunity for graduate nursing students to work individually or in groups of two with an experienced researcher in an area related to their clinical specialization or other professional interest. The student’s individual contribution depends on the stage of the research project and is determined jointly by the student, faculty liaison, and researcher. Evaluation includes the student’s individual effort, participation in the collaborative research process, and appraisal of the learning experience as a research assistant. By participating in an established, scientifically significant project, the student has an opportunity to experience actively the real-life aspects of conducting research. Additionally, the student is socialized to the role of the nurse researcher.
  • Prerequisite: NRSG 6122 with a grade of B; nursing students with graduate standing only; not open to graduate special students in Bouvé College.
  • Equivalent: NRSG 5124.

NRSG 6200 Theories of Health Behavior (3 SH)
Focuses on health illness, sickness, and disability from nursing, sociological, cultural, ecological, and medical perspectives. Examines concepts, theories, and models that explain health-related behaviors. Explores the empirical foundations of interventions designed to promote health and prevent disease for the individuals living in the community, with emphasis on access for populations at risk across the life span.
NRSG 6201 Theories of Family Health (3 SH)
Examines theoretical bases for understanding and promoting family-focused practice. Family theory frameworks and models developed by nursing and related disciplines are discussed and critically analyzed for application to advanced practice. Topics include family system response and family impact on health and illness across the life span and contemporary social issues, cultural factors, and health policy affecting family health.

NRSG 6202 Advanced Nursing Research (3 SH)
Specifically designed for students who choose to complete a master’s thesis, this course may be taken as an elective offering for nonthesis students. It is the second course in the graduate research sequence. Requires the student to complete an in-depth analysis of the research process and apply it to the development of a research proposal. Topics include methods and procedures for implementing a research plan, sampling techniques, methods for data collection, reliability and validity of norm-referenced and criterion-referenced measures, computer utilization and data processing, statistical applications, analysis of findings, and dissemination and utilization of nursing research. Offers students the opportunity to gain experience in computerized data analysis and the use of SPSS software package. Aimed at assisting students to finalize their research proposal.
• Prerequisite: NRSG 5122.
• Equivalent: NRSG 5112 and NRSG 5113.

NRSG 6210 Holistic Healing and Integrative Health (3 SH)
Examines integrative healthcare, which includes a variety of healing modalities and therapies. Designed to define health and to investigate modalities that complement Western medicine. Topics include (1) herbal medicine, (2) diet, nutrition, and lifestyle changes, (3) mind/body or behavioral interventions, (4) alternative systems of medical practice, (5) manual healing methods, (6) bioelectromagnetics, and (7) pharmacologic and biologic treatments. Defines and presents these approaches and therapies from a historical, philosophical, practical, and research perspective. Investigates a variety of healing approaches. Students become familiar with current leaders and philosophies in the area of integrative healthcare.

NRSG 6211 Energy-Based Healing Modalities (3 SH)
Identifies and discusses the principles and practices of energy-based healing therapies. In addition to a variety of energy techniques, specific investigation is given to acupuncture, cranial sacral work, massage, polarity therapy, reiki, and therapeutic touch. Students experience, review, and research one specific modality of energy healing. Students develop knowledge and skills in energy-based modalities and understand and develop strategies to integrate them within their lives.

NRSG 6212 Programs in Integrative Healthcare (3 SH)
Provides students with an opportunity to work with integrative healthcare practitioners. Each student may become certified or licensed through one of the licensing agencies or certification processes within integrative healthcare and practice as a clinician within the area.

NRSG 6213 International Health (3 SH)
Explores various dimensions of international health, with emphasis on the impact on globalization on world health. Examines the financial base for healthcare in representative nations to identify common themes and specific problem areas. Major assaults on health caused by natural disasters and war are assessed in relation to the response of the world community to public health issues. Examines implications and opportunities for specific health professions.

NRSG 6220 Nursing Management: Acute Episodic Illness (3 SH)
Addresses the assessment, preventive, and health maintenance theories of healthcare utilized by the acute-care advanced practice nurse. Includes common problems causing episodic and acute illnesses and the advanced nursing management skills needed to address them and implement initial management skills. Uses current theories and research from nursing and the physical and behavioral sciences as a basis for clinical decision making, with an emphasis on critical thinking and diagnostic reasoning. The nursing process and life cycle are integral frameworks used to structure the delivery of course content.
• Prerequisite: NRSG 5117, NRSG 5126, and NRSG 6115, each with a grade of B; restricted to selected nursing programs or permission of instructor.
• Corequisite: NRSG 6420.

NRSG 6221 Nursing Management: Critical and Chronic Illness (3 SH)
Emphasizes the acquisition of theoretical knowledge essential to understanding the common life-threatening and chronic, long-term pathophysiological problems, differential diagnosis, and related advanced nursing care of critically and chronically ill individuals and families. Addresses common problems causing critical, life-threatening illnesses, the chronic sequelae from these problems, and the advanced nursing management skills needed to address them. Uses current theories and research from nursing and the physical and behavioral sciences as a basis for clinical decision making, with an emphasis on critical thinking and diagnostic reasoning. The nursing process and life cycle are integral frameworks used to structure the delivery of course content.
• Prerequisite: NRSG 6220 with a grade of B; restricted to selected nursing programs or permission of instructor.
• Corequisite: NRSG 6421.
NRSG 6222 Pharmacology of Adults and Older Adults (2 SH)
Covers age-related changes in pharmacokinetics and pharmacodynamics and the prescription, administration, and monitoring of medications for older adults. Includes a detailed discussion of the most common drugs and classes of drugs prescribed for the elderly, as well as the signs and symptoms of drug toxicity particular to older adults. Investigates the impact of race/ethnicity on prescribing practices. Also discusses medication history guidelines for older adults, age-related considerations in prescribing for the elderly, and methods to support drug compliance and prevent inappropriate drug use and adverse drug reactions. Examines over-the-counter drug use among older adults. Emphasis is on the problem of polypharmacy for the older adult and the prevention, recognition, and treatment of drug interactions among older adults.
• Prerequisite: NRSG 5117 with a grade of B.

NRSG 6226 Strategies for Education, Staff Development, and Consultation (3 SH)
Focuses on major concepts of teaching and learning for the adult learner, principles and practices of staff development, and roles of consultation and collaboration. Examines the concepts of leadership, collaboration, and consultation as they relate to the advanced practice role of the clinical nurse specialist. Analyzes the influences of organizational systems, finances, and culture as components of the advanced practice role. Students are expected to learn and apply an evidence-based approach to managing complex healthcare issues that includes policies, procedures and protocols, and best-practice models. Assignments focus on helping students gain expertise in presenting, consulting, teaching, and writing. Offers students an opportunity to integrate advanced assessment techniques and parameters of critical thinking to solve problems related to the care of patients in acute-care settings.

NRSG 6230 Nursing Management: Critically Ill Neonatal 1 (3 SH)
Focuses on the acquisition of knowledge about complex physiological concepts essential to the care of the critically ill neonate. Begins with the actual and potential alterations in fetal/neonatal well-being, adaptation to extrauterine life, and factors that interfere with adaptation to extrauterine life. Also emphasizes the acquisition of theoretical knowledge essential to understanding the neonate’s response to life-threatening problems. Discusses neonatal pathophysiologic disorders in terms of the nursing process and management of the neonate and their families. Uses current theories and research from nursing, biomedical, physical, and behavioral sciences as a basis for clinical decision making. The nursing process and developmental theory are frameworks utilized to structure the delivery of course content.

NRSG 6231 Nursing Management: Critically Ill Neonatal 2 (3 SH)
Continues NRSG 6230. Covers the acquisition of theoretical knowledge essential to understanding the neonate’s response to life-threatening problems. Discusses neonatal pathophysiologic disorders in terms of the nursing process and management of the neonate and their families. Uses current theories and research from nursing, biomedical, physical, and behavioral sciences as a basis for clinical decision making. The nursing process and developmental theory are frameworks utilized to structure the delivery of course content.
• Prerequisite: NRSG 6230 with a grade of B.

NRSG 6232 Neonatal Pharmacology (2 SH)
Focuses on building upon basic knowledge in pharmacology and providing content essential for nurses in the expanded role. Examines the principles of pharmacology and major drug classifications as they relate to the causes and treatment of health and illness problems affecting critically ill neonates.
• Prerequisite: NRSG 5117 with a grade of B.

NRSG 6240 Nursing Management: Immunosuppressed Patient (3 SH)
Explores the relationship between the immune response and pathophysiologic dysfunctions in the critically ill. Utilizing an established knowledge base of physiologic processes and clinical concepts, focuses on current research and theories of immunologic competence, immunomodulated therapies, and the clinical sequelae of the critically ill immunosuppressed patients.

NRSG 6241 Acute-Care Concepts in Nursing Practice (3 SH)
Focuses on the analysis and application of core physiological, behavioral, environmental, and psychosocial concepts essential for advanced nursing care of acute and critically ill individuals. Topics include the utility and clinical implications of monitoring technology available in the acute-care setting, the acute-care environment and its impact on patient and family systems, and the concepts of stress, grief, and coping. Also addresses the advanced nursing management of the multiple trauma patient and the related physiologic and clinical concepts. Opportunity is provided for exploration and development of concepts unique to each student’s area of concentration within the acute-care specialization.
• Prerequisite: NRSG 6221 with a grade of B; restricted to selected nursing programs or permission of instructor.
• Corequisite: NRSG 6422.
NRSG 6242 Pharmacotherapeutics of the Critically Ill (2 SH)
Focuses on the pharmacokinetics and pharmacodynamics in the care of individuals with critical, life-threatening illnesses. The prescription, administration, and monitoring of medications for the critically ill serves as the organizing framework for the course. Includes the most common drugs and classes of drugs prescribed for the critically ill, the signs and symptoms of drug toxicity, and interventions utilized to resolve adverse drug reactions. Also addresses the impact of polypharmacy. Routes of medication delivery in the critical-care setting are examined, analyzed, and evaluated.
• Prerequisite: NRSG 5117.

NRSG 6244 Ethical Issues in Aging, Multicultural Society (3 SH)
Identifies cultural competency as a critical tool for improving the healthcare of older adults. Discusses the demographics of cultural diversity among older adults. Covers personal cultural competency skills, the tension between Western medicine and individual patient belief systems, and the challenge of responding to the linguistic and cultural needs in the acute-care setting. Considers the applicability of the traditional Western medico-ethical principles of autonomy, beneficence, nonmalfeasance, and justice to ethical problems encountered by healthcare providers caring for older adults of diverse racial, ethnic, and religious backgrounds. Emphasizes recognition of true ethical dilemmas, identification of central issues, gathering of necessary and appropriate information, and rational decision making. Considers contemporary ethical questions.

NRSG 6249 Health Promotion of Adult/Older Adult (3 SH)
Focuses on the assessment, preventative, and health maintenance and promotion theories utilized by advanced practice nurses. Includes the impact of political, psychological, sociological, and physiological factors on the healthcare continua of the adolescent/adult/older adult. Explores self-modeling of health behaviors and institution of primary and secondary preventative strategies in the home, community, workplace, and primary care facility. Discusses and utilizes theoretical and strategic approaches to behavior change necessary for health promotion.
• Prerequisite: NRSG 6115 with a grade of B.
• Corequisite: NRSG 6449.

NRSG 6253 Primary Care of Adult/Older Adult Health Problems (4 SH)
Building upon NRSG 6252, seeks to further develop the intellectual and attitudinal competencies necessary for successful performance as a primary healthcare provider. Focuses on assessment, diagnosis, and management of adolescents/adults/older adults with minor acute and stabilized chronic illness in the community and long-term care facility. Emphasizes the nurse practitioner role functions of collaborative interdisciplinary management, consultation, and referral skills.
• Prerequisite: NRSG 6249 with a grade of B.
• Equivalent: NRSG 6251.

NRSG 6254 Primary Care of Adult/Older Adult Complex Patients (4 SH)
Focuses on the assessment and intervention of adults/older adults with complex multisystem health problems/diseases in primary care and long-term care settings. Utilizes knowledge from pathophysiology, pharmacology, and psychosocial sciences to increase knowledge and skill of the advanced practice nurse in the care of adults/older adults with complex problems. Teaches students about the role and expertise of advanced practice nurses and other professionals in diverse settings.
• Prerequisite: NRSG 6253.

NRSG 6255 Family Nurse Practitioner Practicum 1 (3 SH)
Offers a clinical learning experience that correlates with the content presented in NRSG 6266. Focuses on assessment and intervention with the families across the life span within a holistic framework. Emphasizes identification of families at risk for premature morbidity and mortality. Focuses on advanced health-assessment techniques and interpretation of abnormal findings on physical examination. Also focuses on developing a client/family health-promoting plan of care within the advanced practice role of the nurse practitioner. Specific clinical activities focus on the care of pregnant women.
• Prerequisite: Nursing students only.

NRSG 6256 Family Nurse Practitioner Practicum 2 (3 SH)
Seeks to provide clinical learning experiences in the delivery and coordination of comprehensive pediatric care, including, but not limited to, well-child care, episodic care, chronic care, and urgent care. Focuses on performing a comprehensive health assessment of the child and family within the urban community utilizing an evidence-based and culturally competent approach. Emphasizes health promotion, health maintenance, and protection, as well as identification of children and families at risk. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: NRSG 6255; nursing students only.

NRSG 6257 Family Nurse Practitioner Practicum 3 (3 SH)
Seeks to provide clinical learning experiences in the coordination and delivery of care to infants, children, adolescents, and young adults, and their families, within the context of their culture and urban community. Continued clinical practice experiences across settings and continuum of care offer an opportunity to develop knowledge, attitudinal competencies, and skills in the delivery of care to children, with a focus on acute and chronic health issues. Offers students an opportunity to learn to assess, diagnose, and manage chronic conditions and acute illnesses commonly encountered in childhood, adolescence, and young adulthood and to build on a foundation of practice behaviors in health assessment, health promotion, and disease prevention. Emphasizes urban health. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: NRSG 6256; nursing students only.
NRSG 6262 Pediatric Pharmacology (2 SH)
Focuses on the principles of pharmacology and the major drug classifications in relation to the treatment of health problems during childhood and adolescence. Examines the effects of selected medications on pathophysiology and psychopathology. Discusses the implication of practice.
• Prerequisite: NRSG 5117 with a grade of B.

NRSG 6264 Care of Well Child/Adolescent Health Promotion (4 SH)
Focuses on the health assessment on newborns, well children, adolescents, and their families within a community. Discusses issues most pertinent to the various ages of the well child within a community-based primary care framework of anticipatory guidance and health promotion. Emphasizes the utilization of a comprehensive approach to preventative healthcare by examining the impact of psychological, sociological, developmental, behavioral, cultural, and physiological factors on the child’s health status within the family and community. Includes routine healthcare maintenance, screening, developmental issues, genetic implications, family dynamics, confidentiality, self-care, and common health concerns encountered in primary care settings.
• Prerequisite: NRSG 5115 with a grade of B or NRSG 6115 with a grade of B.
• Equivalent: NRSG 6260.

NRSG 6265 Care of Child/Adolescent Health Problems (4 SH)
Builds upon the knowledge and skills gained in NRSG 6264. Seeks to further develop within the student the intellectual and attitudinal competencies necessary to successfully perform as a primary healthcare provider. Focuses on acute and chronic health problems seen in infants through young adults. Encompasses assessment, diagnosis, and management of children with acute and stabilized chronic illness, genetic and reproductive health issues, nutritional concerns, dermatology, sports and activity-related injuries, and perinatal care. Considers family, cultural, and community context. Emphasizes the nurse practitioner role, including the development of consultation and referral skills.
• Prerequisite: NRSG 6260 with a grade of B.
• Equivalent: NRSG 6261.

NRSG 6266 Family Theory and Primary Care in the Childbearing Years (4 SH)
Building on the knowledge of the health-assessment process and primary care concepts, the FNP student has an opportunity to learn to provide family focused primary care bridging the content learned in the adult and pediatric courses. Emphasizes integration of the assessment and management of the changing structure of the family unit throughout the childbearing years into the role of the family nurse practitioner. Applies this knowledge in a clinical learning experience where prenatal and postnatal care is provided to families.
• Prerequisite: NRSG 6115.
• Equivalent: NRSG 6263.

NRSG 6267 Care of the Critically Ill Child (4 SH)
Using a combined didactic and clinical approach, examines the specific issues in the care of children with critical conditions. Designed to provide students with the knowledge and skills necessary to meet the unique needs of fragile children, including urban children who are at risk for poor health outcomes. Offers students clinical experience caring for these children.
• Prerequisite: NRSG 6264 and NRSG 6461.

NRSG 6275 Urban Families at Risk: A Primary Care Approach (4 SH)
Integrates academic and clinical learning into a unique collaborative experience, which affords students the opportunity to explore emerging trends and patterns of healthcare practices in the urban setting. Urban healthcare poses multiple challenges to nurses, including the need to master new skills and competencies and to understand the complex needs of these communities. Primary care providers need to be aware of the social and environmental context of children and their families. Examines the broad issues in the primary healthcare of identified, underrepresented urban groups: lesbians, women and children with HIV, homeless and abused women and children. Mentors students in both the classroom and clinical settings to explore current issues inherent in caring for underserved populations in urban settings through utilization of innovative strategies.
• Prerequisite: NRSG 6115 with a grade of B.
• Equivalent: NRSG 6271.

NRSG 6281 Dimensions of Clinical Practice (3 SH)
Focuses on psychodiagnostic history taking, mental status evaluation, psychodynamic treatment formulations, and designs of psychiatric treatment contracts for various aged clients. Studies the major forms of psychopathology, clinical theory, and the use of the DSM IV-R to make decisions for clients across the life span. Emphasizes supportive and insight-oriented approaches in dynamic therapy, and addresses prevention and treatment approaches for populations at risk. Identifies outcome indicators and describes goal-setting strategies.

NRSG 6282 Clinical Psychopharmacology (3 SH)
Provides comprehensive overview of major classes of psychotropic medications and the related psychiatric disorders associated with medication prescription. Emphasizes clinical nursing decision making related to choice of medication, differential diagnosis and drug interactions, safe monitoring with attention to side effects, and integration of medication management into a treatment regimen for various patient populations.
• Prerequisite: NRSG 5117 with a grade of B.
NRSG 6283 Psychobiological Bases of Mental Disorders (3 SH)
Focuses on major psychiatric disorders across the life span as identified in the DSM IV manual. Studies the central and autonomic nervous systems, stress-response syndrome, neurotransmitter activity, and neuroendocrine immune interactions. Reviews the biological base of mental disorders, and addresses the use of biological interventions in symptom reduction. Also reviews the psychiatric complications of physical illness and common physical disorders to rule out psychiatric conditions. Emphasizes the integration of biological with psychosocial approaches to treatment of mental disorders.

NRSG 6284 Psychopathology of Childhood (3 SH)
Emphasizes psychopathological disorders throughout the developmental phases of infancy, early childhood, latency, and adolescence. Focuses on diagnostic process and treatment planning for intervention. Uses psychodynamic theorists and discusses interactional, behavioral, and neurological models related to assessment, treatment, and prevention. Considers psychotherapeutic and psychopharmacological work with children, families, and communities.

NRSG 6285 Mental Health of Adolescents (3 SH)
Focuses on assessment and therapeutic management of adolescent mental health problems. Includes adolescent suicide, self-destructive behavior, incest, drug and alcohol abuse, acting-out behavior, violence, and psychosis. Explores psychodynamic concepts, psychiatric referral process, and issues related to treatment and placement in the community.

NRSG 6286 Contemporary Psychotherapies—Theory and Practice (3 SH)
Introduces the theory and practice of various forms of psychotherapy. Discusses theory and techniques associated with each therapy with regard to theoretical underpinnings, therapeutic action, techniques, relationship between therapist and patient, and application to different diagnostic populations. Uses lecture and seminar format to present material and case data to illustrate different psychotherapeutic perspectives.
• Prerequisite: NRSG 6281; Bouvé students only.
• Equivalent: NRSG 6280.

NRSG 6287 Child and Adolescent Psychopharmacology (2 SH)
Provides a comprehensive overview of major classes of psychotropic medications for pediatric populations. Relates psychiatric disorders associated with medication prescription, differential diagnosis and drug interactions, safe monitoring with attention to side effects, and integration of medication management into a treatment regimen for various patient populations. Uses clinical cases to illustrate complex issues related to prescribing psychiatric medications for children.

NRSG 6288 Geriatric and Aging Adult Psychopharmacology (2 SH)
Offers a comprehensive overview of psychiatric disorders and the biopsychosocial issues associated with medication prescription, differential diagnosis, drug interactions, and safe monitoring with attention to side effects for geriatric and aging adult populations. Also offers a comprehensive overview of major classes of psychotropic medications and integration of medication management into a treatment regimen for geriatric and aging adult clients. Uses clinical cases to illustrate complex issues related to prescribing psychiatric medications for the geriatric population.
• Prerequisite: Bouvé students only.

NRSG 6300 Healthcare Finance and Marketing (3 SH)
Covers healthcare economics and the financial and marketing functions and responsibilities of healthcare leaders. Emphasizes the decision-making process involved in assuring financial management and management of the exchange process between an organization and its “publics” by which both parties satisfy their needs and wants (marketing). Focuses on the integration of clinical and business aspects of healthcare into decision making for the advanced practice nurse leader.
• Equivalent: NRSG 6308.

NRSG 6301 Human Resources and Operations (3 SH)
Studies the essential practice of human resource management within healthcare organizations with a focus on leading and managing a professional nursing workforce. Quality healthcare is dependent on the availability and retention of adequate numbers of sufficiently educated and competent nurses and nonprofessional healthcare personnel. Examines the strategic management of a professional nursing and nonnursing healthcare workforce from many perspectives, including theoretical concepts relevant to human resource management in complex systems; legal and regulatory considerations; trends in nursing workforce supply/demand and composition; professional practice and participatory governance models; workplace diversity; collective bargaining; healthy work environment; and relational skill development, including conflict management. Discusses implications for nurse leaders within varying levels in the organization/system.
• Prerequisite: NRSG 6302.
NRSG 6302 Health Policy and Law (3 SH)
Examines health policy and health laws by advanced practice nurses from the perspective of issues pertinent to public health, populations, communities, their healthcare, and its coordination. Reviews and criticizes court decisions, legislation, federal, and state regulatory activities relevant to healthcare and health policy initiatives. Discusses the concept of continuous quality improvement through the development of standards of care and evaluation outcomes. Explores healthcare as a vital part of a national care agenda. Concepts are presented for application through the manager-as-developer model, which includes influence, vision, two-way communication, autonomy, team building, and development.

NRSG 6303 Nursing and Business (2 SH)
Provides an opportunity for graduate students to explore the issues that arise at the interface of business and healthcare. Focuses on the role of the manager in the organizations and rapidly changing environments of healthcare. In an interdisciplinary seminar, students examine different and sometimes contrasting organizational frameworks, cultures, and values from the perspectives of business and nursing. Emphasizes the primary skills and competencies that are critical for the manager to identify and deal with complex management problems in healthcare. A healthcare business plan is created.

NRSG 6305 Case Management (3 SH)
Considers case management as a strategy used in healthcare organizations to manage clinical and financial risk related to patient care at the individual and population levels. Examines the roles, responsibilities, multidisciplinary interactions, and accountability of case managers in a variety of healthcare settings. Emphasizes program evaluation and research. Compares the purpose, concepts, and types of case management models in the contemporary healthcare environment from utilization review/discharge planning through venue-specific clinical models to health and disease management programs. Discusses the effects of program design on effective outcomes of care and efficient resource use in the context of realistic expectations and best clinical practice.

NRSG 6306 Health Informatics (3 SH)
Seeks to prepare students to use information systems and technology to support and improve patient care and healthcare systems. Examines the meta-structures (data, information, knowledge, and wisdom), concepts and tools of nursing, and healthcare informatics. Focuses on information literacy, including a critical examination of both electronic patient health information and provider decision support resources. Covers ethical and legal issues, including privacy and security, related to electronic systems. Database concepts, including data mining, warehousing, electronic data collection, and aggregation for research and patient care, are important components of this course. Examines the role of the nurse as a change agent during health information technology implementation.

- Prerequisite: Nursing, pharmacy, and pharmacy studies students only or permission of instructor.
- Equivalent: NRSG 6304.

NRSG 6307 Operational Informatics in Healthcare Organizations (3 SH)
Expands on NRSG 6306. Covers theoretical, empirical, and practical knowledge and skills for effective strategic and operational informatics nursing leadership. Specific topics address systemwide change management and leadership particular to information technology; the interpretation and application of key metrics for evaluating health information systems (HIS); and the selection, assessment, design, building, testing, implementation, evaluation, and promotion of evolving HIS within healthcare organizations (HCOs). Finally, examines the strategic role of executive nursing leadership within HCOs and emerging informatics needs in analytics and reporting to evaluate health outcomes.

- Prerequisite: NRSG 6306 with a grade of B; nursing, pharmacy, and pharmacy studies students only or permission of instructor.

NRSG 6308 Healthcare Management (3 SH)
Offers students an opportunity to prepare for their future roles as managers within a healthcare delivery system. Examines the founding principles and dynamics of healthcare management and the healthcare system. Explores the basic concepts and skills in administration. Analyzes management issues that distinguish health services organizations from other types of organizations and strategies for dealing with these issues.

- Prerequisite: USAGPAN students only.
- Equivalent: NRSG 6300.

NRSG 6310 Nurse/Healthcare Entrepreneur (3 SH)
Provides graduate students with the theoretical foundation to do business planning. This process is examined from a nurse/healthcare entrepreneur perspective. Identifies strategies for achieving business goals in nursing/healthcare. Emphasis is on actualizing a winning business plan in nursing/healthcare through step-by-step approach with a strong focus on marketing, planning, and financial analysis.
NRSG 6320 Role/Practice Issues in Nurse Anesthesia (3 SH)
Focuses on the development and current trends in nurse anesthesia practice, education, and research. Includes the historical, legal, legislative, and professional role issues associated with advanced practice anesthesia nursing. Emphasizes professional responsibilities, ethical issues, diversity, cultural competency, quality assurance, continuing education, and professional involvement.

NRSG 6321 Conceptual Basis of Nurse Anesthesia Practice 1 (3 SH)
Covers fundamental knowledge and skills for entry into advanced practice anesthesia nursing. Includes assessment, essential techniques, monitoring and equipment, pharmacologic interventions, and safe practice across the life span.
• Prerequisite: NRSG 6324 with a grade of B.
• Corequisite: NRSG 6530.

NRSG 6322 Conceptual Basis of Nurse Anesthesia Practice 2 (3 SH)
Continues NRSG 6321 with in-depth knowledge and skills of highly specialized problems and conditions requiring anesthesia or surgical interventions. Includes assessment, techniques, planning, and pharmacologic intervention for patients with disorders of the cardiovascular and pulmonary systems across the life span.
• Prerequisite: NRSG 6321, NRSG 6325, and NRSG 6530, each with a grade of B.
• Corequisite: NRSG 6534.

NRSG 6324 Chemistry and Physics in Anesthesia (3 SH)
Reviews organic functional group chemistry and introduces the principles of medicinal chemistry; provides a foundation for the in-depth study of drugs, including intravenous agents and anesthetic adjuncts. Focuses discussions on physics and technology in anesthesia practice, gas laws, biotransformation of anesthetics, pharmacology of anesthetics and adjuncts, and recent development in general anesthetic agents.
• Prerequisite: Nurse anesthesiologist majors only.

NRSG 6325 Pharmacotherapeutics in Anesthesia and Critical Care Nursing (2 SH)
Concentrates on the mechanisms of action common to many pharmacotherapeutic agents. Helps to increase students’ understanding of general principles of drug actions, interactions, and side effects, especially related to the administration of anesthesia. Includes content of dose-effect relationship, pharmacokinetics, drug allergy, pharmacogenetics, and teratogenic side effects. Consists of lectures, discussions, assignments, and examinations. Requires a presentation of a short paper on a selected topic.
• Prerequisite: NRSG 5117 with a grade of B.

NRSG 6333 Conceptual Basis of Nurse Anesthesia Practice 3 (3 SH)
Covers in-depth knowledge and skills of highly specialized problems and conditions requiring anesthesia or surgical interventions. Includes assessment, techniques; planning; and pharmacologic intervention for patients with disorders of the nervous, endocrine, renal, and hepatic systems across the life span.
• Corequisite: NRSG 6535.
• Equivalent: NRSG 6323.

NRSG 6336 Advanced Concepts in Nurse Anesthesia Practice (3 SH)
Covers in-depth knowledge and skills of highly specialized problems and conditions requiring anesthesia or surgical interventions. Includes assessment, techniques, planning, and pharmacologic intervention for regional anesthesia, pain management, care of obstetrical patients, transplantation surgery, and patients with catastrophic condition.
• Prerequisite: NRSG 6333 and NRSG 6535, each with a grade of B.
• Corequisite: NRSG 6540.
• Equivalent: NRSG 6326.

NRSG 6340 Curriculum Development in Nursing (3 SH)
Focuses on curriculum development in nursing education. Includes history of nursing education, learning theories, criteria for programs in higher education, curriculum designs, and testing and evaluation methods. Examines values, trends, and issues in contemporary nursing education.

NRSG 6341 Teaching Nursing: The Art and Science (3 SH)
Explores various learning theories and their application to practice disciplines. Emphasis is on efforts to enhance critical thinking and problem solving, with assessment of technological aids for learning. Examines teaching modalities as they are related to increasing levels of complexity of information, and offers an introduction to the assessment of teaching effectiveness.

NRSG 6342 Educational Evaluation in Nursing (2 SH)
Introduces professional accreditation practices including the assessment of program outcomes. Testing and clinical evaluation of student learning are integral to the course. Provides the opportunity to develop evaluation tools including examinations.
NRSG 6344 Healthcare Quality Improvement (3 SH)
Focuses on critical issues related to healthcare quality improvement (QI) and nursing leadership to promote safe, timely, effective, efficient, equitable, and patient-centered care and services. Examines the science of improvement from many perspectives including current national reports, trends, and initiatives; standards, culture of safety, patient and staff safety; QI models, measurement, methods, and monitoring of care outcomes; use of healthcare informatics in the QI process; QI projects; and leadership and change related to development and implementation of quality improvement. Students are expected to work with a team to apply knowledge in a quality-improvement project based on a current healthcare problem.
• Prerequisite: NRSG 5118 with a grade of B.

NRSG 6369 Pharmacology for Nurse Anesthesia 1 (5 SH)
Offers the first course in a two-part series. Focuses on pharmacodynamics, pharmacokinetics, uptake, distribution, biotransformation, and excretion of anesthetic agents and those agents used in adjunct during the course of anesthesia.
• Prerequisite: USAGPAN students only.

NRSG 6371 Pharmacology for Nurse Anesthesia 2 (4 SH)
Offers the second course in a two-part series. Focuses on drugs used in anesthesia with particular reference to dosage, mechanism of action, characteristic drug effects, factors modifying drug effects, toxicity, and indications and contraindications for use.
• Prerequisite: NRSG 6369 with a grade of B; USAGPAN students only.

NRSG 6372 Professional Aspects of Nurse Anesthesia Practice (3 SH)
Part of the USAGPAN program. This course focuses on nurse anesthesia practice in a variety of practice settings. A study of the history of anesthesia and nurse anesthesia practice and the relationship of that practice in the development and growth of the American Association of Nurse Anesthetists. The legal aspects of practice will be explored. The various functional roles of the nurse anesthetist related to administration, education, research and consultation with an orientation to administration and the teaching/learning process, and research will be explored. This course will enable the student to acquire knowledge, understanding, and appreciation for the historical aspects of anesthesia, to be aware of the legal ramifications concerning the administration of anesthesia, and understand the current issues affecting the nurse anesthetist’s role in administration, education, and research.
• Prerequisite: USAGPAN students only.

NRSG 6374 Fundamentals of Nurse Anesthesia 1 (6 SH)
Offers the first course in a three-part series. Offers students an opportunity to learn the basic principles governing the practice of anesthesia, including physical principles, anesthesia gas delivery systems, biochemistry, preparation for administration of anesthesia, and intraoperative management of anesthesia.
• Prerequisite: USAGPAN students only.

NRSG 6375 Fundamentals of Nurse Anesthesia Practice 1 (9 SH)
Seeks to integrate nursing science with biophysical sciences to prepare nurses for the highest level of advanced nursing practice in the specialty of anesthesia. Offers students an opportunity to learn the basic principles governing the practice of anesthesia, including physical principles, anesthesia gas delivery systems, preparation for administration of anesthesia, intraoperative management of anesthesia, regional anesthesia, biomedical monitoring, and GETA simulation. Introduces the formulation of anesthetic care plans, anesthetic techniques, prevention of patient complications, procedures and equipment requirements, monitoring, record keeping, and care of equipment.
• Prerequisite: USAGPAN students only.

NRSG 6377 Fundamentals of Nurse Anesthesia 2 (6 SH)
Offers the second course in a three-part series. Offers students an opportunity to learn the more advanced principles governing the practice of anesthesia, including the principles of regional anesthesia, biomedical monitoring, and anesthesia for special patient populations.
• Prerequisite: NRSG 6374 with a grade of B; USAGPAN students only.

NRSG 6378 Fundamentals of Nurse Anesthesia 3 (6 SH)
Offers the final course in a three-part series. Offers students an opportunity to learn the more advanced principles governing the practice of anesthesia, including the principles of caring for patients with pathophysiologic presentations, anesthesia for trauma, and anesthesia in austere conditions. Studies formulation of anesthetic care plans, techniques, and prevention of complications.
• Prerequisite: NRSG 6377 with a grade of B; USAGPAN students only.
NRSG 6379 Fundamentals of Nurse Anesthesia Practice 2 (9 SH)
Continues NRSG 6375. Covers a broad range of anesthesia nursing interventions. Concentrates on the theoretical basis and rationale for specific anesthetic management actions, offering students an opportunity to learn advanced principles governing anesthesia practice. Modules cover several categories of patients and types of surgical cases, including cardiovascular, pulmonary, endocrine, central nervous system, neuromuscular disorders, pediatrics, obstetrics, trauma/austere environments, and subspecialties. Introduces students to the development of individualized anesthetic care plans, anesthetic techniques, monitoring, perioperative pain management, prevention of patient complications, surgical and anesthesia procedures and equipment requirements, and record keeping. Lectures focus on advanced health/physical assessment, physiology, pathophysiology, and the scientific underpinnings of evidence-based anesthesia practice.
• Prerequisite: NRSG 6375 with a grade of B; USAGPAN students only.

NRSG 6390 Family Care of the Adult/Older Adult Patient (4 SH)
Effective Spring 2017
Focuses on the assessment, diagnosis, and management of minor acute and stabilized chronic conditions in the adult and older adult populations in the community and long-term-care facilities. Explores theories of health promotion and health maintenance. Discusses the impact of political, psychological, sociological, and physiological factors as they impact the care of the adult and older adult. Emphasizes the role of the advanced-practice nurse practitioner as a member of collaborative teams, consultant, and model of health behaviors.
• Prerequisite: NRSG 6115.
• Corequisite: NRSG 6391. Restricted to students in the primary care nursing FNP program.

NRSG 6391 Practicum for NRSG 6390 (4 SH)
Effective Spring 2017
Offers a clinical practicum focusing on the adult and older adult with risk for premature morbidity and mortality and family centered health promotion. Emphasizes the care of the adult with complex multisystem health problems and conditions. Explores care of individuals in acute- and long-term-care settings.
• Corequisite: NRSG 6390.

NRSG 6392 Family Theory (2 SH)
Focuses on the assessment and management of the changing family structure across the life span of the family. Emphasizes the identification of families at risk for premature morbidity and mortality. Presents guiding principles and strategies for assessing the family, various theories of family structure and process, and techniques for engaging and connecting with families. Explores the family as an emotional unit, the individual patient as a member in his or her family of origin, and strategies for applying this knowledge in a clinical setting.
• Prerequisite: Restricted to students in the primary care nursing FNP program.

NRSG 6393 Family Care of the Pediatric and Adolescent Patient (4 SH)
Effective Summer 2017
Focuses on the health assessment of individuals from the newborn stage into young adulthood. Emphasizes the utilization of an evidence-based approach to acute and chronic health conditions. Considers family, cultural, and urban community context and anticipatory guidance and health promotion within a culturally competent framework.
• Prerequisite: NRSG 6392.
• Corequisite: NRSG 6394. Restricted to students in the primary care nursing FNP program.

NRSG 6394 Practicum for NRSG 6393 (4 SH)
Effective Summer 2017
Offers a clinical practicum focusing on providing students with clinical learning experiences in the performance of comprehensive health assessments of children and families within the urban community. Using an evidence-based and culturally competent approach, emphasizes health promotion, health maintenance, and protection, as well as identification of children and families at risk. Offers students an opportunity to learn to assess, diagnose, and manage chronic conditions and acute illnesses commonly encountered in childhood, adolescence, and young adulthood. Builds on a foundation of practice behaviors in health assessment, health promotion, and disease prevention with a particular focus on urban health.
• Corequisite: NRSG 6393.

NRSG 6395 Healthcare of Women in Family Practice (2 SH)
Effective Summer 2017
Discusses health assessment, promotion, and care of women through the life span. Emphasizes the perinatal time period.
• Prerequisite: NRSG 6393.
• Corequisite: NRSG 6396. Restricted to students in the primary care nursing FNP program.
NRSG 6396 Practicum for NRSG 6395 (4 SH)

Effective Summer 2017

Focuses on the assessment, diagnosis, and management of acute and chronic health conditions of women and families. Emphasizes the care of women during the perinatal and postpartum periods. Explores family health as the family structure changes across its life span. Emphasizes the role of the advanced-practice nurse practitioner as a member of collaborative teams, as a consultant, and as a model of health behaviors.

• Corequisite: NRSG 6395.

NRSG 6420 Adult-Gerontology Acute-Care Nursing Practicum 1 (2 SH)

Focuses on the assessment, preventative, and health-maintenance aspects of acute and episodic healthcare to adults (including older adults). The clinical practice emphasizes the multiple factors affecting the adult patient across the life span. The application of theory to the care of these patients through participation, observation, and research is facilitated by assignment to a clinical preceptor. Weekly seminars focus on an array of issues surrounding the role of the advanced practice nurse. Requires students to practice in the clinical setting a minimum of eight hours per week.

• Corequisite: NRSG 6220.

NRSG 6421 Adult-Gerontology Acute-Care Nursing Practicum 2 (4 SH)

Continues NRSG 6420. Offers students individualized experiences in the role of practitioner, educator, and manager. Facilitated by assignment to a clinical preceptor, students focus on the provision of care to adults (including older adults) experiencing complex, critical, and chronic health problems. Demonstrates how to assess, diagnose, and manage illnesses in the acute-care, chronic, or rehabilitation setting. Uses concurrent weekly seminars to focus on the roles of the advanced practice nurse. Requires students to practice in the clinical setting a minimum of twenty hours per week.

• Prerequisite: NRSG 6420 with a grade of B.

• Corequisite: NRSG 6221.

NRSG 6422 Adult-Gerontology Acute-Care Nursing Practicum 3 (4 SH)

Continues NRSG 6421. Offers students an opportunity to synthesize their previous learning experiences; to plan, deliver, and evaluate advanced nursing care to patients with complex healthcare problems; and to acquire the skills necessary to manage clients in an acute-care setting. Uses concurrent weekly seminars to analyze the impact of the advanced practice role on long-term patient care, interdisciplinary relationships, and healthcare policy. Requires students to practice in the clinical setting a minimum of twenty hours per week.

• Prerequisite: NRSG 6421 with a grade of B.

• Corequisite: NRSG 6241.

NRSG 6423 Geriatric Acute-Care Clinical Practicum (2 SH)

Designed to provide the student with in-depth, individualized experiences in the role of practitioner, educator, leader, and manager. Facilitated by assignment to a nurse practitioner with a practice providing care to older adults, the student focuses on managing illness across multiple healthcare settings. Concurrent weekly seminars focus on the role of the geriatric acute-care nurse practitioner.

• Prerequisite: Successful completion of clinical practicum sequence in specialization.

NRSG 6424 Specialty Acute-Care Clinical Practicum (2 SH)

Designed to provide the student with in-depth, individualized experiences in the role of practitioner, educator, leader, and manager in a specialty area identified by the student and consistent with professional development goals. Facilitated by assignment to a nurse practitioner with a practice providing care to acute or critically ill adults, the student focuses on managing illness across the healthcare continuum. Concurrent weekly seminars focus on the role of the acute-care nurse practitioner in a specialty area.

• Prerequisite: Successful completion of clinical practicum sequence in specialization.

NRSG 6426 Adult Health Clinical Nurse Specialist Practicum 1 (4 SH)

Introduces students to the role of the clinical specialist in the first of a two-course sequence. Seeks to integrate principles of leadership, collaboration, consultation, and management into the role development for advanced practice. Three spheres of influence—patient/family, nursing, and organization/system—serve as the organizing framework for the clinical experience. Students are assigned a clinical nurse specialist preceptor who oversees the experiential portion of the course. Requires students to complete a minimum of twenty hours per week of precepted clinical experience, attend a weekly seminar, and conduct a needs assessment, inclusive of the development of population profiles and the conduct of clinical inquiries. Seeks to enable the successful student to define a clinical nursing problem in the healthcare setting and to develop an appropriate intervention.
NRSG 6427 Adult Health Clinical Nurse Specialist Practicum 2 (4 SH)
Provides further opportunity for students to develop as clinical specialists in this follow-up to NRSG 6426. Explores principles of leadership, collaboration, consultation, and management as students have the opportunity to integrate these responsibilities into their advanced practice. Three spheres of influence—patient/family, nursing, and organization/system—continue to serve as the organizing framework for the clinical experience. Integrates principles of nursing research and evidence-based practice throughout the course. Students are assigned a clinical nurse specialist preceptor who oversees the experiential portion of the course. Requires students to complete a minimum of twenty hours per week of precepted clinical experience and attend a weekly seminar. Offers students an opportunity to implement and evaluate the intervention they developed in NRSG 6426 in response to the needs assessment and problem discovery.
• Prerequisite: NRSG 6426.

NRSG 6430 Neonatal Clinical Practicum 1 (4 SH)
Focuses on the skills necessary for management of the high-risk neonate and family. Students have the opportunity to provide direct care under the supervision of NNP preceptors in the hospital neonatal intensive care unit (NICU), responsible for daily management of a specified caseload of neonates and their families, including therapeutic and diagnostic procedures. Supervised delivery room management of the high-risk neonate is expected, where available. Seeks to familiarize the student with respiratory distress syndrome, transient tachypnea, pneumonia, pulmonary hypertension, congenital heart disease, and patent ductus arteriosus, with appropriate management strategies. Requires students to practice in the clinical setting a minimum of twenty hours per week.

NRSG 6431 Neonatal Clinical Practicum 2 (4 SH)
Continues NRSG 6430. Offers the second in a series of three courses focusing on the acquisition of clinical skills necessary for patient management of the high-risk neonate and family. Students have the opportunity to provide direct care under the supervision of NNP or neonatologist preceptors in the hospital neonatal intensive care unit (NICU), responsible for daily management of a specified caseload of neonates and their families, including therapeutic and diagnostic procedures. Supervised delivery room management of the high-risk neonate is expected, where available. Seeks to familiarize the student with disease processes commonly encountered in the term and preterm infant populations and appropriate management strategies. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: NRSG 6430 with a grade of B.

NRSG 6432 Neonatal Clinical Practicum 3 (2 SH)
Continues NRSG 6431. Offers the final course in the series focusing on the acquisition of clinical skills and expertise necessary for patient management of the high-risk neonate and family. Provides the student with intensified experience in the hospital neonatal intensive care unit (NICU) providing direct care under the supervision of NNP or neonatologist preceptors. The student is responsible for daily management of a specified caseload of neonates and their families. Proficient delivery room management of the high-risk neonate is an expectation. The student should exhibit the ability to function as an independent novice practitioner with preceptor support.
• Prerequisite: NRSG 6431.

NRSG 6444 Healthcare Systems and Quality Patient Care (3 SH)
Offers a theory course emphasizing the use of systems thinking and systems theory as a guide for analyzing and improving healthcare systems. Emphasizes the complex challenges of leading change to achieve quality healthcare for aggregate populations within systems of care. Examines the role of nurses as leaders of the discipline and managers of healthcare services within team-based healthcare structures. Course topics include systems and organizational theory, health systems analysis, transformative leadership concepts, change management theory, outcomes assessment, and teamwork and team-based care delivery concepts and practices.
• Prerequisite: NRSG 5118 with a grade of B.

NRSG 6449 Health Promotion of Adult/Older Adult Practicum (1 SH)
Applies knowledge acquired in NRSG 6249. Focuses on the assessment and health promotion of adults/older adults in the primary care settings. Utilizes selected clinical experiences to increase and apply health and risk-assessment skills with adult populations in the community. Also offers students an opportunity to acquire a beginning knowledge of the role of the adult/older adult nurse practitioner in primary care settings.
• Prerequisite: NRSG 6115 with a grade of B.
• Corequisite: NRSG 6249.

NRSG 6450 Adult/Older Adult Practicum 1 (4 SH)
Provides a clinical learning experience that correlates with the content presented in NRSG 6250. Focuses on assessment of the adult life span within a holistic framework. Emphasizes identification of individuals at risk for premature morbidity and mortality, as well as focusing on advanced health assessment techniques and interpretation of abnormal findings on physical examination and developing a client/family health-promoting plan of care within the advanced practice role of the nurse practitioner.
Requires students to practice in the clinical setting a minimum of sixteen hours per week.
• Prerequisite: NRSG 6249 with a grade of B and NRSG 6449 with a grade of B.
NRSG 6451 Adult/Older Adult Practicum 2 (4 SH)
Continues NRSG 6450. Focuses on providing the student with clinical learning experiences in the coordination and delivery of primary healthcare nursing services to adults and their families, with emphasis on underserved populations. Studies how to assess, diagnose, and manage acute and chronic conditions and illnesses commonly encountered in adult populations. Students build on a foundation of practice behaviors in health assessment, health promotion, and disease prevention. Requires students to practice in the clinical setting a minimum of sixteen hours per week.

- **Prerequisite:** NRSG 6450 (may be taken concurrently).

NRSG 6460 Care of Well Child/Adolescent Health Promotion Practicum (4 SH)
Provides the student with clinical learning experiences in the delivery and coordination of primary-care services to well infants, children, adolescents, and young adults and their families. Focuses on performing a comprehensive health assessment of the child and family utilizing a holistic approach. Emphasis is on health promotion, health maintenance, and identification of individuals or families at risk. The utilization of two clinical sites provides the opportunity for the student to evaluate interdisciplinary role responsibilities and clinical practice standards. Weekly seminar discussion fosters critical analysis of clinical experiences and the integration of theory, research, and primary practice. Requires students to practice in the clinical setting a minimum of twenty hours per week.

- **Prerequisite:** NRSG 6275 (may be taken concurrently).

NRSG 6461 Child/Adolescent Health Problems Practicum (4 SH)
Continues NRSG 6460. Focuses on providing the student with clinical learning experiences in the coordination and delivery of primary-care nursing services to infants, children, adolescents, and young adults and their families within the context of their culture and community. Studies how to assess, diagnose, and manage stable chronic conditions and acute episodic illnesses commonly encountered in childhood, adolescence, and young adulthood. Students build on a foundation of practice behaviors in health assessment, health promotion, and disease prevention. Requires students to practice in the clinical setting a minimum of twenty hours per week.

- **Prerequisite:** NRSG 6460 with a grade of B.

NRSG 6463 Care of the Critically Ill Child Practicum (4 SH)
Designed to accompany NRSG 6267, this course focuses on providing the student with clinical learning experiences in the coordination and delivery of critical care to infants, children, adolescents, and young adults and their families within the context of their culture and urban community. The goal of continued clinical practice experiences across settings and continuum of acuity care is to facilitate the development of knowledge and attitudinal competencies and skills in the delivery of care to children with a focus on critical health issues. Requires students to practice in the clinical setting a minimum of twenty hours per week.

- **Prerequisite:** NRSG 6461.

NRSG 6480 Psychiatric Practicum across the Life Span 1 (5 SH)
Provides clinical experience with individuals and families throughout the life span in a psychiatric mental health setting in the advanced practice nursing role. Includes a didactic seminar that focuses on assessment of psychopathology and mental health, psychodiagnostic history taking, mental status evaluation, differential diagnosis, and treatment for various aged diverse clients. Requires students to develop a caseload, and to practice in the clinical setting a minimum of twenty hours per week with an agency preceptor. Integration of theory and practice is emphasized, utilizing the data from the students’ clinical placement as they apply to the specific diagnoses presented in clinical work. Also requires students to draft a needs assessment proposal to be completed in NRSG 6481.

- **Prerequisite:** NRSG 6281 (may be taken concurrently).

NRSG 6481 Psychiatric Practicum across the Life Span 2 (5 SH)
Continues NRSG 6480. Provides clinical experiences with individuals and families throughout the life span in a mental health setting. Requires students to continue to treat a caseload of clients and to practice a minimum of twenty hours per week with an agency preceptor. The focus is on planning and providing care, utilizing various treatment modalities, applying theoretical frameworks, prevention of psychiatric problems and promotion of mental health, group process, termination issues, and evaluation of clients’ progress. Clinical cases provide the basis for discussion in didactic seminar. Requires students to complete the activity proposed in NRSG 6480 to meet an identified need in their community or clinical setting.

- **Prerequisite:** NRSG 6480.

NRSG 6502 Healthcare Informatics Practicum (2 SH)
Synthesizes knowledge and experience that advanced nurse clinicians/administrators need to acquire to use information systems effectively and efficiently in nursing and healthcare for innovative decision making and strategic planning in managerial positions in nursing.

- **Prerequisite:** NRSG 6304.
NRSG 6510 Nursing Leadership Role Practicum 1 (3 SH)
Offers students an opportunity to engage in a mentored nurse leadership role within a complex healthcare system. Using the AONE Nursing Leadership Competencies (2006; 2011) as a guiding framework, emphasizes developing all aspects of the leadership role and practice at the micro- and mesosystem levels with an aggregate population focus (long-term community care, school health, acute care, etc.) in a team-based care environment. Focuses on integrating systems thinking and evidence-based leadership experiences and emerging issues in leading and managing healthcare delivery in diverse, technical, and dynamic environments. Expects students to practice in a clinical setting for eight hours per week.
• Prerequisite: NRSG 6444 (may be taken concurrently).

NRSG 6520 Nursing Leadership Role Practicum 2 (3 SH)
Continues NRSG 6510. Continuing to work directly with a nursing leader preceptor in a complex health care system, offers students an opportunity for a concentrated experience implementing the multifaceted role of the nurse leader by expanding their focus to include responsibility for the strategic and daily operation of nursing services. Emphasizes strengthening the student’s abilities strategically to manage interpersonal relationships effectively and to convene, participate in, and lead healthcare teams. Focuses on relational skill building, such as negotiation, conflict resolution, coaching, and evaluating. Concurrent seminars focus on an array of issues surrounding the role of the nurse leader as well as team-building skills. Expects students to practice in a clinical setting for eight hours per week.
• Prerequisite: NRSG 6510.

NRSG 6530 Nurse Anesthesia Practicum 1 (2 SH)
Offers clinical learning opportunities designed to enable the student to develop an anesthesia plan and, with supervision, participate in the implementation of that plan.
• Prerequisite: NRSG 6324 with a grade of B.
• Corequisite: NRSG 6321.

NRSG 6534 Nurse Anesthesia Practicum 2 (4 SH)
Seeks to provide students with the opportunity to apply theoretical concepts in clinical settings. With supervision, students are expected to determine the appropriate sequencing and timing of emergence and postanesthesia management of the patient. Requires students to practice in the clinical setting approximately thirty-six hours per week.
• Prerequisite: NRSG 6321, NRSG 6325, and NRSG 6530, each with a grade of B.
• Corequisite: NRSG 6322.
• Equivalent: NRSG 6531 and NRSG 6532.

NRSG 6535 Nurse Anesthesia Practicum 3 (4 SH)
Seeks to provide an in-depth clinical learning experience of advanced nurse anesthesia in specialty areas. Emphasizes increasingly independent integration of scientific principles to clinical practice and evaluation of patient outcomes and professional role development. Requires students to practice in the clinical setting approximately thirty-six hours per week.
• Prerequisite: NRSG 6322 and NRSG 6534, each with a grade of B.
• Corequisite: NRSG 6533.
• Equivalent: NRSG 6533.

NRSG 6540 Advanced Clinical Experiences in Nurse Anesthesia 1 (1 SH)
Offers initial integration and synthesis course of advanced knowledge and skills for interdisciplinary anesthesia nursing care for complex problems and conditions across the life span. Selected topics and clinical case studies include collaborative decision making, effective communication, and root cause/adverse event analysis. With moderate guidance, students are expected to assume greater responsibility in planning and evaluation of anesthesia care. Requires students to practice in the clinical setting approximately thirty-six hours per week.
• Prerequisite: NRSG 6333 and NRSG 6535, each with a grade of B.
• Corequisite: NRSG 6336.

NRSG 6541 Advanced Clinical Experiences in Nurse Anesthesia 2 (1 SH)
Offers second integration and synthesis course of advanced knowledge and skills for interdisciplinary anesthesia nursing care for complex problems and conditions across the life span. Selected topics and clinical case studies include collaborative decision making, effective communication, and root cause/adverse event analysis. With moderate guidance, students are expected to assume greater responsibility in planning and evaluation of anesthesia care. Requires students to practice in the clinical setting approximately thirty-six hours per week.
• Prerequisite: NRSG 6336 and NRSG 6540, each with a grade of B.

NRSG 6542 Advanced Clinical Experiences in Nurse Anesthesia 3 (1 SH)
Offers third and final integration and synthesis course of advanced knowledge and skills for interdisciplinary anesthesia nursing care for complex problems and conditions across the life span. Selected topics and clinical case studies include collaborative decision making, effective communication, and root cause/adverse event analysis. With minimal guidance, students are expected to assume greater responsibility in planning and evaluation of anesthesia care. Requires students to practice in the clinical setting approximately thirty-six hours per week.
• Prerequisite: NRSG 6541 with a grade of B.
NRSG 6550 Teaching Practicum (2 SH)
Provides an individualized experience in practice teaching in a clinical or educational setting. Emphasizes teaching strategies, methods of learning reinforcement, and evaluation of teaching effectiveness. Examines faculty roles and responsibilities. Requires implementation and evaluation of a teaching project or course, with assistance from a faculty preceptor.

NRSG 6551 Elective Advanced Clinical Experience (1 to 4 SH)
Provides an individualized field experience in an appropriate agency or community setting. Focuses on a selected client population to allow observation and practice of specific therapeutic skills, with supervision by the course instructor.
• Repeatability: May be repeated without limit.

NRSG 6570 Nurse Anesthesia Role Practicum 1 (12 SH)
Part of the USAGPAN program. An advanced graduate-level course which provides the student an opportunity to continue supervised clinical experience in the administration and management of anesthesia agents and techniques for all types of surgery and all patient age groups. This course provides the student an opportunity to explore current issues relevant to the practice of nurse anesthesia, and to address such issues from a legal, functional, historical, ethical, political, professional, and nursing theory framework. The course will review, discuss, and integrate clinical cases with physiology, pathophysiology, and pharmacological principles.
• Prerequisite: USAGPAN students only.

NRSG 6572 Nurse Anesthesia Clinical Practicum 1 (10 SH)
Part of the USAGPAN program. An introductory graduate-level clinical course which provides the student an opportunity to obtain supervised clinical experience in the administration and management of anesthesia in patients undergoing surgical procedures. The course will review, discuss, and integrate clinical cases with physiology, pathophysiology, and pharmacological principles.
• Prerequisite: USAGPAN students only.

NRSG 6574 Nurse Anesthesia Role Practicum 2 (12 SH)
Part of the USAGPAN program. An advanced course, the second of a two-course sequence, which provides the student an opportunity to study the components of the nurse anesthetist role using a multi-theoretical framework. The course will continue to review, discuss, and integrate clinical cases with physiology, pathophysiology, and pharmacological principles.
• Prerequisite: NRSG 6570 with a grade of B; USAGPAN students only.

NRSG 6576 Nurse Anesthesia Clinical Practicum 2 (10 SH)
Part of the USAGPAN program. An intermediate graduate-level course which provides the student an opportunity to obtain supervised clinical experience in the administration and management of anesthesia in patients undergoing surgical procedures. The course will review, discuss, and integrate clinical cases with physiology, pathophysiology, and pharmacological principles.
• Prerequisite: USAGPAN students only.

NRSG 6580 Nurse Anesthesia Clinical Practicum—Advanced (0 SH)
Offers students an opportunity to obtain further supervised clinical experience and to enhance clinical skills. Requires students to practice in the clinical setting a minimum of twenty hours per week.
• Prerequisite: USAGPAN students only.

NRSG 6800 Introduction to Industry Research Guidelines (3 SH)
Introduces the process by which drugs, devices, biologics, and medical procedures are tested for safety and effectiveness. Emphasizes the evolution of the Food and Drug Administration (FDA); the role of the U.S. Department of Agriculture (USDA); the Animal Welfare Act (AWA); and the regulations pertaining to the conduct, review, and reporting of clinical research intended for FDA submission. Examines international standards as they relate to increasing levels of complexity of research. Introduces students to industry decision making in conducting clinical research trials.

NRSG 6805 Integrative Application of Evidence-Based Research: Working with Industry Partners (3 SH)
Introduces evidence-based practice guidelines and how to partner with industry in the research planning, implementation, and communication of findings. Emphasizes understanding the role of the healthcare professional and industry partners in facilitating, coordinating, and conducting research and interdisciplinary investigations in the field of evidence-based practice and quality improvement.

NRSG 6810 Managing Regulated Clinical Research Trials: The Role of Clinical Research Organizations (3 SH)
Introduces clinical trial management practices (preclinical through phase IV); clinical, medical, and safety monitoring; data management principles; biostatistical analysis; and medical writing services for preparation of an FDA New Drug Application (NDA) or Investigational Device Exemptions (IDE). Focuses on understanding the role of the healthcare professional in managing a regulated, global clinical research study.
NRSG 6812 Management of Health Problems in the School Setting (3 SH)
Seeks to provide school nurses with enhanced pediatric and adolescent health assessment skills and knowledge necessary to manage common diseases and illnesses in the school setting. Offers students an opportunity to synthesize knowledge from nursing, physical, social, and health sciences. Focuses on both the physical and mental health assessment process as it pertains to the school nurse. Discusses identification and management of common diagnoses and illnesses that a school nurse might encounter.
• Prerequisite: Graduate nursing students only.

NRSG 6844 Advancing Health Outcomes through Interprofessional Collaborative Practice (2 SH)
Seeks to provide an interdisciplinary background in the concepts and theories of interprofessional collaboration in healthcare settings and in the science and methods of teamwork and team-based care as aspects of interprofessional collaborative practice. The core competencies for interprofessional collaborative practice—values/ethics, roles/responsibilities, communication, and teams/teamwork—serve as an organizing framework for this course. Addresses the history, evidence, and outcomes of collaborative practice; the interdependence between interprofessional education and collaborative practice; professional role contributions and accountability in collaborative practice; research-based and innovative team structures; and team-based care practices and outcomes in healthcare environments, including patient-centered teams, and effective communication and collaborative skills and processes. Emphasizes the role of the advanced practice nurse in developing and leading collaborative practices and teams.
• Prerequisite: Nursing students only.

NRSG 6850 Introduction to Health and Aging (3 SH)
Seeks to offer students core knowledge of health and aging. Uses current literature and research to integrate the sociological, psychological, and physical aspects of aging in multicultural, political, and economic ecological contexts.
• Prerequisite: Bouvé students only.

NRSG 6864 Professional Preparation Seminar (0 SH)
Seeks to prepare the newly graduated BSN student to take necessary steps for entry into the professional nursing role and workforce prior to beginning master’s specialization. Focuses on strategies for the transition from student nurse to professional nurse.
• Prerequisite: Nursing and nursing administration graduate students only.

NRSG 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

NRSG 7100 Leadership in Advanced Practice Nursing (3 SH)
Seeks to provide a solid foundation for providing leadership. Analyzes the principles of transformational leadership and organizational behavior pertinent to healthcare systems. Seeks to prepare nursing leaders at the practice doctorate level to use critical thinking skills and evidence-based decision making to effect systems and organizational change. Discusses leadership skills and characteristics of leadership styles within the broader framework of interprofessional collaboration and innovations in healthcare delivery. Presents information from a variety of disciplines and perspectives (legal, fiscal, ethical, cultural, and political) for purposes of improving quality of care for patients, populations, and communities in healthcare settings across the continuum of care.
• Prerequisite: Students enrolled in the Doctorate of Nursing Practice Program only.

NRSG 7104 Foundations in Nursing Research (3 SH)
Addresses the development of nursing science with specific emphasis on the importance of developing theory-based research. Includes a broad review of the various types of research studies (e.g., descriptive, causal, and relational); the steps of the research process; and the related analytic strategies and/or issues associated with each type of research study. Also reviews the guidelines for conducting critical literature reviews (i.e., systematic or meta-analyses) and how the results are used to determine the type of research study to employ. Discusses the scientific principles and integrity related to the conduct of responsible research and the means for assuring ethical integrity of research on human subjects.
• Prerequisite: Nursing PhD students only.

NRSG 7105 Translating Research Evidence into Practice (3 SH)
Offers opportunities for students to examine strategies and tools for retrieval, compilation, critical appraisal, and application of empirical, reflective, and practice-based information to improve quality of care and health outcomes for populations of interest. Uses systematic reviews, case studies emphasizing use of quality improvement methods, clinical guidelines, collaborative interprofessional practice networks, and information technology. Includes program evaluation strategies and interpretation of biostatistical concepts relevant to population-based advanced practice. Offers students an opportunity to explore techniques that support their professional presence and voice as a leader. This course meets the requirements of the following DNP Essentials of Doctoral Education for Advanced Practice Nursing: (1): Scientific Underpinnings for Practice; (3): Clinical Scholarship and Analytical Methods for Evidence-Based (AACN, 2006).
NRSG 7110 Evidence-Based Practice Research Application (2 SH)
Offers graduate nursing students an opportunity to work singly or in groups of two with an experienced researcher in an area related to their clinical specialization or other professional interest. The student’s individual contribution depends on the stage of the research project and is determined jointly by the student, faculty liaison, and researcher. Evaluation includes the student’s individual effort, participation in the collaborative research process, and appraisal of the learning experience as a research assistant. By participating in an established, scientifically significant project, offers students an opportunity to actively experience the “real-life” aspects of conducting research and to be socialized to the role of the researcher.
• Prerequisite: NRSG 7105 with a grade of B; nursing students only.

NRSG 7400 Nurse Anesthesia Clinical Practicum 1 (5 SH)
Constitutes an introductory doctoral-level clinical anesthesia course that offers the novice student registered nurse anesthetist (SRNA) an opportunity to gain supervised clinical experience in the preparation, administration, and management of anesthesia in patients undergoing surgical procedures or requiring pain management. Offers students an opportunity to begin to incorporate didactic (Phase 1) knowledge into providing anesthesia care of all forms to patients across the life span and to apply American Society of Anesthesiologists (ASA) physical status classification. The students receive extensive mentoring and direction with the goal of becoming safe, novice SRNAs able to accept increased independence and responsibility.
• Prerequisite: NRSG 6379; USAGPAN students only.

NRSG 7403 Nurse Anesthesia Clinical Practicum 2 (5 SH)
Constitutes an introductory doctoral-level clinical anesthesia course that offers the advanced-beginner student registered nurse anesthetist (SRNA) an opportunity to gain supervised clinical experience in the preparation, administration, and management of anesthesia in patients undergoing surgical procedures. Offers students an opportunity to continue to incorporate didactic (Phase 1) knowledge into providing anesthesia care of all forms to patients across the life span and to apply American Society of Anesthesiologists (ASA) physical status classification. The SRNA continues to receive extensive mentoring and direction and is expected to demonstrate performance consistent with the advanced beginner and not at the level of a novice nursing anesthesia student.
• Prerequisite: NRSG 7400; USAGPAN students only.

NRSG 7406 Nurse Anesthesia Clinical Practicum 3 (5 SH)
Constitutes an advanced doctoral-level clinical anesthesia course that offers the senior student registered nurse anesthetist (SRNA) an opportunity to gain clinical experience with reduced levels of supervision in the preparation, administration, and management of anesthesia in patients undergoing surgical procedures. Expects students to incorporate the science of anesthesia (i.e., didactic knowledge) and evidence-based practice as found in the anesthesia literature into providing anesthesia care of all forms to patients across the life span and to apply American Society of Anesthesiologists (ASA) physical status classification. The SRNA continues to receive mentoring and direction and is expected to demonstrate performance consistent with the competent anesthesia provider and not at the level of an advanced-beginner nursing anesthesia student.
• Prerequisite: NRSG 7403; USAGPAN students only.

NRSG 7409 Nurse Anesthesia Clinical Practicum 4 (5 SH)
Constitutes an advanced doctoral-level clinical anesthesia course that offers the senior student registered nurse anesthetist (SRNA) an opportunity to gain clinical experience with minimal supervision in the preparation, administration, and management of anesthesia in patients undergoing surgical procedures. Expects students to incorporate the science of anesthesia (i.e., didactic knowledge) and evidence-based practice as found in the anesthesia literature into providing anesthesia care of all forms to patients of all ages and health status. The SRNA continues to receive mentoring and direction as necessary, is expected to demonstrate performance consistent with the competent-to-proficient anesthesia provider, and have the ability to function independently as a CRNA in a military and/or Department of Defense (DOD) facility or deployed environment.
• Prerequisite: NRSG 7406; USAGPAN students only.

NRSG 7412 Nurse Anesthesia Role Development 1 (6 SH)
Constitutes an introductory doctoral-level course that offers the novice student registered nurse anesthetist (SRNA) an opportunity to continue supervised clinical experience while developing the skills necessary to function as a professional clinician and member of a military/Department of Defense (DOD) healthcare system. Focuses on developing anesthesia providers capable of functioning as the sole anesthesia provider in potentially austere environments. The role of a DOD-certified registered nurse anesthetist requires a high level of leadership, communication and interpersonal skills, collaboration with the surgical team, and unwavering independence. Seeks to facilitate a broad vision of the military surgical mission with a focus on high-quality care, patient outcomes, and improvement of safety through system processes.
• Prerequisite: NRSG 6379; USAGPAN students only.
NRSG 7415 Nurse Anesthesia Role Development 2 (6 SH)
Constitutes an introductory doctoral-level course that offers the novice student registered nurse anesthetist (SRNA) an opportunity to continue supervised clinical experience while developing the skills necessary to function as a professional clinician and member of a military/Department of Defense (DOD) healthcare system. Focuses on developing anesthesia providers capable of functioning as the sole anesthesia provider in potentially austere environments. The role of a DOD-certified registered nurse anesthetist requires a high level of leadership, communication and interpersonal skills, collaboration with the surgical team, and unwavering independence. Seeks to facilitate a broad vision of the military surgical mission with a focus on high-quality care, patient outcomes, and improvement of safety through system processes.
• Prerequisite: NRSG 7412; USAGPAN students only.

NRSG 7418 Nurse Anesthesia Role Development 3 (6 SH)
Constitutes a doctoral-level course that offers the senior student registered nurse anesthetist (SRNA) an opportunity to continue clinical experience while developing the skills necessary to function as a professional clinician and member of a military/Department of Defense (DOD) healthcare system. Focuses on developing anesthesia providers capable of functioning as the sole anesthesia provider in potentially austere environments. The role of a DOD-certified registered nurse anesthetist requires a high level of leadership, communication and interpersonal skills, collaboration with the surgical team, and unwavering independence. Seeks to help refine the professional role of the SRNA and facilitate a broad vision of the military surgical mission with a focus on high-quality care, patient outcomes, and improvement of safety through system processes.
• Prerequisite: NRSG 7415; USAGPAN students only.

NRSG 7421 Nurse Anesthesia Role Development 4 (6 SH)
Constitutes an advanced doctoral-level course that offers the senior student registered nurse anesthetist (SRNA) an opportunity to continue clinical experience while refining the skills necessary to function as a professional clinician and member of a military/Department of Defense (DOD) healthcare system. Focuses on developing anesthesia providers capable of functioning as the sole anesthesia provider in potentially austere environments. Requires a high level of leadership, communication and interpersonal skills, collaboration with the surgical team, and unwavering independence. Seeks to help refine the professional role of the SRNA. Challenges SRNAs to set the example as professional doctoral-level anesthesia students and assist (to the extent possible) in mentoring the junior SRNAs in their professional/clinical roles.
• Prerequisite: NRSG 7418; USAGPAN students only.

NRSG 7700 The Science of Nursing (3 SH)
Introduces basic concepts in philosophy of science and the development of knowledge. Explores the historical development and themes for knowledge building in nursing and healthcare. Offers students an opportunity to analyze different ways of knowing and world views as they relate to the development of programs of research in nursing. Content from this course is applied to each student’s area of research interest. The examination of the scientific literature, identification of gaps in knowledge, and the development of research questions are completed to begin the process of developing a research plan.
• Prerequisite: Nursing majors only.

NRSG 7705 Theoretical and Conceptual Foundations in Nursing Science (3 SH)
Examines the nature of nursing science by critically analyzing the current relevance of nursing theories and conceptual models to the advancement of nursing’s scientific development. Emphasizes various approaches to concept/theory development, analysis, and synthesis. Expect students to develop skills in concept/theory analysis and synthesis and to apply these skills to a formal analysis of concept relevant to their phenomena of interest.
• Prerequisite: NRSG 7700 (which may be taken concurrently) or permission of instructor; nursing PhD students only or permission of instructor.
• Equivalent: NRSG 7706.

NRSG 7709 Qualitative Research Methods (3 SH)
Examines published qualitative research in nursing and related disciplines. Emphasizes major strategies of qualitative inquiry, including ethnography, grounded theory, phenomenology, narrative inquiry, and case study. Offers students an opportunity to begin to develop mastery in critiquing qualitative research, ethical issues, data analysis techniques, and proposal development.
• Prerequisite: NRSG 7700 with a grade of B.

NRSG 7712 Quantitative Research Methods (3 SH)
Introduces different types of quantitative research methods as they relate to investigation of phenomena in nursing and healthcare. Begins with a focus on defining research problems, theory testing, and causal inference, then explores a range of research designs and methodologic techniques that are available for empirical research. Quantitative techniques include sampling, data collection, analysis, and interpretation.
• Prerequisite: NRSG 7700 with a grade of B.
NRSG 7715 Measurement in Clinical Research (3 SH)
Examines the concepts of measurement, sources of measurement error, control, and instrumentation as they relate to variables in clinical research. Students have an opportunity to explore the procedural aspects of measurement, criterion-referenced and norm-referenced measures, as well as the reliability and validity of measurement techniques. Discusses methods and statistical procedures used in instrument design and testing, such as instrument blueprints, factor analysis, and item response theory. Emphasizes the measurement of variables to evaluate the effectiveness of clinical interventions.
• Prerequisite: NRSG 7700 with a grade of B.

NRSG 7750 Healthcare of Urban Populations (3 SH)
Provides students with an opportunity to explore the body of urban health research to identify key themes, conceptual foundations, and contemporary research findings. Examines integration of cultural and community contextual factors that affect the health status of urban populations. These include racial, ethnic, and economic health disparities; influences of the urban physical environment and the urban social environment; and the availability of and access to health and social services. Studies the influence of concepts such as vulnerability, underserved, culture, ethnicity, poverty, discrimination, disparities in healthcare, urbanization, diversity, social determinants of health, environmental justice, and migration on health status.
• Prerequisite: Nursing majors only.

NRSG 7755 Intervention Research: Development, Implementation, and Evaluation (3 SH)
Examines theory-based intervention research for individuals, groups, populations, and systems. Offers an overview of the types of theory-based interventions across the health spectrum. Reviews the development and testing of theory-based interventions. Emphasizes understanding the strengths and challenges of integrating technology across the development, testing, and implementation of a theory-based intervention. Also emphasizes the selection of existing interventions, the process of adaption, and the valid and reliable execution of the selected theory-based intervention by examining such issues as treatment, fidelity, intervention duration, context, and interventionist expertise. Compares and contrasts intervention research developed for efficacy, effectiveness, and implementation.
• Prerequisite: NRSG 7705, NRSG 7709 (both may be taken concurrently), and PhD program enrollment or permission of instructor.

NRSG 7770 Research Colloquium (1 SH)
Offers doctoral students an opportunity to explore in-depth key concepts in nursing and healthcare research. Led by a faculty expert, offers students an opportunity to engage in meaningful dialogue and analysis to examine the concept from multiple perspectives.
• Prerequisite: Nursing PhD students only.
• Repeatability: May be repeated up to 4 times.

NRSG 7780 Advanced Statistics (3 SH)
Reviews basic statistical concepts and their applications as a foundation for data analysis. Provides students with an opportunity to build upon their previous knowledge of statistics and explore the topics of multiple analysis of variance, logistic regression, repeated measures, latent variables, and structural equation modeling. Examines data analysis strategies of multiple regression, canonical analysis, and discriminant analysis as applied to clinical nursing research.
• Prerequisite: Nursing majors only.

NRSG 7782 Multiple Regression Analysis in Health Sciences (3 SH)
Presents regression analysis at an advanced level. Focuses on regression for continuous variables: specification, estimation, testing, and diagnostics. Explores logistic regression for binomial and multinomial variables, log-linear regression for continuous variables, and proportional hazards regression for duration variables.
• Prerequisite: NRSG 7780 and NRSG 7781.

NRSG 7915 Capstone 1 (3 SH)
Reflects the culmination of practice inquiry, knowledge, and competencies attained during the Doctorate of Nursing Practice program. Expects that students have identified a practice area that provides a guide for the development and completion of a capstone project. In this seminar, students are guided through the process of evidence-based project development, including formulation of goals and objectives, refinement of project design, implementation strategies, development of tools and or forms for data collection, identification of resources (personnel and fiscal), and evaluation. Through group discussion, offers students an opportunity to participate in a process of peer consultation and critique in support of project refinement.
• Prerequisite: NRSG 7105 with a grade of B; DNP students only.

NRSG 7917 Capstone 2 (6 SH)
Reflects the culmination of practice inquiry, knowledge, and competencies attained during the Doctorate of Nursing Practice program. In this seminar, students are guided through the process of completing an evidenced-based project and disseminating the results of the project.
• Prerequisite: NRSG 7915; DNP students only.
NRSG 7920 The Steps to Practice Inquiry: Analyze, Evaluate, Synthesize, and Apply the Evidence (3 SH)
Designed as a complement to NRSG 7105 or equivalent. Offers students an opportunity to obtain skills and competencies needed for a practice doctorate—ability to generate new knowledge from practice, evaluate current practice approaches, analyze current knowledge, and adapt/translate knowledge into usable clinical strategies that improve practice and lead to better outcomes.
• Prerequisite: DNP students only.

NRSG 7921 Capstone 1: Design and Ethical Consideration of Practice Application (3 SH)
Reflects the culmination of practice inquiry, knowledge, and competencies attained during the Doctorate of Nursing Practice program. In this seminar, students are mentored through the process of evidence-based project development, including formulation of goals and objectives; refinement of project design and implementation strategies; and development of tools and/or forms for data collection, identification of resources (personnel and fiscal), ethical review, and evaluation. Offers students an opportunity to participate in a process of peer consultation and critique in support of project refinement. Requires a minimum total of 250 scholarly practice hours.
• Prerequisite: NRSG 7920 with a grade of B; DNP students only.

NRSG 7922 Capstone 2: Applying Practice Knowledge—Implementation/Outcomes (3 SH)
Reflects the culmination of practice inquiry, knowledge, and competencies attained during the Doctorate of Nursing Practice program. In this seminar, students are guided through the process of completing an evidence-based project. Emphasizes the acquisition of reflective practice skills and competencies needed to assess and implement evaluation of evidence and outcomes. Requires a minimum total of 250 scholarly practice hours.
• Prerequisite: NRSG 7921: DNP students only.

NRSG 7923 Capstone 3: Dissemination of Practice Inquiry (3 SH)
Reflects the culmination of practice inquiry, knowledge, and competencies attained during the Doctorate of Nursing Practice program. In this seminar, students are guided through the process of summarizing and disseminating the results of the project. Requires a minimum total of 250 scholarly practice hours.
• Prerequisite: NRSG 7922: DNP students only.

NRSG 7976 Directed Study (1 to 4 SH)
Allows PhD students to develop an individual plan to attain specific knowledge related to research goals or specific research technique/approach. May consist of library study and reading, preparation of scholarly presentation or publication, mentored research experience, or other appropriate activity as approved by professor and academic advisor.
• Repeatability: May be repeated without limit.

NRSG 7990 Thesis (1 to 4 SH)
Allows students to implement a research proposal with the guidance of a thesis adviser. Requires data collection and analysis, writing the thesis, and presentation of the findings.
• Repeatability: May be repeated without limit.

NRSG 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity, under faculty supervision, to prepare for the PhD qualifying exam.

NRSG 9000 Comprehensive Exam (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

NRSG 9845 Dissertation Seminar 1 (3 SH)
Guides students through the beginning of the research process as they prepare their dissertation proposals, including writing the literature review and outlining the research design for their projects. Students have an opportunity to work with their dissertation advisors both individually and in small groups.
• Prerequisite: NRSG 7700 with a grade of B; nursing majors only.

NRSG 9846 Dissertation Seminar 2 (3 SH)
Provides students with an opportunity to finalize their dissertation proposals and make the necessary arrangements to begin their investigations by completing the design and methods and obtaining Investigative Review Board approval. Students have an opportunity to work with their dissertation advisors both individually and in small groups.
• Prerequisite: NRSG 9845 with a grade of B.

NRSG 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.

NRSG 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
• Repeatability: May be repeated without limit.

NRSG 9990 Dissertation (1 SH)
Offers research/experimental work for PhD thesis on a full-time basis.
• Prerequisite: Doctoral candidacy; Bouvé students only.
• Repeatability: May be repeated up to 2 times.

NRSG 9996 Dissertation Continuation (0 SH)
Offers continuation of PhD dissertation research.
• Repeatability: May be repeated up to 15 times.
OPERATIONS RESEARCH (OR)

OR 5374 Special Topics in Operations Research (4 SH)
Offers topics of current interest in operations research.
• Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Engineering and the College of Science.
• Repeatability: May be repeated up to 4 times.

OR 6205 Deterministic Operations Research (4 SH)
Introduces the theory, computation, and application of deterministic models to represent industrial operations. Includes linear programming formulation and solution using spreadsheet and algebraic languages software; simplex, big-M, two-phase, revised simplex, and dual simplex algorithms for solving linear programs; introduction to the theory of simplex, fundamental insight, duality, and sensitivity analysis; transportation, assignment, and transshipment problems; shortest path, minimum spanning tree, maximum flow, minimum cost network flow problems and project networks; and discrete-state and continuous-state dynamic programming models and applications.
• Prerequisite: Knowledge of linear algebra; restricted to students in the College of Engineering and in the College of Science.

OR 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Prerequisite: ENCP 6000.
• Repeatability: May be repeated without limit.

OR 6965 Co-op Work Experience Abroad (0 SH)
Offers eligible students an opportunity for work experience abroad.
• Prerequisite: Engineering students only.
• Repeatability: May be repeated without limit.

OR 7230 Probabilistic Operation Research (4 SH)
Introduces the theory and use of stochastic models to represent industrial operations. Topics include discrete-state Markov chains and applications, state transitions and properties, first passage probabilities, steady-state analysis; absorbing chains and absorption probabilities; introduction to continuous-time Markov chains, transition rates and steady-state analysis; basic elements of queuing systems, birth-and-death process, and special cases; steady-state analysis of simple queuing models including M/M/s, M/M/s/K, M/M/s/N/N and their special cases; and queuing models involving nonexponential distributions.
• Prerequisite: IE 6200 with a grade of C or MATH 7241 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7235 Inventory Theory (4 SH)
Considers the nature and characteristics of inventory systems. Examines techniques of constructing and analyzing mathematical models of inventory systems with a view toward determining operating policies for such systems.
• Prerequisite: OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7240 Integer and Nonlinear Optimization (4 SH)
Covers important families of mathematical programming problems and optimization methods. Discusses the cutting plane and the branch and bound algorithm for binary and mixed integer programming problems. Introduces nonlinear programming including unconstrained optimization, the Kuhn-Tucker conditions, gradient methods, and separable, quadratic, and geometric programming.
• Prerequisite: OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7245 Network Analysis and Advanced Optimization (4 SH)
Considers concepts of advanced linear programming and network flows. Includes theory of the simplex method, the revised simplex algorithm using LU factorization, and simplex for bounded variables and primal-dual methods; methods for solving large-scale models such as Danzig-Wolfe decomposition, Bender’s partitioning, Lagrangian relaxation, and subgradient optimization; computational complexity and Karmarkar’s algorithm; minimum cost network flows, network simplex, and generalized and multicommodity network flow problems; and special types of network problems including the traveling salesman, routing, network location, and reliability problems.
• Prerequisite: OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7250 Multi-Criteria Decision Making (4 SH)
Offers theory, computation, and application of multicriteria decision making. Topics include conventional and criterion cone parametric programming; approaches for generating efficient solutions, such as weighted sums, e-constraint, reduced feasible regions, and Fourier-Motzkin elimination; vector maximum algorithms and ADBASE software; multiattribute utility theory; goal programming; analytic hierarchy process and Expert Choice software; filtering techniques; multiple objective fractional programming; and interactive and Tchebycheff procedures.
• Prerequisite: OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.
OR 7260 Constraint Programming (4 SH)
Covers the basic foundations of logic-based modeling and constraint programming, which includes logic of propositions, discrete variables and 0-1 inequalities, global constraints (all different, cardinality, cumulative, stretch, disjunctive, element, sum), consistency, constraint propagation, domain reduction, and search strategies (branching, backtracking). Constraint programming uses techniques from artificial intelligence, computer science, and operations research to solve combinatorial problems such as planning, scheduling, vehicle routing, the traveling salesman problem (TSP), staff rostering, and course timetabling. Also covers integrated constraint programming and mathematical programming methods such as Benders decomposition, column generation, relaxation, and local search methods.
• Prerequisite: OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7310 Logistics, Warehousing, and Scheduling (4 SH)
Explores the determination of needs and requirements for logistics within large-scale manufacturing and business environments. Examines warehousing and scheduling in the context of a business logistics system. Introduces managerial, mathematical, and software tools and techniques for modeling and optimizing various aspects of the business supply chain. Considers approaches to examining warehousing operations and the associated algorithms.
• Prerequisite: (a) IE 6200 with a grade of C or MATH 7241 with a grade of C and (b) OR 6205 with a grade of C; restricted to students in the College of Engineering and in the College of Science.

OR 7374 Special Topics in Operations Research (4 SH)
Offers topics of interest to the staff member conducting this class for advanced study.
• Repeatability: May be repeated without limit.

OR 7440 Operations Research Engineering Leadership Challenge Project 1 (4 SH)
Offers students an opportunity to develop and present a plan for the demonstration of a marketable technology product or prototype with an operations-research focus. Constitutes the first half of a thesis-scale project in technology commercialization. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: Operations research/engineering leadership students only.

OR 7442 Operations Research Engineering Leadership Challenge Project 2 (4 SH)
Continues OR 7440, a thesis-scale project in technology commercialization. Offers students an opportunity to demonstrate their development of a marketable technology product or prototype with an operations-research focus and produce a written documentary report on the project to the satisfaction of an advising committee. Requires work/training with a sponsoring organization or employer to improve a process or develop a project that is of significant value to the organization and demonstrates a quantifiable market impact while enhancing the student’s technological and engineering depth and fostering the student’s leadership development.
• Prerequisite: OR 7440; operations research/engineering leadership students only.

OR 745 Master’s Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.

OR 7945 Master’s Project (4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

OR 7978 Independent Study (1 to 4 SH)
Offers theoretical or experimental work under individual faculty supervision.
• Repeatability: May be repeated without limit.

OR 7990 Thesis (1 to 8 SH)
Offers analytical and/or experimental work conducted under the direction of the faculty in fulfillment of the requirements for the degree. Requires first-year students to attend a graduate seminar program that introduces the students to the methods of choosing a research topic, conducting research, and preparing a thesis. Requires successful completion of the seminar program.
• Repeatability: May be repeated without limit.

OR 7994 Thesis Continuation—Part Time (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
• Repeatability: May be repeated without limit.

OR 7996 Thesis Continuation (0 SH)
Continues thesis work conducted under the supervision of a departmental faculty member.
ORGANIZATIONAL BEHAVIOR (ORGB)

ORGB 3201 Organizational Behavior (4 SH)
Provides an overview of the actions and behaviors of people in organizations. Uses case studies, videos, experiential exercises, lectures, and discussions to explore the effects of individual, interpersonal, group, organizational, and cross-cultural factors on human behavior. Topics include groups and teams, motivation, leadership, organizational change, organizational culture, structure, conflict resolution, and communication. Both the underlying theories and principles of these topics, as well as their practical applications and implications for organizations, are covered.
• Prerequisite: COOP 3945 (which may be taken concurrently); restricted to business majors, business combined majors, information science majors, and computer science/information science combined majors.
• Equivalent: ORGB 3202 and ORGB 3209.

ORGB 3202 Organizational Behavior in a Global Context (4 SH)
Covers the actions and behaviors of people in organizations. Uses case studies, videos, experiential exercises, lectures, and discussions to explore the effects of individual, interpersonal, group, organizational, and cross-cultural factors on human behavior. Topics include groups and teams, motivation, leadership, organizational change, organizational culture, structure, conflict resolution, and communication. Emphasizes the social and cultural issues faced by firms that operate globally. Studies both the underlying theories and principles of these topics, as well as their practical applications and implications for organizations.
• Prerequisite: COOP 3945 (which may be taken concurrently) and sophomore standing or above; international business majors only.
• Equivalent: ORGB 3201 and ORGB 3209.

ORGB 3209 Organizational Behavior (4 SH)
Does not count as credit for business majors. Counts as ORGB 3201 for business minors only.
• Prerequisite: Nonbusiness majors with sophomore standing or above.
• Equivalent: ORGB 3201 and ORGB 3202.

PHARMACEUTICAL SCIENCE (PHSC)

PHSC 2000 Professional Development Co-op (1 SH)
Introduces the Bouvé Cooperative Education Program. Offers students an opportunity to develop job-search and career-management skills. Students perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Offers students an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Familiarizes students with workplace issues relative to their field of study and presents the MyNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.

PHSC 2301 Human Physiology I (3 SH)
Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cardiovascular, respiratory, digestive, urinary, and endocrine systems. Focuses on the physiological mechanisms of the major organ systems. Physiological information is related to the specific areas of pharmacology.
• Prerequisite: BIOL 1113 with a grade of C– and sophomore standing or above; pharmacy majors only.
• Corequisite: PHSC 2302.

PHSC 2302 Human Anatomy Lab (1 SH)
Accompanies PHSC 2301. Focuses on the anatomy of the major organ systems. Interactive CD-ROMs allow each student to study in-depth the structure of each organ system.
• Prerequisite: BIOL 1113 with a grade of C– and sophomore standing or above; pharmacy majors only.
• Corequisite: PHSC 2301.

PHSC 2303 Human Physiology II (3 SH)
Continues PHSC 2301. Provides students with an understanding of the principles of physiology. Discusses physiological information mostly related to cell physiology, muscle physiology, and physiology of the nervous system. Focuses on the physiological mechanisms of the major organ systems. Physiological information is related to the specific areas of pharmacology.
• Prerequisite: PHSC 2301 with a grade of C, PHSC 2302 with a grade of C, and sophomore standing or above; pharmacy majors only.
• Corequisite: PHSC 2304.
PHSC 2301 Human Physiology Lab (1 SH)
Accompanies PHSC 2303. Covers topics from the course through various experiments.
• Prerequisite: PHSC 2301 with a grade of C, PHSC 2302 with a grade of C, and sophomore standing or above; pharmacy majors only.
• Corequisite: PHSC 2303.

PHSC 2302 Biochemistry (4 SH)
Introduces the structures, functions, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Discusses the mechanisms of enzyme reactions, enzyme kinetics, vitamins, biological oxidation-reduction reactions, and bioenergetics, as well as various inborn errors of metabolism.
• Prerequisite: (a) PHSC 2301 with a grade of C or BIOL 1117 with a grade of C and (b) BIOL 1103 with a grade of C– or BIOL 1113 with a grade of C– and (c) CHEM 2313 with a grade of C.

PHSC 2303 Immunology (3 SH)
Provides students with an understanding of the principles, mechanisms, organs, cells, and molecules of the innate and adaptive immunity. Monoclonal antibodies, organ transplant immunity, hypersensitivity, tolerance, tumor immunity, autoimmunity, and immunodeficiencies are discussed in light of potential therapeutic interventions. Weekly journal club-style presentation of related assigned topic is required.
• Prerequisite: (a) PHSC 2303 with a grade of C, PHSC 2320 with a grade of C, and undergraduate standing or (b) BIOL 1119 with a grade of C, PHSC 2320 with a grade of C, and undergraduate standing or (c) graduate standing.
• Equivalent: PHSC 6250.

PHSC 2360 Medical Microbiology (3 SH)
Reviews the structure and physiology of bacteria, fungi, parasites, and viruses, and then surveys the members of each of these groups of organisms that commonly colonize and/or cause significant disease in humans. The survey focuses on human organ systems such as skin and mucous membranes, gastrointestinal, respiratory, and urinary tracts, central nervous system, blood and lymphatics, and others. When possible, demonstration cultures of microorganisms are made available to students, and computer study guides or Kodachrome slide sets are available for review.
• Prerequisite: BIOL 1113 with a grade of C– and sophomore standing or above; pharmacy majors only.

PHSC 2650 Introduction to Health Science Research (4 SH)
Effective Spring 2017
Surveys research methods and topics relevant to health science research with the goal of engaging undergraduate students to commit to research training throughout at least one semester and possibly continuing throughout their undergraduate program. Exposes students to lectures addressing the benefits of a research experience and readings of original literature. Health science faculty from across the university present their lines of research focusing on projects that would be available to students. Seeks to familiarize students with use of the scientific method in addressing unsolved problems and to prepare them to select the most appropriate research laboratory to engage in research.
• Prerequisite: Freshman or sophomore standing.

PHSC 3411 Pharmaceutics 1 (4 SH)
Develops an understanding of pharmaceutical dosage forms, with emphasis on solids, liquids, semisolids, parenterals, inhalation, and novel drug delivery systems. Combines the discussion of pharmaceutical products developed in industry and those compounded in local pharmacies. Focuses on application of mathematical principles and problem-solving skills in pharmaceutical compounding.
• Prerequisite: (a) MATH 1241 with a grade of C– or MATH 1341 with a grade of C– and (b) CHEM 2313 with a grade of C and (c) PHYS 1145 with a grade of C, PHYS 1149 with a grade of C, or PHYS 1161 with a grade of C.
• Equivalent: PHSC 6236.

PHSC 3412 Pharmaceutics 2 (4 SH)
Continues PHSC 3411. Examines the physical and chemical properties of the drug as it relates to pharmaceutical product development. Covers concepts of thermodynamics, colligative properties, ionic equilibriums and buffers, solubility, complexation and protein binding, reaction kinetics, mass transport, interfacial phenomena and dispersion, and rheology.
• Prerequisite: PHSC 3411 with a grade of C.

PHSC 3419 Pharmaceutics Laboratory (1 SH)
Formulates pharmaceutical dosage forms such as powders, capsules, solutions, suspensions, emulsions, ointments, gels, creams, lotions, and suppositories, and tests the quality of the products in the lab using approved methods of analysis. Also provides an understanding of the physical and chemical properties of drugs as they relate to formulation development through experimental observation of dissolution, stability, and effects of pH and co-solvent on solubility of drugs.
• Prerequisite: PHSC 3411 with a grade of C.
• Equivalent: PHSC 6243.
PHSC 3430 Pharmacokinetics and Biopharmaceutics (3 SH)
Focuses on the basic principles and methods of biopharmaceutics and pharmacokinetics. Covers the kinetics of drug absorption, distribution, metabolism, and excretion; linear and nonlinear pharmacokinetics; general concept of one- and two-compartment models with instantaneous (i.v. bolus), zero order (i.v. infusion), or first order (oral administration or i.m. injection) input; evaluation of bioavailability and investigation of the factors affecting drug availability; influence of the route of administration, dosage form, and regimen on bioavailability of drugs; bioequivalence study; multiple dosing kinetics; general approaches to dosage adjustment in renal disease; noncompartmental analysis; and pharmacokinetic-pharmacodynamic modeling.
• Prerequisite: PHSC 3412 with a grade of C or graduate standing.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: PHSC 6246.

PHSC 3430 Pharmacokinetics and Biopharmaceutics (3 SH)
Effective Spring 2017
Focuses on the basic principles and methods of biopharmaceutics and pharmacokinetics. Covers the kinetics of drug absorption, distribution, metabolism, and excretion; linear and nonlinear pharmacokinetics; general concept of one- and two-compartment models with instantaneous (i.v. bolus), zero order (i.v. infusion), or first order (oral administration or i.m. injection) input; evaluation of bioavailability and investigation of the factors affecting drug availability; influence of the route of administration, dosage form, and regimen on bioavailability of drugs; bioequivalence study; multiple dosing kinetics; general approaches to dosage adjustment in renal disease; noncompartmental analysis; and pharmacokinetic-pharmacodynamic modeling.
• Prerequisite: PHSC 3412 with a grade of C or graduate standing.
• NU Core: Mathematical/analytical thinking level 2.
• Equivalent: PHSC 6246.

PHSC 4340 Pharmacology for the Health Professions (4 SH)
Provides the fundamentals of pharmacology to students entering the health professions. Topics include the general principles of drug action, drug distribution, and drug elimination, with attention to the development of reasoning skills necessary to identify, avoid, and solve practical drug-related problems. Drugs are presented according to therapeutic or functional classification.
• Prerequisite: PHSC 2303 with a grade of C, BIOL 1119 with a grade of C–, or graduate standing; Bouvé students only.

PHSC 4501 Pharmacology/Medicinal Chemistry 1 (5 SH)
Introduces the principles and basic concepts of pharmacology and the general mechanisms of drug action including drug receptor interactions. Discusses the major drug classes affecting the peripheral autonomic and central nervous systems including anxiolytics, sedative-hypnotics, anesthetics, anticonvulsants, neuroleptics, antidepressants, and antihypertensive agents. Considers therapeutic uses, mechanisms of drug action, and undesirable actions including side effects and adverse reactions.
• Prerequisite: (a) PHSC 2303 with a grade of C, CHEM 2313 with a grade of C, and junior or senior standing or (b) BIOL 1119 with a grade of C, CHEM 2313 with a grade of C, and junior or senior standing or (c) graduate standing; pharmacy majors only.
• Equivalent: PHSC 6230.

PHSC 4502 Pharmacology/Medicinal Chemistry 2 (5 SH)
Continues PHSC 4501. Covers the mechanisms of action, structure-activity relationships, therapeutic uses, and adverse effects of drugs including cardiovascular agents, hormones, anticancer drugs, antibiotics, and antiinflammatory agents.
• Prerequisite: PHSC 4501 with a grade of C.
• Equivalent: PHSC 6233.

PHSC 4600 Pharmacy Capstone (4 SH)
Acts as a final integrator of the major, general education, and experiential aspects of the student’s education. Expects students to demonstrate motivation and initiative and to work cooperatively with their faculty mentor, community partners, and fellow students (where applicable) in order to complete a comprehensive, high-quality scholarly work (e.g., a research project, educational project, administrative project, business plan, case report, or community-service learning project or professional manuscript) appropriate for dissemination to the university and professional community. The timeline for completion is set by the faculty mentor and agreed to by the individual or all members of the student group.
• Prerequisite: Junior or senior standing; pharmacy students and pharmacy studies students only.
• NU Core: Capstone.
• Repeatability: May be repeated once.
PHSC 4850 Capstone for BS in Pharmaceutical Sciences (4 SH)
Designed to facilitate integration of major, general education, and experiential aspects of the individual student’s program of study with a focused scientific research experience under the mentorship of a faculty member. Offers students an opportunity to develop a research question, perform data collection and analysis, and satisfactorily complete a quality research report (detailing background; methods; results; discussion, including relevance to their pharmaceutical science career development; and references), followed by participation in a seminar on their work presented to the Northeastern community. In addition, students are strongly encouraged to present their findings at local, regional, national, and international professional meetings.
• Prerequisite: Approval of director of pharmaceutical sciences BS program and senior standing; pharmaceutical sciences majors only.
• NU Core: Capstone, writing intensive in the major.

PHSC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

PHSC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: PHSC 4970 with a grade of C.
• Repeatability: May be repeated without limit.

PHSC 4991 Research (4 SH)
Extends current knowledge or offers novel insights through faculty-directed and supervised individual undergraduate research or creative projects. The project must be designed in concert with and obtain formal prior approval from relevant faculty and program director.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHSC 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHSC 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHSC 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHSC 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.

PHSC 5100 Concepts in Pharmaceutical Science (2 SH)
Introduces new students in the Pharmaceutical Science Graduate Program to important concepts in medicinal and combinatorial chemistry as they relate to drug discovery, and a brief overview of pharmacology, drug metabolism, pharmacokinetics, and toxicology. Also introduces the major drug receptor families and their signaling pathways.
• Prerequisite: Junior, senior, or graduate standing.

PHSC 5200 Advanced Immunology and Immunological Therapies (2 SH)
Offers an interactive course about molecular principles of immunity and ways to manipulate it. Provides instructive overview of molecular and cellular bases of the immunological diseases. Highlights the problems of modern clinical immunology and immunotherapies. Summarizes the molecular and cellular mechanisms by which the immune system protects the host from disease. Studies clinical cases of examples of the failure of immunity to some infections and, on the other hand, how inappropriate immune responses can themselves cause disease, such as with allergy and autoimmunity. Describes the pharmacological and physiological regulation of immune response and explains biotechnological approaches to develop new effective vaccines and immunotherapies.

PHSC 5300 Pharmaceutical Biochemistry (2 SH)
Offers students an opportunity to obtain an understanding of the principles of physiological chemistry. Focuses in-depth on the major topics of physiological chemistry, including general chemistry and biomolecules, peptide synthesis and protein structure, carbohydrates and nucleic acids, thermodynamics and kinetics of molecular interactions, and colloids and micelles. Relates biochemical information to the specific areas of pharmacology, pharmaceutics, and drug discovery/development.
PHSC 5305 Professional Development for Pharmaceutical Sciences (1 SH)
Introduces and examines the goals, expectations, policies, and procedures of the Masters’ in Pharmaceutical Sciences internship program and professionalism in the field. Discusses the role and involvement of internship employers. Offers students an opportunity to develop job search and career management skills; assess their workplace skills, interests, and values; discuss how those qualities impact career decisions; prepare a professional resume; and learn proper interviewing techniques. Issues of ethics and professionalism are designed to inform students of issues they will face in the pharmaceutical field. Content of this course is geared to students’ participation in the internship program and overall professional development in pharmaceutical sciences.
• Prerequisite: Restricted to students in biomedical nanotechnology, biomedical science, medicinal chemistry, pharmaceutical sciences, and pharmacology.

PHSC 5310 Cellular Physiology (2 SH)
Focuses in-depth on the major cellular physiological mechanisms, including physiology of the cell membrane, ion channels and transport phenomena, energy production, signal transduction, synapses, and physiological processes in the cytosol. Relates physiological information on the specific areas of pharmacology, pharmaceutics, and drug discovery/development. Offers students an opportunity to obtain an understanding of the principles of cellular physiology.

PHSC 5360 Anti-Infectives (4 SH)
Reviews the structure and physiology of bacteria, fungi, and viruses and surveys significant organisms of medical importance. Introduces specific antibiotic, antifungal, and antiviral agents and classes of agents once a foundation of knowledge of the microorganisms that cause disease is established. Discusses concepts of pharmacology, pharmacokinetics, antimicrobial resistance, pharmacodynamics of antimicrobial agents, and spectra of activity.
• Prerequisite: PHSC 4502 and junior, senior, or graduate standing; pharmacy, pharmacy studies, and pharmaceutical sciences students only.

PHSC 5400 Principles of Drug Design (3 SH)
Studies important aspects of drug discovery and development with a focus on drug design. Covers basic organic medicinal chemistry concepts and seeks to build students’ skills in lead compound discovery, structure-activity relationship studies, and lead optimization strategies. Topics include the fundamentals of pharmacology, pharmacokinetics, and pharmacodynamics of therapeutic agents relevant to the drug-structure optimization. These skills often help develop a strong foundation in the concepts that govern the multidisciplinary process of drug discovery. Uses lectures and peer-reviewed seminar presentations to help students to incrementally increase their knowledge required to identify new, marketable therapeutic agents.
• Prerequisite: Organic or medicinal chemistry at the undergraduate level; restricted to students in Bouvé College of Health Sciences, the College of Engineering, and the College of Science.

PHSC 5500 Repurposing Drugs for Cancer Immunotherapies (2 SH)
Offers a multidisciplinary course targeted to students interested in recent advances in biomedical research, clinical practice, and personalized medicine as related to cancer immunotherapies. Describes current promises and disappointments with cancer immunotherapies and recent FDA drug approvals for personalized cancer therapies. Explains the role of immunological and physiological negative regulators of antitumor and tumor biology as needed. Explains underlying principles of immunology, biochemistry, genetics, and preclinical and clinical studies when introducing new concepts. Assigned detailed study of specific areas and discussion of assigned papers are designed to complement classroom material.
• Prerequisite: Bouvé students only.

PHSC 5555 Pharmaceutical Toxicology (3 SH)
Covers fundamental concepts of toxicology and technical methods in toxicology along with comprehensive analysis of both in-vitro and in-vivo toxicity in drug discovery and development. Through lectures given by experts in various fields in toxicology on several topics required for specialized work in research, industrial, and clinical settings, offers students an opportunity to become familiar with methods and analyses including in-vitro and in-vivo toxicity assessments and toxicokinetic-toxicodynamic models and analyses. Includes mechanistic basis of toxicity, methods of toxicological analysis, and case studies pertinent to topics.
• Prerequisite: Undergraduate physiology or biochemistry and junior, senior, or graduate standing; restricted to students in Bouvé College of Health Sciences, the College of Engineering, and the College of Science.
PHSC 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** PHSC 5100 with a grade of C and junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

PHSC 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

PHSC 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- **Prerequisite:** Junior, senior, or graduate standing.
- **Repeatability:** May be repeated without limit.

PHSC 6210 Drug Design, Evaluation, and Development (2 SH)
Teaches students the concepts of using immunological, genomic, and proteomic techniques to find novel drug targets. Also introduces the concepts of drug targeting and dosage forms, in vivo/in vitro drug screening, and the importance of pharmacogenetics to explain variability in drug reactions.

PHSC 6212 Research Skills and Ethics (1 SH)
Teaches students the basics of laboratory safety, safekeeping laboratory data, and the process of writing a grant proposal. Also, case studies explore the concepts of data distortion or fabrication, conflicts of interest, confidentiality, ethical aspects of peer review, and the attribution of credit in science.

PHSC 6214 Experimental Design and Biostatistics (2 SH)
Discusses fundamental principles of experimental design and statistical analysis, with emphasis on clinical research. Topics include descriptive statistics, hypothesis testing, analysis of variance, correlation, regression, chi-square test, and nonparametric methods.
- **Prerequisite:** Pharmaceutical sciences and biotechnology students only.
- **Equivalent:** BIOT 6214.

PHSC 6216 Human Physiology and Pathophysiology (2 SH)
Introduces major topics in human physiology, emphasizing knowledge essential to health-related laboratory research. Topics include neurophysiology, immunology, cardiovascular, respiratory, renal, and gastrointestinal physiology and endocrinology.

PHSC 6218 Biomedical Chemical Analysis (2 SH)
Presents the modern reagents, techniques, and instrumentation used to analyze biological samples and purify their components (that is, drugs, metabolites, hormones, macromolecules, organelles, and cells) in health and disease. Emphasizes basic concepts and mechanisms at the chemical level, and applications to human samples.
- **Equivalent:** MLBS 6350.

PHSC 6222 The Chemistry and Biology of Drugs of Abuse (2 SH)
Provides an interdisciplinary introduction to substance abuse, including the medicinal chemistry and neurobiology of drugs that act through the opioid, dopamine, acetylcholine, and cannabinoid systems. Compares and contrasts neurochemical mechanisms that are common to many addictive agents and those that are specific to individual drug classes. Highlights the involvement of the brain dopamine system and differences and discusses similarities between the pharmacology of abused and therapeutic drugs, together with the development of medications for treating drug dependence. Includes lectures by experts on particular topics of their own recent research. Introduces students to key aspects of biological and chemical research as they pertain to drug abuse and its treatment.

PHSC 6224 Behavioral Pharmacology and Drug Discovery (2 SH)
Designed to prepare students to understand the advantages, shortcomings, and pitfalls of the use of live, behaving animals in drug discovery. Covers an in-depth analysis of ethical issues in animal research, as well as aspects of animal behavioral models, behavior and brain biochemistry, and methods of behavioral analysis. Specific topics include psychopharmacology; fear and anxiety; pain and stress; depression and reward; general arousal and tolerance; drug abuse and habitual behaviors. The ways in which animal behaviors can be described in a quantitative manner and the effects of medications and abused drugs quantified and related to human diseases and drug responses are an important component of the course.

PHSC 6226 Imaging in Medicine and Drug Discovery (2 SH)
Designed to prepare students to understand modern noninvasive medical imaging modalities, principally positron emission tomography (PET) and magnetic resonance imaging (MRI), used in metabolic and functional studies. Reviews the basic science of magnetic resonance and radioactivity and radiation measurement, as well as tracer kinetics, but concentrates on applications. Covers a survey of clinical radiological studies; clinical and preclinical human drug discovery and development research involving imaging; and the development and uses of radiopharmaceuticals and other contrast agents for imaging modalities, including X-rays and ultrasound as well as PET and MRI.
PHSC 6280 Immunobiotechnology (2 SH)
Presents the basic elements of immunopathology, reviewing the components and function of the immune system. Covers the disorders of the complement system, the biologic mechanisms of immunologically induced tissue injury (hypersensitivity reactions), autoimmunity, and immunodeficiency. Considers the immunological features of cancer and transplant rejection.
• Prerequisite: BIOL 5573 and BIOL 5583, both with a grade of C.

PHSC 6290 Biophysical Methods in Drug Discovery (2 SH)
Provides an interdisciplinary introduction to biophysical methods used in modern drug discovery, including hit generation and lead optimization. Emphasizes key experimental methods, including nuclear magnetic resonance (NMR) spectroscopy and X-ray crystallography, as well as computer modeling as applied to ligand- and structure-based drug design. Includes lectures by experts on related topics from their recent drug-discovery research. Presented under the auspices of the Center for Drug Discovery.
• Prerequisite: (a) Graduate standing or (b) junior or senior standing and permission of instructor.

PHSC 6300 Pharmaceutical Science Seminar (1 SH)
Teaches students to evaluate critically the scientific literature in a journal club format. Several sections may be offered each semester to accommodate different specializations or interest groups.
• Repeatability: May be repeated without limit.

PHSC 6314 Special Topics of Pharmaceutical Science (2 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: PHSC 5100 with a grade of C.
• Repeatability: May be repeated without limit.

PHSC 6401 Pharmaceutical Science Internship (1 SH)
Offers an experiential component of the graduate curriculum that fosters professional development through internship in drug discovery, development, and/or regulatory affairs in a pharmaceutical or biotechnology company. Requires students to work in a company for a minimum of twenty hours per week. Offers students an opportunity to engage in pharmaceutical science research or to work in an environment outside the University but under the supervision of a faculty instructor. May be taken in any semester.
• Prerequisite: Pharmaceutical science students only.
• Repeatability: May be repeated up to 2 times.

PHSC 6760 Doctoral Pharmaceutical Science Research 1 (2 SH)
Offers PhD research in preparation for thesis proposal.

PHSC 6761 Doctoral Pharmaceutical Science Research 2 (2 SH)
Offers PhD research in preparation for thesis proposal.

PHSC 6810 Pharmaceutical Science Colloquium (1 SH)
Requires students to present one formal seminar on their research. This presentation is open to all those interested.

PHSC 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

PHSC 6984 Pharmaceutical Science Research (2 SH)
Offers students laboratory research under the guidance of an adviser.
• Repeatability: May be repeated once for up to 4 total semester hours.

PHSC 6990 Thesis (2 SH)
Offers research/experimental work for master’s thesis. Students may register twice.
• Repeatability: May be repeated once.

PHSC 6996 Thesis Continuation (0 SH)
Offers continued registration while student completes master’s thesis or other research project to meet the research requirement in pharmaceutical science.

PHSC 7010 Pharmaceutical Sciences Laboratory (4 SH)
Offers a hands-on graduate laboratory course that introduces students to the investigative approaches and laboratory methods used in contemporary pharmaceutical sciences research. Laboratory exercises have a practical relationship to essential techniques in modern drug discovery, drug targeting and delivery, and determining mechanisms of drug action. These exercises cover basic laboratory skills, the rationale for and application of standard laboratory methods, training in the use of equipment and techniques central to pharmaceutical sciences research, how to maintain a laboratory notebook, statistical analysis and interpretation of data, and how to present research results in technical laboratory reports.
• Prerequisite: Pharmaceutical sciences, biology, biotechnology, chemistry, and chemical engineering students only.
PHSC 7020 Scientific Writing: Thesis Proposal (2 SH)
Prepares the principles of writing a proposal based on the NIH R01 grant proposal template used by the department. Participants develop their own proposal in collaboration with their faculty advisor or the immediate project supervisor designated by their faculty advisor (the project principle investigator). Offers students an opportunity to meet with their own project principle investigators to develop content and map out the project aims and experimental design and to produce a revised draft of their thesis proposal.
- Prerequisite: Each student must have initiated MS or PhD thesis research and have some preliminary data; PhD students must have passed their qualifying exam; MS students must petition the graduate committee in writing for permission to enroll; pharmaceutical sciences students only.

PHSC 7030 Working with Radioactive Drugs (1 SH)
Offers students an opportunity to learn through a combination of lectures, readings, and hands-on laboratory work how to conduct experiments with radioactive drugs and other radio-labeled compounds in a manner that is safe, that is compliant with federal and state regulations, and that generates scientific data of high quality.

PHSC 7990 Thesis (1 to 4 SH)
Offers preparation of PhD thesis proposal and proposal defense before thesis committee.
- Prerequisite: PHSC 7000 with a grade of C and qualifying examination.
- Repeatability: May be repeated without limit.

PHSC 8940 Doctoral Training and Research (1 SH)
Intended to show full-time status for pharmaceutical science PhD students in the semester in which they are taking the comprehensive exam. In addition to successfully completing the comprehensive exam, students are expected to perform research in preparation for the doctoral proposal; the grade for this course documents successful performance.
- Prerequisite: Restricted to pharmaceutical science PhD students wishing to establish doctoral candidacy.

PHSC 8986 Doctoral Full-Time Research (0 SH)
Requires student to conduct full-time research in an advisor’s laboratory.
- Repeatability: May be repeated without limit.

PHSC 9000 Comprehensive Exam (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

PHSC 9681 Doctoral Proposal (2 SH)
Offers preparation of PhD dissertation proposal and proposal defense before dissertation committee.
- Prerequisite: Passing of comprehensive exam.
- Repeatability: May be repeated without limit.

PHSC 9990 Dissertation (3 SH)
Offers research/experimental work for PhD thesis. Students may register three times.
- Prerequisite: PHSC 9681 with a grade of C.
- Repeatability: May be repeated up to 2 times.

PHSC 9996 Dissertation Continuation (0 SH)
Offers continuation of PhD dissertation research.
- Repeatability: May be repeated without limit.

PHARMACEUTICS (PMST)

PMST 6250 Advanced Physical Pharmacy (2 SH)
Covers the physical and chemical principles in drug formulation design, with emphasis on such topics as solutions of nonelectrolytes and electrolytes, ionic equilibria, drug complexation, reaction kinetics, mass transport, and interfacial phenomena.

PMST 6252 Pharmacokinetics and Drug Metabolism (3 SH)
Focuses on concepts of one- and two-compartment linear and nonlinear pharmacokinetics and compartmental modeling with plasma and/or urinary data. Discusses principles and methods of metabolic biotransformation and disposition of xenobiotics in biological system.

PMST 6254 Advanced Drug Delivery System (3 SH)
Examines in-depth the role of sustained, controlled, and site-specific delivery systems for drugs and genetic materials using polymeric systems, colloidal drug delivery systems, and vectors for gene therapy.

PMST 6256 Advanced Pharmacokinetics (2 SH)
Covers derivation of general equations for linear and nonlinear mamillary models by using Laplace transform, input-disposition functions, and general partial fraction theorem. Explores development of compartmental, physiological, and stochastic models.
PMST 6258 Advanced Pharmacokinetics and Toxicology (3 SH)
Focuses on expanding prior basic pharmacokinetics to more advanced topics required for specialized work in research, clinical, and industrial settings. Using presentation and class participation, offers students an opportunity to become familiar with various analyses and modeling techniques, including compartmental/physiologic models, pharmacokinetic-pharmacodynamic analysis and modeling, and toxicokinetics/toxicodynamics.

• Prerequisite: PMST 6252 or equivalent graduate pharmacokinetics course with calculus.

PHARMACOLOGY (PMCL)

PMCL 6260 Pharmacology 1 (2 SH)
Surveys the chemical and pharmacological basis of the major classes of drugs and their use in the treatment of disease. Characteristics of drugs studied include indications, adverse reactions, contraindications, structure-activity relationships, metabolism, mechanism of action, and clinically significant interactions.

PMCL 6261 Pharmacology 2 (2 SH)
Continues PMCL 6260, although in a format that is not contingent that PMCL 6260 precedes this course.

• Prerequisite: PHSC 5100 with a grade of C and PHSC 6216 with a grade of C.

PMCL 6262 Receptor Pharmacology (2 SH)
Reviews receptors for drug substances and for endogenous ligands in a format that combines lecture presentations and discussion. Focuses on the evaluation of current literature. Covers techniques available to study receptors, various models for receptor-ligand interactions, stereochemical aspects of receptor interactions, receptor-mediated coupling mechanisms, and evaluation of several specific receptor systems.

• Prerequisite: PHSC 5100.

PHARMACY PRACTICE (PHMD)

PHMD 1001 Introduction to the Profession of Pharmacy (1 SH)
Introduces the profession of pharmacy in this one-credit course. Covers pharmacists’ responsibilities, pharmacy organizations, ethical issues related to healthcare, and the education and training of pharmacists. Offers students the opportunity to learn about the role of the pharmacist within different healthcare systems. Guest speakers, from several areas of pharmacy practice, provide firsthand information on career options.

• Prerequisite: Pharmacy majors only.

PHMD 1201 Introduction to Pharmacy Practice (2.5 SH)
Seeks to prepare pharmacy students for their first introductory pharmacy practice experience (IPPE)/co-op. Introduces students to the policies, procedures, and expectations of the Cooperative Education Program. Offers students an opportunity to develop the skills needed to be successful in the preparation, activity, and reflection components of the pharmacy co-op program; to prepare their first résumés; and to learn proper interviewing techniques. Exposes students to the various co-op opportunities available to them as well as potential career paths within the pharmacy profession. Covers workplace issues including diversity, sexual harassment, ethics, and confidence of information. Introduces students to the technical knowledge and skills required for their first pharmacy experiences in both community and institutional pharmacy practice and to drug information resources. Offers students an opportunity to develop basic communication skills to aid them in successful completion of their first IPPE.

• Prerequisite: Sophomore standing or above; pharmacy and pharmacy studies majors only.

• Corequisite: PHMD 1202.

PHMD 1202 Lab for PHMD 1201 (0.5 SH)
Accompanies PHMD 1201. Focuses on skills needed for future patient-care experiences. Intended to supplement lecture content and provide practical reinforcement of concepts. Offers students an opportunity to apply knowledge learned in the classroom related to the appropriate and effective use of communication strategies, drug information resources, and sterile techniques. Labs related to the learning of communication skills support a client-centered approach in assessing, adapting, and evaluating patient medication use needs. Offers students an opportunity to learn and practice of six core communication skills: (1) listening, (2) asking questions, (3) providing empathy, (4) understanding and managing confusion, (5) understanding and managing conflict, and (6) understanding and analyzing nonverbal behavior.

• Corequisite: PHMD 1201.
PHMD 2000 Professional Development Co-op (1 SH)
Introduces the Bouvé Cooperative Education Program. Offers students an opportunity to develop job-search and career-management skills. Students perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Offers students an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Familiarizes students with workplace issues relative to their field of study and presents the MyNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.

PHMD 2310 Educational and Behavioral Interventions in Pharmacy Practice (2 SH)
Seeks to provide pharmacy students with theoretical frameworks and principles for understanding communication processes and practical tools to engage in effective interpersonal communication when providing medication therapy management to diverse patient populations. Uses a patient-centered approach to assess, adapt, and evaluate various types of communications within a variety of pharmacy settings. Reviews core communication skills, including listening, asking questions, providing empathy, understanding/managing confusion, understanding/managing conflict, and understanding/analyzing nonverbal behavior. Additional skills covered include detecting/intervening to improve adherence, facilitating behavioral change, communicating with special populations, leading/facilitating group communication, collaborating with other professionals, analyzing organizational communication in pharmacies, and understanding/analyzing health promotion campaigns. Offers students an opportunity to become aware of communication issues facing pharmacy practice at interpersonal, interprofessional, and organizational levels.
- Corequisite: PHMD 2311.
- NUpath: Engaging difference and diversity.
- Equivalent: PHMD 6202.

PHMD 2311 Lab for PHMD 2310 (0.5 SH)
Offers a laboratory course designed to support a patient-centered approach to how pharmacy students assess, adapt, and evaluate various types of communications within pharmacy settings. Offers students an opportunity to apply course concepts in group discussions, interact with standardized patients, and complete various written and oral exercises. Seeks to provide students with practical tools to engage in effective interpersonal communication when providing medication therapy management to diverse patient populations. Also covers how to deliver a professional presentation of information to an audience.
- Corequisite: PHMD 2310.
- Equivalent: PHMD 6204.

PHMD 2350 Healthcare Systems (3 SH)
Examines the evolution of the healthcare system in the United States, from the early forms of organized institutional care to the dynamic, increasingly integrated, and managed-care system of present healthcare delivery. Examines the interaction of regulatory, economic, political, social, and ethical aspects of the healthcare system, with emphasis on issues related to pharmacy practice. Current proposals for healthcare and drug-related reform and regulation are considered. Considers the impact and consequences of action in one era on the structure and function of healthcare in later years.
- Prerequisite: Junior, senior, or graduate standing.
- NU Core: Writing intensive in the major.
- Equivalent: PHMD 6203.
PHMD 3450 Research Methodology and Biostatistics (3 SH)
Offers an interactive course covering aspects of research designs used in experimental and observational studies, hypothesis testing, and an introduction to basic biostatistics. Offers students an opportunity to critically examine selected articles from the clinical literature and to analyze the framing of the research question and the methods used to insure the validity and generalizability of the study’s findings. Clinical trials, observational studies, and problem sets illustrate principles of research design, conduct, and data analysis.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; restricted to students with junior, senior, or graduate standing.
• NU Core: Mathematical/analytical thinking level 2, writing intensive in the major.
• Equivalent: PHMD 6210.

PHMD 3600 Leadership and Advocacy in Health Professions (2 SH)
Designed to help facilitate successful careers of young healthcare professionals and expand students’ knowledge of their leadership potential. Consists primarily of topic discussions that include a variety of issues related to professional development, focusing on leadership, organizational and relational skills, and advocacy. Covers global issues in leadership and advocacy. Encourages students to recognize the need for leadership in health professions and the ability of practitioners to influence change regardless of whether they have a title or position of authority. Seeks to be valuable to students with interests in administrative positions in various settings, including in high-level clinical positions, and to students who plan to pursue postgraduate training.
• Prerequisite: Junior, senior, or graduate standing; Bouvé students only.

PHMD 4350 Exploring Academic Careers (2 SH)
Seeks to prepare pharmacy students to become more confident and effective as educators. Also seeks to increase the student’s awareness of academic careers and the roles and responsibilities that faculty play in the class, department, and school of pharmacy. The knowledge, skills, and attitudes discussed and explored in this course are applicable across the profession of pharmacy regardless of practice setting.
• Prerequisite: Pharmacy and pharmacy studies students only with fifth-year standing.

PHMD 4580 Drug Interactions (2 SH)
Designed as an elective course to enhance students’ knowledge and skills regarding drug interactions. Course lectures review commonly encountered drug interactions, with emphasis on the mechanism and clinical significance of interactions. Class discussions and assignments emphasize a scientific approach to identifying and evaluating potential interactions and recommending appropriate, patient-specific management of a given interaction.
• Prerequisite: Senior or graduate standing; pharmacy majors only.

PHMD 4581 Cancer Chemotherapy (3 SH)
Emphasizes the role of chemotherapy in the management of malignant disease. Discussions include an in-depth review of specific antineoplastic agents, a review of specific malignancies, and related topics such as management of nausea and vomiting in cancer patients, hypercalcemia of malignancy, malignant pleural effusions, treatment of bone marrow depression, and unproven methods of cancer treatment.
• Prerequisite: Senior or graduate standing; pharmacy majors only.

PHMD 4585 Research Methods in Health Systems (4 SH)
Exposes students to the research methods that health system pharmacists use most often when conducting research and builds on the content of PHMD 2350, PHMD 3450, and PHMD 4560. Incorporates a seminar discussion format led by healthcare system-based pharmacists actively involved in clinical research and helps prepare students for careers or postgraduate training programs (e.g., residencies) in health systems. Faculty use published studies, live patient databases, and descriptions of their current research projects to illustrate the topics in each session.
• Prerequisite: PHMD 3450; pharmacy majors with senior or graduate standing.
PHMD 4611 Comprehensive Disease Management 1 (6 SH)
Covers foundational concepts of pharmacy practice, including patient evaluation; identification of drug-related problems; pathophysiology; and clinical management of diseases of the respiratory, cardiovascular, and endocrine systems. Specifically covers asthma and COPD, hypertension, hyperlipidemia, diabetes, fluids/electrolytes, and renal disorders. Reviews, system-by-system, the mechanisms of these diseases and their evidence-based prevention and treatment strategies. Offers students an opportunity to apply scientific knowledge and principles of medicinal chemistry, pharmacology, pharmaceutics, and pharmacokinetics to the design of rational, evidence-based therapeutic strategies to provide care to patients in inpatient, ambulatory, and community settings. Emphasizes pathophysiology, self-care, patient education, assessment, medication administration, management, monitoring, and preventative health and population-based health outcomes.
• Prerequisite: PHMD 2350, PHSC 3412, and PHSC 4502; pharmacy and pharmacy studies students only.
• Corequisite: PHMD 4612.

PHMD 4612 Comprehensive Disease Management 1 Seminar (1 SH)
Designed to provide students with opportunities to apply concepts from PHMD 4611 to patient cases, special projects, and other medication-related issues focusing on foundational aspects of pharmacy practice, identification of drug-related problems, and diseases of the respiratory, endocrine, cardiovascular, and renal systems. Accompanies PHMD 4611 and seeks to facilitate accomplishment of course objectives using an active learning format. While completing seminar work, students are expected to review, discuss, integrate, and apply information presented in comprehensive disease management lectures and readings as well as previous and concurrent course work.
• Corequisite: PHMD 4611.
• Equivalent: PHMD 4588.

PHMD 4621 Comprehensive Disease Management 2 (6 SH)
Covers the pathophysiology and clinical management of diseases of the renal, cardiovascular, neurological, and gastrointestinal systems. Reinforces foundational concepts of pharmacy practice and diseases covered in PHMD 4611, while completing a system-by-system review of the mechanisms of renal, cardiovascular, neurological, and gastrointestinal disorders and their evidence-based prevention and treatment strategies. Offers students an opportunity to design rational therapeutic strategies to provide care to patients with these disease states in inpatient, ambulatory, and community settings. Emphasizes pathophysiology, self-care, patient education, assessment, medication administration, management, monitoring, and preventative health and population-based health outcomes.
• Prerequisite: PHMD 4611 and PHSC 3430; pharmacy and pharmacy studies students only.
• Corequisite: PHMD 4622 and PHMD 4623.
• Equivalent: PHMD 4539, PHMD 6233, and PHMD 6239.

PHMD 4622 Comprehensive Disease Management 2 Seminar (1 SH)
Designed to provide students with opportunities to apply concepts from PHMD 4621 to patient cases, special projects, and other medication-related issues focusing on foundational aspects of pharmacy practice; identification of drug-related problems; and diseases of the renal, cardiovascular, neurological, and gastrointestinal systems. Accompanies PHMD 4621 and seeks to facilitate accomplishment of course objectives using an active-learning format. While completing seminar work, students are expected to review, discuss, integrate, and apply information presented in comprehensive disease management lectures and readings as well as previous and concurrent course work. Activities in seminar are reinforced by laboratory skill-building exercises in PHMD 4623.
• Corequisite: PHMD 4621 and PHMD 4623.
• Equivalent: PHMD 6234.

PHMD 4623 Comprehensive Disease Management 2 Skills Lab (0.5 SH)
Offers a self-paced, blended learning experience designed to provide the student with functional knowledge and skills in the area of physical assessment, patient education, and counseling in the ambulatory clinic and community pharmacy settings. Uses discussions, videos, podcasts, simulations, and hands-on learning activities in the lab. Offers students an opportunity to apply information gained in previous and concurrent courses to clinical situations. While completing laboratory work, students are expected to review, discuss, integrate, and apply information presented in the closely aligned PHMD 4621 and PHMD 4622 as well as previous and concurrent course work.
• Corequisite: PHMD 4621 and PHMD 4622.
• Equivalent: PHMD 6235.

PHMD 4631 Comprehensive Disease Management 3 (6 SH)
Covers the pathophysiology and clinical management of infectious diseases, solid organ transplant, dermatology, and otic/ophthalmic disorders. Reinforces foundational concepts of pharmacy practice and diseases covered in PHMD 4611 and PHMD 4612, while completing a system-by-system review of the mechanisms of infectious diseases and their evidence-based prevention and treatment strategies. Offers students an opportunity to design rational therapeutic strategies to provide care to patients with these disease states in inpatient, ambulatory, and community settings. Emphasizes pathophysiology, self-care, patient education, assessment, medication administration, management, monitoring, and preventative health and population-based health outcomes.
• Prerequisite: PHMD 4621; pharmacy and pharmacy studies students only.
• Corequisite: PHMD 4632 and PHMD 4633.
PHMD 4632 Comprehensive Disease Management 3 Seminar (1 SH)
Designed to provide students with opportunities to apply concepts from PHMD 4631 to patient cases, special projects, and other medication-related issues focusing on foundational aspects of pharmacy practice, identification of drug-related problems, and management of the infectious diseases and dermatologic and oral/otic disorders. Accompanies PHMD 4631 and seeks to facilitate accomplishment of course objectives using an active-learning format. While completing seminar work, students are expected to review, discuss, integrate, and apply information presented in comprehensive disease management lectures and readings as well as previous and concurrent course work. Activities in seminar are reinforced by laboratory skill-building exercises in PHMD 4633.
• Corequisite: PHMD 4631 and PHMD 4632.
• Equivalent: PHMD 6256.

PHMD 4633 Comprehensive Disease Management 3 Skills Lab (0.5 SH)
Teaches and assesses various skills, including interpretation, processing, and verification of medication orders; detection and resolution of drug-related problems; use of current pharmacy software programs; and patient education and counseling in the community pharmacy setting. Uses discussions, videos, podcasts, simulations, and hands-on learning activities in the lab. While completing laboratory work, students are expected to review, discuss, integrate, and apply information presented in the closely aligned PHMD 4631 and PHMD 4632 as well as previous and concurrent course work.
• Corequisite: PHMD 4631 and PHMD 4632.
• Equivalent: PHMD 4566 and PHMD 6366.

PHMD 4641 Comprehensive Disease Management 4 (6 SH)
Covers the pathophysiology and clinical management of men’s and women’s health issues and neurological, psychiatric, and oncologic disorders. Reinforces foundational concepts of pharmacy practice and diseases covered in PHMD 4611, PHMD 4612, and PHMD 4613, while completing a system-by-system review of the mechanisms of infectious diseases and their evidence-based prevention and treatment strategies. Offers students an opportunity to design rational therapeutic strategies to provide care to patients with these disease states in inpatient, ambulatory, and community settings. Emphasizes pathophysiology, self-care, patient education, assessment, medication administration, management, monitoring, and preventative health and population-based health outcomes.
• Prerequisite: PHMD 4631; pharmacy and pharmacy studies students only.
• Corequisite: PHMD 4642 and PHMD 4643.

PHMD 4642 Comprehensive Disease Management 4 Seminar (1 SH)
Designed to provide students with opportunities to apply concepts from PHMD 4641 to patient cases, special projects, and other medication-related issues focusing on foundational aspects of pharmacy practice, identification of drug-related problems, and management of women’s and men’s disease, psychological disorders, and cancers. Accompanies PHMD 4641 and seeks to facilitate accomplishment of course objectives using an active-learning format. While completing seminar work, students are expected to review, discuss, integrate, and apply information presented in comprehensive disease management lectures and readings as well as previous and concurrent course work. Activities in seminar are reinforced by laboratory skill-building exercises in PHMD 4643.
• Corequisite: PHMD 4641 and PHMD 4643.
• Equivalent: PHMD 6268.

PHMD 4643 Comprehensive Disease Management 4 Skills Lab (0.5 SH)
Teaches and assesses various skills, including interpretation, processing, and verification of medication orders; detection and resolution of drug-related problems; use of current pharmacy software programs; medication reconciliation; presentation of hospitalized patients; and management of sterile compounding systems in the hospital pharmacy setting. Uses discussions, videos, podcasts, simulations, and hands-on learning activities in the lab. While completing laboratory work, students are expected to review, discuss, integrate, and apply information presented in the closely aligned PHMD 4641 and PHMD 4642 as well as previous and concurrent course work.
• Corequisite: PHMD 4641 and PHMD 4642.
• Equivalent: PHMD 4576 and PHMD 6376.

PHMD 4700 Principles in General Medicine (2 SH)
Offers students an opportunity to apply concepts learned in comprehensive-disease-management modules to patient cases, special projects, and other medication-related problems in an active-learning environment. Creates an environment similar to that of acute care advanced pharmacy practice experiences (APPEs) to enable students to gain familiarity and confidence in disease-state management, oral communication skills, and professional behavior and interactions. Focuses on oral presentations and communication skills, which is similar to how students are evaluated on clinically based rotations; students are also evaluated by quizzes and exams to measure mastery of content-specific objectives.
• Prerequisite: PHMD 4631; pharmacy, pharmacy studies, and pharmaceutical sciences students only.
PHMD 4880 Special Topics (3 SH)
Explores topics germane to the use of medication as established by the course coordinator in various section offerings.
  • Prerequisite: Senior standing; pharmacy and pharmacy studies majors only.
  • Repeatability: May be repeated up to 2 times.

PHMD 4890 Contemporary Issues in Geriatric Pharmacy (2 SH)
Focuses on physiological and practical aspects of medication use in the elderly, the pharmacist’s role in geriatric care, and the management of disease states and syndromes that predominantly occur in the elderly. Pharmacists must assess and assure safe and effective use of medication in the geriatric population to prevent adverse events that increase morbidity and mortality and reduce quality of life. Utilizes problem-based learning by promoting critical thinking, effective use of resources in research, and application of concepts to real-world situations.
  • Prerequisite: PHMD 4611 and senior or graduate standing; restricted to majors in pharmacy, pharmacy studies, and pharmaceutical sciences.

PHMD 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
  • Repeatability: May be repeated without limit.

PHMD 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
  • Prerequisite: PHMD 4970.
  • Repeatability: May be repeated without limit.

PHMD 4991 Research (4 SH)
Extends current knowledge or offers novel insights through faculty-directed and supervised individual undergraduate research or creative projects. The project must be designed in concert with and obtain formal prior approval from relevant faculty and program director.
  • NUpath: Integrating knowledge and skills through experience.
  • Repeatability: May be repeated without limit.

PHMD 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Prerequisite: Junior or senior standing.
  • Repeatability: May be repeated without limit.

PHMD 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
  • Repeatability: May be repeated without limit.

PHMD 5223 Evidence-Based Medicine (2 SH)
Studies the principles of evidence-based medicine and how to apply them to patient-centered care. Offers students an opportunity to develop skills in critical appraisal of the scientific literature and practical application of the evidence to clinical decision making. Consists of didactic instruction, in-class group projects, and a group-based written assignment. Applies principles of research methodology, biostatistics, and professional writing.
  • Prerequisite: (a) PHMD 3450, ENGW 3306, and junior or senior standing or (b) PHMD 3450 and graduate standing; pharmacy students only.
  • NU Core: Writing intensive in the major.
  • NUpath: Writing intensive in the major.
  • Equivalent: PHMD 4560 and PHMD 6223.

PHMD 5250 Pharmacy Care Management (3 SH)
Focuses on the managerial and administrative skills required by a contemporary pharmacist practicing in either a community or hospital setting. Covers classical management principles of planning, decision making, organizing, hiring, and controlling. Case study methods are used as an interactive teaching tool. Also covers pertinent current events.
  • Prerequisite: PHMD 2350 with a grade of C; pharmacy students only.
  • Equivalent: PHMD 6250.

PHMD 5270 Economic Evaluation of Pharmaceuticals and Pharmacy Practice (2 SH)
Introduces the principles of economic theory of healthcare markets and economic evaluation of health products and services. Economic theory topics include fundamentals of supply and demand, market structure, market failure, and the role of government. Economic evaluation topics include measuring costs and benefits of a specific treatment, types of formal decision analysis, ethical considerations, and implementation in the real world.
  • Prerequisite: PHMD 4631, PHMD 4632, and fifth-year PharmD standing; pharmacy majors only.
  • NU Core: Capstone; writing intensive in the major.
  • Equivalent: PHMD 6270.
PHMD 5330 Jurisprudence (3 SH)
Covers all federal and state laws and regulations that affect the practice of pharmacy. Discusses sources of law including the U.S. Constitution, statutes, administrative regulations, and case law. Introduces federal and state administrative agencies that regulate pharmacy, including the Drug Enforcement Administration (DEA), Food and Drug Administration (FDA), Consumer Products Safety Commission (CPSC), Massachusetts Board of Registration in Pharmacy, and Massachusetts Department of Public Health. Requires students to research a pharmacy case decided by a court and give an oral presentation. Centers on the individuals who operate a pharmacy: pharmacists, pharmacy technicians, and pharmacy interns; their workplaces: pharmacy, pharmacy department, hospital, restricted pharmacy, managed care, nuclear pharmacy, and wholesale businesses; and duties performed by pharmacy personnel: dispensing medication and counseling patients.
- Prerequisite: PHMD 4587 and senior or graduate standing; pharmacy majors only.
- Equivalent: PHMD 6330.

PHMD 5438 Advanced Pharmacy Practice Experience Preparatory Seminar 1 (0.5 SH)
Seeks to provide relevant information to enable fifth-year students to make informed decisions concerning the selection and completion of the advance pharmacy practice experiences (APPEs). Using the professional portfolio as a catalyst for exploration, students are required to examine and discuss the variety of APPEs offered. The review of APPE types includes utilizing effective strategies to identify appropriate APPE selections. Students are guided by faculty on how to make APPE selections based on student-identified professional career goals.
- Prerequisite: Senior or graduate standing; pharmacy students only.
- Equivalent: PHMD 6438.

PHMD 5439 Advanced Pharmacy Practice Experience Preparatory Seminar 2 (0.5 SH)
Designed to provide students with opportunities to apply concepts from PHMD 6438 and to continue to provide relevant information to enable fifth-year students to make informed decisions concerning the selection and completion of the advance pharmacy practice experiences (APPEs). Seeks to provide new knowledge and strengthen existing knowledge to ensure a smooth transition from the didactic courses to APPEs.
- Prerequisite: PHMD 5438 or PHMD 6438 with a grade of C and senior or graduate standing; pharmacy students only.
- Equivalent: PHMD 6439.

PHMD 5570 Technology in Healthcare and Pharmacy Practice (3 SH)
Examines trends and drivers of innovation in healthcare and how emerging technologies are assessed and adopted. Introduces students to frameworks for evaluating emerging technologies and their existing and potential impacts. Uses examples from electronic health records, outpatient e-prescribing, inpatient computerized physician order entry systems, regional health information organizations, personal health records, quality of care, pharmacogenomics, patient-centered and other emerging technologies relevant to pharmacy practice and research to illustrate concepts.
- Prerequisite: Junior, senior, or graduate standing.

PHMD 5600 Pharmacy Capstone (4 SH)
Acts as a final integrator of the major, general education, and experiential aspects of the student’s education. Expects students to demonstrate motivation and initiative and to work cooperatively with their faculty mentor, community partners, and fellow students (where applicable) in order to complete a comprehensive, high-quality scholarly work (e.g., a research project, educational project, administrative project, business plan, case report, or community-service learning project or professional manuscript) appropriate for dissemination to the university and professional community. The timeline for completion is set by the faculty mentor and agreed to by the individual or all members of the student group.
- Prerequisite: Junior, senior, or graduate standing; pharmacy students and pharmacy studies students only.
- NU Core: Capstone.
- Repeatability: May be repeated once.
- Equivalent: PHMD 4600.

PHMD 5675 Ambulatory Care Pharmacy Practice in Urban Health (2 SH)
Introduces various aspects of ambulatory care pharmacy practice and social, economic, cultural, and psychological intricacies. Covers chronic disease management and prevention and wellness. Offers students an opportunity to gain insight into the pharmacist’s role as part of a patient-centered medical home model and/or an interdisciplinary primary care team, with an emphasis on urban health. Requires students to be enrolled in the third professional year of the pharmacy curriculum and to apply and be approved by the course coordinators through an application process. Criteria to be considered include, but are not limited to, grades of B or better in PHMD 4611, PHMD 4612, PHMD 4621, and PHMD 4622.

PHMD 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated for up to 4 total semester hours.
PHMD 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

PHMD 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

PHMD 6220 Advocacy and Pharmacy Health Policy (3 SH)
Designed to introduce students to the political influences shaping the U.S. healthcare system in general and pharmacy practice specifically. In addition to a theoretical grounding through seminars, case analyses, and project development, students also have an opportunity to gain practical advocacy and policy analytical skills necessary to effect change in the current system. Addresses key questions such as: What is the role of government in health policy? What are the key elements of the public policy process at the local, state, and national level? What role do pharmacists and pharmacy associations play in the policy process? How can individuals and groups influence the policy process? The goal of this course is to prepare students to ultimately take a leadership role in the pharmacy profession.
- Prerequisite: Junior, senior, or graduate standing.

PHMD 6440 Internal Medicine Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in the hospital setting. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
- Prerequisite: Pharmacy majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.

PHMD 6441 Acute Care Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
- Prerequisite: Pharmacy majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.

PHMD 6442 Ambulatory Care Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in an ambulatory clinic environment. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
- Prerequisite: Pharmacy majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.

PHMD 6443 Community Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a community setting. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
- Prerequisite: Pharmacy majors only.
- NU Core: Capstone, experiential learning, writing intensive in the major.
PHMD 6444 Internal Medicine Elective Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in the hospital setting. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: PHMD 6440 with a grade of C; pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6445 Ambulatory Care Elective Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in an ambulatory clinic environment. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: PHMD 6442 with a grade of C; pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6446 Psychiatry Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients under psychiatric care. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6447 Community Elective Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a community setting. In collaboration with other members of the healthcare team, and under the supervision of a clinical preceptor, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6448 Long Term Care Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a nursing home or rehabilitation center. Under the supervision of a clinical preceptor and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6449 Geriatrics Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a geriatric practice setting. Under the supervision of a clinical preceptor and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.
PHMD 6450 Pediatrics Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a pediatric practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6451 Neonatology Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a neonatal practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6452 Critical Care Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a critical-care practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6453 Surgery Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a surgical practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6454 Cardiology Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a cardiology practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6455 Pharmacokinetics Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients on a pharmacokinetic consult service. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.
PHMD 6456 Drug Information Advanced Pharmacy Practice Experience (6 SH)
Applies drug information skills to site-specific drug information requests under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the site team. Using appropriate sources, the student analyzes drug information findings, such as dosing, monitoring, indications, efficacy, and adverse drug reactions.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6457 Oncology Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in an oncology practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6458 Drug Utilization Advanced Pharmacy Practice Experience (6 SH)
Identifies topics and design of methodology for drug-use evaluation as well as completion of data collection, data evaluation, and presentation of results under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6459 Home Health Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a home healthcare practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6460 Nutritional Support Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients on a nutritional support consult service. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6461 Infectious Disease Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients on an infectious disease consult service. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6462 Pharmacy Industry Advanced Pharmacy Practice Experience (6 SH)
Focuses on the application of regulatory affairs and healthcare principles in the pharmaceutical industry. Under the supervision of a preceptor, and, when appropriate, in conjunction with other members of the site team, participates in appropriate activities, such as drug research and development, marketing, medical affairs, regulatory affairs, and information service.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6463 Pharmacy Administration Advanced Pharmacy Practice Experience (6 SH)
Applies healthcare and management principles, with emphasis on pharmacy administration, under the supervision of a preceptor, and, when appropriate, in conjunction with other members of the site team.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.
PHMD 6464 Regulatory Advanced Pharmacy Practice Experience (6 SH)
Participates in appropriate activities including but not limited to principles of and compliance with pharmacy law and review of regulations governing the FDA’s mandatory reporting of adverse drug reactions under the supervision of a preceptor, and, when appropriate, in conjunction with other members of the site team. In addition, students may have the opportunity to be given a step-by-step introduction to public record laws, Board Regulations at 247 CMR, and pharmacy statutes at Massachusetts General Laws, Chapter 112, 24(A)–42(A).
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6465 Managed Care Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a managed-care practice setting. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6466 Transplantation Advanced Pharmacy Practice Experience (6 SH)
Applies principles of pathophysiology, therapeutics, and communication to the pharmacy-care management of individual patients in a transplantation unit. Under the supervision of a clinical preceptor, and, when appropriate, in conjunction with other members of the healthcare team, offers identification of appropriate drug therapy and monitoring requirements for common pathophysiologic processes, and, when indicated, modification of population-based treatment strategies based on the unique characteristics of individual patients.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6467 Directed Practice Advanced Pharmacy Practice Experience (6 SH)
Offers nontraditional experience with an approved preceptor at an appropriate site. Based on availability.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6468 International Advanced Pharmacy Practice Experience (6 SH)
Provides an international experience with an approved preceptor at an appropriate site. Based on availability.
• Prerequisite: Pharmacy majors only.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

PHMD 6469 Management Advanced Pharmacy Practice Experience (6 SH)
Offers students an opportunity to apply healthcare and management principles, with an emphasis on pharmacy management, under the supervision of a preceptor and, when appropriate, in conjunction with other members of the site management team.
• Prerequisite: Pharmacy students only.
• Repeatability: May be repeated up to 2 times.

PHMD 6470 Education Advanced Pharmacy Practice Experience (6 SH)
Offers students an opportunity to teach in the pharmacy curriculum under the supervision of a faculty member. Students have an opportunity to examine how teachers use experience-based and problem-based approaches to engage the range of student learners (third- through fifth-year pharmacy students) to attain their learning goals.
• Prerequisite: Pharmacy students only.
• Repeatability: May be repeated up to 2 times.

PHMD 6471 Research 1 Advanced Pharmacy Practice Experience (6 SH)
Offers students interested in gaining basic or clinical research experience an opportunity to work under the direction of an experienced researcher at an appropriate site. Students can elect either a basic science (lab-based) preceptor or a clinical (patient-based) preceptor. Students can expect to be an active participant in a variety of different research activities and experiences that are deemed appropriate by the preceptor. The research efforts of the student may result in a peer-reviewed research abstract and/or presentation.
• Prerequisite: Pharmacy students only.
• Repeatability: May be repeated up to 2 times.

PHMD 6472 Research 2 Advanced Pharmacy Practice Experience (6 SH)
Offers students an opportunity to further develop research skills and experience gained in PHMD 6471. Intended for those students interested in pursing a postgraduate research training program (e.g., fellowship or graduate school). The research efforts of the student in the course may result in authorship opportunities on a peer-reviewed research abstract and/or manuscript.
• Prerequisite: PHMD 6471 (may be taken concurrently) with a grade of C; pharmacy students only.
• Repeatability: May be repeated up to 2 times.
PHIL 1000 Philosophy at Northeastern (1 SH)
Intended for freshmen in the College of Social Sciences and Humanities. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSB 1000, INSH 1000, INTL 1000, LANG 1000, POLS 1000, and SOCL 1000.

PHIL 1101 Introduction to Philosophy (4 SH)
Introduces students to philosophy by acquainting them with the theories and arguments of classical and contemporary philosophers and by teaching skills of constructing and analyzing arguments. Emphasizes philosophical inquiry. Topics include the basis of morality, free will vs. determinism, the existence of God, the problem of suffering, and the nature of knowledge.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: PHLS 1101.

PHIL 1102 Introduction to Contemporary Moral Issues (4 SH)
Focuses on current controversial issues and moral debates. Specific topics vary but include subjects like abortion, euthanasia, global poverty, economic justice, affirmative action, gender relations, animal rights, the environment, the death penalty, war, cloning, and same-sex marriage. Offers an opportunity to learn to apply both the methods of philosophical analysis and various ethical and political theories to these controversies.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

PHIL 1104 Goddesses, Witches, Saints, and Sinners: Women in Western Religions (4 SH)
Begins with an analysis of the theory that original Western religion was goddess centered. Examines image, text, and ritual in the ancient world to analyze this theory and to explore what some scholars call the patriarchalization of these primal religions. Looks at the way that goddesses of the ancient world became saints or sinners under the newly constituted patriarchy. Includes a consideration of scripture such as the Hebrew Bible, Greek Testament, and Qu’ran as well as noncanonical texts.
• Prerequisite: Not open to students who have completed PHIL 1103 except by permission of instructor.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1104.

PHIL 1105 Science and Pseudoscience (4 SH)
Examines the distinction between science and pseudoscience, how scientific theories change over time, the limits of scientific explanation, and whether or not scientific practice is rational and objective. What makes a theory scientific? Does culture influence scientific reasoning? What separates Einstein’s theory of relativity and astrological horoscopes? Covers a variety of topics in the history of science such as the Copernican revolution and the practice of psychoanalysis. Also covers contemporary issues regarding the scientific status of IQ tests, intelligent design theory, and others.
• NU Core: Humanities level 1.
• NUpath: Engaging with the natural and designed world, interpreting culture.
PHIL 1110 Introduction to Religion (4 SH)
Examines the methods, disciplines, and theories employed in the academic study of religion. Focuses on major theories of religion employed in the discipline of religious studies, including historical, psychological, anthropological, and sociological approaches. Introduces students to the primary methods of research in the academic study of religion.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: RELS 1110.

PHIL 1111 Introduction to World Religions (4 SH)
Offers a historical and thematic overview of the most widely recognized religions in the world today: Christianity, Judaism, Islam, Hinduism, and Buddhism. Focuses on the formative periods and historical developments of the great religions, ritual practices, and the differing ways in which they answer the fundamental religious questions. Considers ways in which religious practitioners have attempted to understand the nature of the world, human society, and a person’s place within them.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Engaging difference and diversity, employing ethical reasoning.
• Equivalent: RELS 1111.

PHIL 1114 Reason, Risk, and Evidence (4 SH)
Introduces the tools of inductive logic and probability while exploring their various philosophical and practical applications. What is the probability of a terrorist attack today given that there were none last week? What is the best bet to make at a roulette table? Is it rational to buy health insurance? What counts as good evidence for the existence of God? Examines evidence-based reasoning, the foundations of probability, the philosophical problem of induction, and how to make rational decisions when faced with risk and uncertainty.
• NU Core: Humanities level 1.

PHIL 1115 Introduction to Logic (4 SH)
Covers the fundamentals of (formal) deductive and inductive logic. Begins with a thorough treatment of Boolean (i.e., truth-functional or propositional) logic, which provides the foundation for both mathematical and statistical reasoning. Discusses various applications of Boolean logic, including the reconstruction and evaluation of (natural language) deductive arguments. Covers inductive-logical reasoning, such as the fundamentals of the probability calculus and its applications to inductive (ampliative) inference. Offers students an opportunity to understand both deductive (e.g., mathematical) and inductive (e.g., statistical) reasoning.
• NU Core: Humanities level 1.
• NUpath: Conducting formal and quantitative reasoning, analyzing and using data.
• Equivalent: LING 1115.

PHIL 1120 Understanding the Bible (4 SH)
Introduces students to the Old and New Testaments, so that they may enter into a dialogue with the Bible, understanding not only what it says, but why it is said that way. To do this, discussion focuses on the Bible’s social, political and cultural backgrounds.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: RELS 1150.

PHIL 1130 Ethics: East and West (4 SH)
Focuses on how traditions imagine the moral life in cross-cultural contexts. Topics may include ideals of human flourishing, notions of virtue and vice, and conceptions of self and community. Offers students an opportunity to learn methods of philosophical analysis and argumentation in cross-cultural contexts.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Engaging difference and diversity, employing ethical reasoning.

PHIL 1145 Technology and Human Values (4 SH)
Studies philosophy of technology, as well as ethics and modern technology. Considers the relationship between technology and humanity, the social dimensions of technology, and ethical issues raised by emerging technologies. Discusses emerging technologies such as biotechnology, information technology, nanotechnology, and virtual reality.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: PHLS 1145.

PHIL 1150 Sex, Power, and Oppression: An Introduction (4 SH)
Examines various philosophical issues that relate to gender and other forms of social identity, such as race, sexual orientation, and disability. Our genders (being male or female) shape not only who we are but also how we experience the world and possibilities that are open to us. Examines the ways in which these categories are socially constructed and looks at how they impact who we are, our autonomy/freedom, and our ability to be authentic. Examines philosophical articles and related pieces of popular media (newspaper articles, television clips, movies, etc.).
• NU Core: Humanities level 1.
PHIL 1155 Introduction to Human Rights (4 SH)
Introduces human rights taught from an interdisciplinary perspective. Begins by looking at some philosophical questions around human rights. Explores what human rights are, where they come from, and what their historical and social roots are. Then looks at current human rights mechanisms in a global context, such as the functioning of the United Nations, the effectiveness of various human rights declarations, and mechanisms of transitional justice, such as the International Criminal Court. Concludes by discussing human rights issues such as genocide, women’s rights, refugees, and torture in today’s world.
• NU Core: Humanities level 1, comparative study of cultures.

PHIL 1156 Human Rights through Film: Witnessing Human Suffering (4 SH)
Examines through film the political, philosophical, and legal dimensions of human rights and current human rights debates. Focuses on how human suffering is portrayed across a variety of cultures. Since the beginning of political philosophy, there have been two main ways of viewing power. The first holds that “might makes right” and that one’s power is enough to justify one’s actions. The second upholds the idea that all are of equal importance and that we have a moral duty to protect the weak. This view is most powerfully expressed by the language of human rights—that each human being has certain inalienable rights that ought not to be violated under any circumstances.
• NU Core: Humanities level 1, comparative study of cultures.

PHIL 1157 Global Charities: Solution or Problem? (4 SH)
Explores the ethical issues that arise in the context of aid, philanthropy, charity, microfinance, and volunteering. Considers those issues from both domestic and global perspectives. Given great global and domestic need, the moral imperative to help others is pressing and falls on the state, civil society, enterprises, and individuals. In recent years, philanthropy—the “love of humanity”—has received widespread attention. Warren Buffett, Bill and Melinda Gates, George Soros, Ted Turner, and Oprah Winfrey have given incredible sums of money to help people both globally and domestically. In addition, members of the middle class often give generously both of their time, in the form of service, and financially.
• NU Core: Humanities level 1.

PHIL 1158 Introduction to Economic Justice (4 SH)
Attempts to answer the questions: What is economic justice? What are the criteria by which we tell whether a society is (or is not) an economically just society? Looks at views on these issues developed by advocates of capitalism, socialism, and the welfare state.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: PHIL 2304.

PHIL 1162 Ethics and Philosophy through Sport (4 SH)
Introduces issues in philosophical ethics, epistemology, and metaphysics through sports. Each topic consists of a case study from the domain of sports in which an ethical or philosophical issue arises, paired with a classical or contemporary reading on the issue. Thus, this is not primarily a course on ethical issues that arise in the context of particular sports, but rather the course uses examples from sport that clearly exemplify core philosophical topics that arise as well in domains beyond sport. Studies justice and fairness, ability and disability, conceptual clarity/definition, individual vs. collective welfare, social goods, punishment, animal welfare, game theory, counterfactual reasoning, epistemological standards, and the rationality of group identification.
• NU Core: Humanities level 1.

PHIL 1165 Moral and Social Problems in Healthcare (4 SH)
Introduces ethical theories and moral principles, and then uses these theories and principles to analyze the moral problems that arise in the medical context. Topics include euthanasia, medical paternalism, informed consent, patient confidentiality, the right to die, the ethics of medical research, abortion, the right to healthcare, distribution of scarce medical resources, and the ethical implications of health maintenance organizations.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

PHIL 1170 Business Ethics (4 SH)
Examines ethical principles and considerations involved in making moral business decisions. Studies basic ethical viewpoints as a foundation; analyzes specific characteristics of business life through case studies and examples. Topics include corporate responsibility, employee rights, conflict of interest and roles, advertising and information disclosure, environmental issues, and self- and governmental regulations.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

PHIL 1180 Environmental Ethics (4 SH)
Focuses on a current ecological crisis and addresses the values that underlie our concern over this crisis, whether the values at issue are anthropocentric or biocentric. Explores the ethical implications these ecological concerns have for our individual lifestyles, and for our role as members of communities.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
PHIL 1181 Environmental Ethics Abroad (4 SH)
Examine the human relationship with the natural environment, with an emphasis on the ethical dimensions of our current ecological challenges. Focuses on the values that underlie our concern over environmental issues and what we ought to do in response to those issues, including the implications for our individual lifestyles and for our roles as members of communities. Offered abroad.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHIL 1185 The Ethics of Food (4 SH)
Introduces the ethics of food. Elucidates a wide range of ethical issues associated with food production, processing, distribution, and consumption. Offers students an opportunity to develop skills in ethics and values analysis that can be applied to evaluate food-related practices and policies. Includes topics such as the ethics of different food systems, genetically modified crops, meat eating, hunting, food security, food justice, sustainability, synthetic meat, food advertising, food safety, and foodie culture.
• NU Core: Humanities level 1.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

PHIL 1215 Symbolic Logic (4 SH)
Focuses on the syntax and semantics of propositional logic and first-order quantification theory. Considers relations between these systems and natural language. Covers analysis of the notion of derivation within a system, the notion of logical consequence, and practice in analyzing logical structure in natural language sentences.
• NU Core: Mathematical/analytical thinking level 1.
• Equivalent: LING 1215.

PHIL 1220 The Meaning of Death (4 SH)
Offers an inquiry into different philosophical and religious perspectives on death and life after death, including an examination of some powerful contemporary accounts of personal confrontation with death along with investigations into attitudes toward death in other traditions (for example, Hinduism and Buddhism).
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: RELS 1220.

PHIL 1230 Sound, Music, and Religion (4 SH)
Explores the relationship between religion, sound, and musical expression using the lenses of gender studies, cultural studies, and performance theory. Emphasizes the interpretive and symbolic understandings of sonic expressions of religiosity, including chanting, mantra use, choir and congregational singing, and speaking in tongues. Seeks to familiarize students with some of the key sonic expressions within the Christian, Islamic, Hindu, and Buddhist traditions; to explore the methods of studying musical and sonic theology; and to analyze these traditions’ own debates about the use of sound and music in religious practice.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1230.

PHIL 1231 Image and Icon in South Asia (4 SH)
Explores the relationship between South Asian religions and artistic expression. Examines the variety and identifying features of many Hindu, Jain, and Buddhist temples and images. Particular attention is paid to the interpretive and symbolic understandings of these expressions. Explores the idea of the embodiment of a deity within an image and challenges such an idea in the readings. This course’s objectives are: to familiarize the students with the iconography of Hinduism, Jainism, and Buddhism in South Asia; to explore the methods of studying iconography and visual theology; and to analyze these traditions’ own debates about the use of icons and images.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1231.

PHIL 1250 Jesus in the Gospels, American Culture, and the Movies (4 SH)
Explores different portraits of Jesus drawn by the New Testament and extrabiblical gospel writers. Examines the varieties of understandings of Jesus in American culture with a focus on the twentieth century. Using the materials from the biblical and cultural analysis, the course then turns to films about Jesus to assess the different cultural situations and understandings of Jesus in films such as From the Manger to the Cross, Intolerance, The King of Kings, The Greatest Story Ever Told, The Gospel According to Matthew, Jesus Christ Superstar, Godspell, Jesus of Nazareth, The Life of Brian, The Last Temptation of Christ, Jesus of Montreal, and The Passion of the Christ.
• NU Core: Humanities level 1.
• Equivalent: RELS 1250.
PHIL 1260 Apocalypticism in Film (4 SH)
Begins with an investigation of biblical texts that give rise to apocalypticism, definitions of apocalypticism, and an introductory exploration of the various ways in which apocalypticism has manifested itself in western culture. Examines the diverse and changing presentation of apocalypticism in film and includes titles such as The Day the Earth Stood Still, Independence Day, The Seventh Seal, Smoke Signals, Blade Runner, and The Matrix.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: RELS 1260.

PHIL 1270 Judaism, Christianity, and Islam: Abrahamic Religions (4 SH)
Introduces the three major religious traditions: Judaism, Christianity, and Islam, sometimes called “Abrahamic traditions,” as they all claim a special relationship with the biblical figure Abraham. Explores the foundation narratives, doctrines, rituals, and ethics of these three traditions, independently and in relation to each other. Focuses on how these traditions adapted to specific cultural and historical contexts. Offers students firsthand experience of the complex issues involved in the academic study of religion in comparative context.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: RELS 1270.

PHIL 1271 Sex in Judaism, Christianity, and Islam (4 SH)
Explores approaches to gender, social organization of sexuality and gender, sexual ethics, and marriage in Judaism, Christianity, and Islam. Explores various sources within each tradition that serve as normative foundations, contemporary cultural and sociological dynamics that challenge those foundations, and psychological/existential considerations for understanding the general nature of human sexuality. Addresses how these traditions understand gender and gender roles, seek to shape and control interactions between men and women, regulate sexual relations outside of and within marriage, view sexuality education, regard homosexuality, and examine historical and contemporary approaches to marriage, divorce, and parenting.
• Cross-list: WMNS 1271.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: RELS 1271 and WMNS 1271.

PHIL 1272 Ethics in the World's Religions (4 SH)
Examines the ethical systems emerging from various religions. Includes Eastern religions with an emphasis on the Abrahamic religions (Judaism, Christianity, and Islam) and the different stances taken within the branches of each religion. Explores, for example, different perspectives among various types of Christianity, Islam, and Judaism. Examines the religious ethics of various indigenous peoples, Native Americans, Australian Aborigines, Maori, and some of the African peoples.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1272.

PHIL 1273 Jainism (4 SH)
Explores Jainism, one of the world’s oldest religious traditions. The Jain community—a small but influential one mostly concentrated in western India—presents us with a complex and fascinating philosophy, a lively temple and ritual culture, and a full year of fasts and festivals. Jainism offers both the most thorough examination of the value of nonviolence and an unprecedented prominence of women within the tradition both in the texts and in practice. Finally, Jainism is a religion of people, and the course examines both their religious lives and the ways their religion affects their socioeconomics. An in-depth look at Jainism demonstrates its importance in the development of Asian religions.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1273.

PHIL 1275 Hinduism, Buddhism, and Beyond: Eastern Religions (4 SH)
Examines Hinduism, Jainism, Theravada Buddhism, Mahayana Buddhism, Confucianism, Taoism, and Shinto within South Asia (India) and east Asia (China and Japan). Combines readings in primary source materials (the religious texts of these traditions) with secondary examinations of the historical and doctrinal developments within each tradition and region. This course intends to give students a context in which to examine the ways in which religions develop in interlocking sociocultural and political contexts and to provide a grounding in the lived experiences of these religious traditions.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, employing ethical reasoning.
• Equivalent: RELS 1275.

PHIL 1276 Indian Religions (4 SH)
Traces the development of religious thought in India. South Asian religion is marked by the ongoing dialogues between the South Asian traditions we call Hinduism, Sikhism, and Jainism (as well as Buddhism and Islam, which are covered in separate courses). The interaction between these traditions shows the ways each defined itself independently and in response to challenges presented by the others.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1276.
PHIL 1280 Encountering Islam: Traditions, Debates, and Crosscultural Diversity (4 SH)
Explores Islam through its foundations narrative, rituals, doctrines, and ethical teachings. Presents Islam in terms of its diversity by focusing on a series of key debates in Islamic thought and practice from its early history to the present day in cross-cultural perspectives.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, engaging difference and diversity.
• Equivalent: RELS 1280.

PHIL 1281 Islam, Gender, and Fashion (4 SH)
Explores why the Islamic veil today is so “pregnant with meanings” and how this impacts the lives of not only Muslim women who cover but also of those who do not. Specifically examines the various things wearing a veil “can do,” that is, its political, social, economic, and moral power. Considers how colonialism, nationalism, and Islamic movements have affected the Islamic veil; how veiling affects educational and employment opportunities for Muslim women; how the veil is used as a symbol of cultural identity; and when the Islamic veil is also a fashion statement.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 1281.

PHIL 1285 Jewish Religion and Culture (4 SH)
Explores the basic features of Judaism in the ancient, rabbinic, and modern periods. Employs an historical critical approach to the formative texts and their interpreters. Analyzes Jewish practices within specific historical contexts and discusses the ways in which practices relate to the texts and history of Judaism. Examines the rich varieties of Jewish cultural expressions.
• Cross-list: JWSS 1285.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: JWSS 1285 and RELS 1285.

PHIL 1286 American Judaism (4 SH)
Explores Jewish theology, ethics, thought, and praxis in the United States beginning with the arrival of the first Jewish settlers in colonial times and culminating with an inquiry into the contemporary scene. Explores topics such as the challenges Judaism faced as it confronted a culture in which religion was both personal and voluntary; responded to the horrors of Hitler’s Germany; engaged the issues raised with the re-establishment of the nation of Israel; faced the developments of new forms of Judaism; and reacted to issues of Jewish identity, diversity, and gender as they were raised in the late twentieth century.
• NU Core: Humanities level 1.
• Equivalent: RELS 1286.

PHIL 1287 Modern Judaism (4 SH)
Studies the ways in which Judaism has changed in modern times. How did this ancient religion respond to the Enlightenment? How did the freedom of religion granted to Jews in America affect their religious expression? What does the birth of the State of Israel in 1948 mean in religious terms? The course addresses all of these questions as well as examining the rise of denominations, Zionism, Jewish feminism, and changing notions of Jewish peoplehood. Emphasizes the ways in which developments within Judaism reflected and responded to changes in the larger world and overlapped with developments in other Western religions.
• NU Core: Comparative study of cultures.
• Equivalent: RELS 1287.

PHIL 1290 Chinese Philosophy and Religion (4 SH)
Surveys the origins and development of the indigenous religious traditions of China, from the oracle bone divinations of the Shang Dynasty to the philosophical and religious traditions of Confucianism, Mohism, Yangism, Daoism, and Legalism. Identifies and elucidates those elements of ancient Chinese thought that have had the most lasting influence on the Chinese ethos and worldview. Studies the foundational texts of ancient China and also examines the relevant practices that helped to define the various traditions of thought. Focuses on how religious and philosophical ideas influenced the larger culture of Chinese life in regard to the arts, medicine, the social order, and government.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Interpreting culture, employing ethical reasoning.
• Equivalent: RELS 1290.

PHIL 1295 Religious Perspectives on Health and Healing (4 SH)
Explores aspects of the historical, religious, and cultural context for contemporary alternatives in healthcare, beginning with an examination of several examples of traditional healing practices and their accompanying religious and philosophical views about human life. Explores this “holistic” tradition in two frames of reference: the ascendency of scientific rationalism over religion; and the takeover, by male-dominated professions, of healing functions that society has traditionally assigned to women (that is, the rise of obstetrics and the suppression of midwifery). Emphasizes major women healers of the nineteenth century. Includes some contemporary efforts at integration of scientific and traditional values in the modern healthcare system.
• Equivalent: RELS 1295.
PHIL 1410 From Vodou and the Rastas to Afro-Islam: African Religions in the Americas (4 SH)
Explores the religions of Africa as they express themselves in the Americas in various Christian forms; in new religions such as Vodou, Santeria, and the Rastafari; and unique forms of Islam, Judaism, and Christianity. Begins by exploring indigenous African religions, then traces the forced transplantation of those religions and the way in which new religions emerge from the combination, or syncretism, of African symbols and belief and the forms of Christianity that existed in the New World when Africans arrived. To examine these religious traditions, the course draws on the methodology of comparative religion to explore the theory, practice, and symbol systems of the religions of Africa and the African Diaspora in the New World.
• Equivalent: RELS 1410.

PHIL 1445 Philosophy of Religion (4 SH)
Explores classic issues in philosophy of religion, including arguments for and against the existence of God, the relationship between religion and ethics, and the nature of religious experience. Also examines problems in recent philosophy of religion, such as how religious language works, whether it makes sense to say that religious beliefs are true or false, and the nature of religious ritual and what this may mean for philosophical analysis of religion. Also considers non-Western religious traditions and philosophies.
• NU Core: Humanities level 1.
• Equivalent: PHIL 3445.

PHIL 1666 The Problem of Evil in Film (4 SH)
Seeks to answer the question, what is evil? Uses a variety of film genres to examine the definitions of evil in relation to concepts such as power, sin, hate, greed, envy, murder, neglect, fear, terror, tragedy, and “the Other.” Studies the problem of evil from the perspectives of religious studies and philosophy. Examines the various explanations for evil from a variety of Western religious traditions and explores the presentation of ethical dilemmas and moral theory to assess the content of a variety of films. Studies film titles such as The Dark Knight, The Exorcist, Silence of the Lambs, Frankenstein, Life Is Beautiful, Rear Window, Dr. Strangelove, Phone Booth, Crash, Star Wars, and The Wizard of Oz.
• NU Core: Humanities level 1.
• NUpath: Engaging difference and diversity, employing ethical reasoning.
• Equivalent: RELS 1666.

PHIL 1667 Science Fiction and Film: Moral Dilemmas and Ethical Analysis (4 SH)
Explores how science fiction films function as mythical cautionary tales about moral dilemmas of the twentieth and twenty-first centuries and as projections about how these dilemmas may be resolved or continue in the future. Provides a framework for an ethical analysis and examines how themes such as manifest destiny, nationalism, utopia, good vs. evil, war, and concepts of “the Other” are presented in classic and contemporary film. Also shows how science fiction film sometimes reinterprets pre-existing stories from world cultures and world religious traditions, updating earlier moral dilemmas to the contemporary situation.
• NU Core: Humanities level 1.
• NUpath: Engaging difference and diversity, employing ethical reasoning.
• Equivalent: RELS 1667.

PHIL 2001 Ethics and Evolutionary Games (4 SH)
Surveys the basic ideas and principles from evolutionary game theory and how they can be applied to philosophical questions about ethical and social norms. Investigates how cooperation evolves and is maintained; where our sense of fairness comes from and how it affects the way we interact with others; why individuals are altruistic; and whether there is a rational basis for our most basic social norms. Basic ethical norms can involve cooperation, altruism, mutual aid, fairness, coordination, and communication. Evolution and game theory, the formal study of social interaction, have recently been applied to these areas in order to better understand how these norms can arise naturally.
• Prerequisite: PHIL 1115, PHIL 1215, or completion of the NU Core requirement for mathematical/analytical thinking level 1 recommended.
• NUpath: Understanding societies and institutions, employing ethical reasoning.

PHIL 2300 Mysticism (4 SH)
Looks primarily at mysticism in the major world religions, with an emphasis on Western mystics. Investigates the role of mysticism in some of the tribal religions of Africa and North America and compares the perceptions of the various forms. Looks at the ways in which the mystics are part of the larger traditions, such as cabala within Judaism, mysticism within Christianity, and Sufism within Islam. Describes the extent to which the cultural settings of the religions play a role in the form of mysticism that arises in the dominant religion.
• Prerequisite: 4 SH of philosophy and religion or permission of instructor.
• NU Core: Humanities level 1, comparative study of cultures.
• Equivalent: RELS 2300.
PHIL 2301 Philosophical Problems of Law and Justice (4 SH)
Focuses on general questions about the law: What is the nature and proper scope of the law? How should the law be enforced and are there alternatives to punishment? How can laws be properly interpreted? Examples of legal controversies are related to the theories studied.
- Prerequisite: Sophomore standing or above.
- Equivalent: PHIL 1135.

PHIL 2302 Philosophical Problems of War and Peace (4 SH)
Concentrates on ethical and philosophical issues about war and peace. Focuses on the nature and justification of war, moral questions about tactics in war, ideas for avoiding war, concepts of and strategies for attaining peace, and the morality of relations between nations.
- Prerequisite: Sophomore standing or above.
- Equivalent: PHIL 1137.

PHIL 2303 Social and Political Philosophy (4 SH)
Focuses on basic questions about the nature of the state and the relationship of individuals to the state. What basis is there for individuals to obey the laws of the state? What conditions must a government meet to be legitimate? What justification can be given for democratic forms of government? Also examines what sorts of controls the state should exert over citizens, and what benefits citizens have a right to expect from the state. Includes readings from both classical and contemporary sources.
- NU Core: Humanities level 1.
- NUpath: Understanding societies and institutions, employing ethical reasoning.
- Equivalent: PHIL 1140.

PHIL 2311 The Kabbalah: Jewish Mysticism from the Zohar to Madonna (4 SH)
Surveys early mystical tendencies in the Hebrew Bible, in rabbinic literature, and in early medieval Jewish texts as background for grappling with the ideas of the Zohar, a fundamental text of the Jewish mystical tradition, or kabbalah. Begins with a brief overview of mysticism in general and Jewish mysticism in particular. Explores later kabbalistic developments, including Hasidism and kabbalah in popular culture today. Topics include God in kabbalah; mystical experiences; the relationship of kabbalah to Jewish tradition; the power of language, gender, the body; and meditation and other mystical practices.
- NU Core: Humanities level 1, comparative study of cultures.
- Equivalent: RELS 2301.

PHIL 2313 Exploring the Jewish Diaspora—From Mountain Jews to Crypto-Jews (4 SH)
Explores vibrant Jewish life in foreign lands, including Argentina, Brazil, Canada, and South Africa, as well as unusual Jewish communities in places such as Uganda and northeastern India. Covers topics such as how Jewish religion and identity are reshaped by other cultures, the emergence of secret Jews who fled the Iberian peninsula more than five centuries ago, and a brief history of Jewish life in the modern diaspora. Includes presentations and discussion of diaspora art, literature, film, and music.
- Cross-list: JWSS 2313.
- NU Core: Humanities level 1, comparative study of cultures.
- Equivalent: JWSS 2313 and RELS 2313.

PHIL 2314 Biblical Prophets and Their Interpreters (4 SH)
Analyzes several key prophets of the Hebrew Bible, such as Amos, Jeremiah, and Isaiah. Explores the cultural and historical contexts in which their prophecies originally arose. Examines the various ways in which prophecy has been interpreted within both Judaism and Christianity.
- Prerequisite: PHIL 1120 or RELS 1150.
- Equivalent: RELS 2314.

PHIL 2315 Adam and Eve and Their Interpreters (4 SH)
Focuses on the story of Eden, which has been interpreted and reinterpreted by Jewish, Christian, and Muslim thinkers throughout history. Primarily, Adam and Eve have served to legitimize and enforce gender and other social hierarchies, but occasionally, and particularly in light of modern feminism, are employed to justify egalitarianism. The course uses this story, and its long history of interpretation, as a case study for examining the social and political applications of religious principles derived from sacred texts in Western societies, as well as the influence of those societies on the diverse ways in which the text has historically been interpreted.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Humanities level 1, comparative study of cultures, writing intensive in the major.
- NUpath: Writing intensive in the major.
- Equivalent: RELS 2315.

PHIL 2316 Interpreting the Bible (4 SH)
Offers students the opportunity to understand the Bible as it is continually interpreted by believing communities in their own social and religious contexts. By appreciating the process of scriptural interpretation and the various sources of authority for it, allows us to see contemporary theological conflicts in a broader perspective.
- Prerequisite: PHIL 1120 or RELS 1150.
- Equivalent: RELS 2316.
PHIL 2322 Responses to the Holocaust (4 SH)
Explores the variety of responses to the mass death brought on by the Holocaust. Examines the responses of theology, and literature, as well as relevant ethical issues.
- Prerequisite: One philosophy course.
- Equivalent: RELS 2322.

PHIL 2325 Ancient Philosophy and Political Thought (4 SH)
Examines the philosophers of classical Greece, primarily Socrates, Plato, and Aristotle. These philosophers examined the nature of the material world, of the city, and of the person. The course takes up both the moral and political writings as well as the metaphysical writings. Devotes considerable attention to major works such as Plato’s Republic. Some time is given to early Greek philosophers, to the Sophists, and to later developments. Requires written analysis of philosophical texts.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Cross-list: POLS 2325.
- NU Core: Experiential learning, writing intensive in the major.
- NUpath: Interpreting culture, employing ethical reasoning, writing intensive in the major.
- Equivalent: POLS 2325.

PHIL 2327 Medieval Western Philosophy (4 SH)
Examines the writings of two major medieval Christian philosophers (Augustine and Aquinas), two major medieval Muslim philosophers (al-Ghazali and ibn Rushd [Averroës]), and two major medieval Jewish philosophers (Saadia Gaon and Maimonides). Focuses on the following themes: the conception of sin, God’s existence, the problem of God’s foreknowledge and our free will, God’s nature, God’s justice, the creation of the universe, the priority of reason versus faith, the literal versus metaphorical nature of religious language, and the soul’s immortality.
- Prerequisite: 8 SH of philosophy.
- NU Core: Comparative study of cultures.

PHIL 2330 Modern Philosophy (4 SH)
Focuses on the hundred years between 1650 and 1750, sometimes called “the century of genius.” It was a period in which philosophers reacted to the new scientific discoveries of Copernicus, Kepler, and Galileo. Out of this reaction came new ways of thinking about the nature of knowledge and the nature of reality. Focuses on such major figures as the rationalists Descartes, Leibniz, and Spinoza, and the empiricists Locke, Berkeley, and Hume.
- Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) two philosophy courses.
- NU Core: Writing intensive in the major.
- NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

PHIL 2340 Philosophy of Human Nature (4 SH)
Focuses on various attributes of human beings, such as intelligence, sexuality, and language, in the context of biological, psychological, linguistic, and philosophical views of human nature.
- Prerequisite: Two philosophy courses.

PHIL 2343 Existentialism (4 SH)
Examines existentialist philosophy in its greatest representatives, such as Kierkegaard, Nietzsche, Heidegger, Camus, and Sartre. Focuses on central themes including self-alienation, inauthenticity, authenticity, and existential experiences.
- Prerequisite: Three philosophy courses.

PHIL 2394 Chinese Buddhism (4 SH)
Offers a historical survey of the major forms of Buddhism that developed in China, from the beginning of the Common Era to the “Golden Age” of Chinese Buddhism during the Tang and Song dynasties to its eventual decline. Beyond examining the particular texts, figures, and practices (particularly forms of meditation and prayer) from each historical period, the class addresses the following questions: How did the Chinese absorb and re-create Indian Buddhism to reflect the cultural foundations of Chinese traditional society? How were ideological lines drawn between Daoism, Confucianism, and Buddhism?
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Humanities level 1, comparative study of cultures, experiential learning, writing intensive in the major.
- NUpath: Interpreting culture, employing ethical reasoning, writing intensive in the major.
- Equivalent: RELS 2394.

PHIL 2395 Japanese Buddhism (4 SH)
Surveys the major forms of Japanese Buddhism, from the earliest transmission of Buddhism to the maturation of Buddhist thought and practice during the Kamakura and Muromachi periods. Focuses not only on the major schools and figures of each period but also the ways in which Buddhism influenced and shaped Japanese culture. Examines, in particular, the formative influence of Buddhism on Japanese aesthetic sensibilities, samurai culture, and ritual. Focuses thematically on the religious practices that defined each school and how those practices were incorporated into a holistic religious vision.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Humanities level 1, comparative study of cultures, experiential learning, writing intensive in the major.
- NUpath: Interpreting culture, employing ethical reasoning, writing intensive in the major.
- Equivalent: RELS 2395.
PHIL 2398 Religion and Culture in Indian Cinema (4 SH)
Explores the intersecting discourses of gender, nationalism, and religion in India through the lens of Hindi cinema and the framework of the expanding scholarship on Indian cinema. Film is a particularly powerful medium for analyzing the representations of a culture. India boasts the largest film industry and film viewing audiences in the world. The course centers around Hindi popular cinema (Bollywood) but includes films from art cinema (New Cinema) and diaspora films for contrast with the mainstream cinema. Students are expected to watch films weekly and read corresponding work in cinema studies, gender studies, and religious studies. All films are subtitled in English.
• NU Core: Comparative study of cultures.
• Equivalent: CINE 2398, PHIL 3398, RELS 2398, and RELS 3398.

PHIL 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

PHIL 3350 Twentieth-Century Continental Philosophy (4 SH)
Examines some of the main ideas and thinkers in twentieth-century continental philosophy as represented by such philosophers as Husserl, Heidegger, Sartre, Ricoeur, Gadamer, Habermas, and Derrida.
• Prerequisite: Two courses in philosophy.

PHIL 3355 Twentieth-Century Analytic Philosophy (4 SH)
Explores some of the main ideas and thinkers in twentieth-century analytic philosophy as represented by such philosophers as Moore, Russell, Wittgenstein, the logical positivists, Quine, Popper, and Rawls.
• Prerequisite: PHIL 2325 and PHIL 2330.

PHIL 3385 History of Jewish Rationalism (4 SH)
Studies the Jewish rational tradition from Philo (first century C.E.) to Spinoza (seventeenth century C.E.). Emphasis is on tracking the development of the rationalist commitment within the tradition and its interaction with religious doctrine and faith. Among the thinkers studied are Philo, Saadia Gaon, Judah Halevi, Maimonides, Gersonides, and Spinoza.
• Prerequisite: PHIL 2325 and PHIL 2330.

PHIL 3387 Religion, Nation, and Identity in Modern Jewish Thought (4 SH)
Examines the thought of major Jewish thinkers of the modern era. May include such figures as Spinoza, Mendelssohn, Buber, Rosenzweig, Kaplan, Heschel, and Rubenstein.
• Prerequisite: Two philosophy courses.
• Equivalent: RELS 3387.

PHIL 3410 Religion and Spirituality in the African Diaspora (4 SH)
Examines religious thought and rituals and its Diaspora in a comparative context. Topics include traditional religions, Islam, Christianity, and Judaism in Africa and the diaspora. Emphasizes the transformation of religions practiced in Africa when African captives were forced into the three slave trades affecting the continent of Africa: trans-Saharan, Indian Ocean, and transatlantic.
• Prerequisite: Sophomore standing or above.
• NU Core: Comparative study of cultures.
• Equivalent: AFRS 3410 and RELS 3410.

PHIL 3435 Moral Philosophy (4 SH)
Explores two basic questions: What sorts of things are good or bad? What actions are right or wrong? Covers major philosophical theories about the nature of morality—whether it is relative or absolute, whether it accords or conflicts with self-interest. Such classic theories as utilitarianism and Kant are examined as well as contemporary developments and debates.
• Prerequisite: Two philosophy courses.

PHIL 3436 History of Modern Moral Philosophy (4 SH)
Studies the development of modern moral philosophy from its origins, the skepticism of Montaigne and the natural law theories of Hobbes and Pufendorf, to the emergence of the two major theories: consequentialism in the writing of Bentham and deontology in the writings of Kant. Includes readings from Hobbes, Clarke, Butler, Hutcheson, Hume, Smith, Price, and others.
• Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PHIL 3460 Philosophy and Literature (4 SH)
Provides the student the opportunity to learn to recognize, appreciate, and criticize philosophical themes in literature. Includes readings from acknowledged classics by philosophical authors.
• Prerequisite: Two philosophy courses.
PHIL 3465 Advanced Medical Ethics (4 SH)
Designed for students with a background in moral philosophy or medical ethics. Takes an in-depth look at one major moral problem in medicine. Topics may include AIDS, euthanasia, or reproduction.
• Prerequisite: PHIL 1165 or PHIL 3435.

PHIL 3480 Environmental Philosophy (4 SH)
Examines philosophical issues that arise in the context of human interactions with the natural environment. Emphasis is on the conceptual dimensions of these issues. Although many of these issues are ethical, they are also metaphysical and epistemological. There are also a number of significant methodological questions that arise in addressing them.
• Prerequisite: PHIL 1180 or PHIL 3435.

PHIL 3500 Sexuality, Gender, and the Law (4 SH)
Examines the legal regulation of gender and sexuality. Investigates concrete legal cases to study the history of constitutional interpretation and the current status of rights for women and sexual minorities. Focuses on important theoretical issues emerging in the writings of diverse feminist and queer legal scholars. Addresses debates over the value of conventional equality approaches in legal doctrine; equality vs. difference perspectives; ways in which legal language constructs gender and sexuality; the incorporation of sexuality and gender in ideologies of law; and the intersections of gender, sexuality, and race in legal doctrine and legal theory.
• Prerequisite: Sophomore standing or above.
• Cross-list: WMNS 3500.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: WMNS 3500.

PHIL 4390 Cults and Sects (4 SH)
Offers an examination of the varieties of religious experience from the perspectives of sociology and psychology of religion. Focuses on such cultic and sectarian groups as Christian Science, the American Shakers, the Unification Church, the Hare Krishna movement, and the Black Muslims. Provides students the opportunity to acquire critical investigative tools with which to analyze different religious expressions.
• Prerequisite: Sophomore standing or above only.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Interpreting culture, engaging difference and diversity, writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: PHIL 3390, RELS 3390, and RELS 4390.

PHIL 4393 Asian Religions in the United States (4 SH)
Examines challenges from Americans to Asian religions and from Asians to the American interpretations of Asian religions. Asian religions in the United States include two basic groups of believers. The first are the immigrant communities and their children who retain their religion and reinterpret this tradition in the North American setting. The second group are American converts to Asian religions who recreate the traditions to answer their needs. While no religion is static, the movement of a tradition to a new land always involves a certain amount of reinterpretation. Also explores some of the challenges of a study such as this class.
• Prerequisite: PHIL 1275 or RELS 1275.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: PHIL 3393, RELS 3393, and RELS 4393.

PHIL 4395 Ramayana (4 SH)
Examines the Ramayana, the story of Ram, Lakshmana, Sita, and Hanuman—from Ram’s exile and Sita’s abduction to the victorious battle to recapture her—one of the world’s great epics and a central religious story for Hindus. Explores the classical Sanskrit Ramayana, regional variants, subverted interpretations, and pop culture representations. From Sanskrit text recitation to ritual dance-drama performances, from comic books and a television series to Hindu nationalist politics, the Ramayana has provided a ground for debates about what it means to be a good king, what it means to be a good person, and also what it means to be Hindu. All texts are read in English.
• Prerequisite: PHIL 1275 or RELS 1275; prior knowledge about Hinduism would be very useful.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: PHIL 3395, RELS 3395, and RELS 4395.

PHIL 4500 Theory of Knowledge (4 SH)
Focuses on questions about the nature and justification of claims to knowledge. Is there genuine knowledge? How do we tell when a belief or theory is sufficiently justified to count as knowledge? Discusses theories such as various forms of rationalism, empiricism, and skepticism. Requires careful reading of works by such influential thinkers as René Descartes, Bertrand Russell, A. J. Ayer, and T. S. Kuhn.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) PHIL 2330 and (c) two additional philosophy courses; junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
PHIL 4505 Metaphysics (4 SH)
Considers central problems and theories concerning the nature of reality, with special attention to such areas as the relation between mind and matter, free will and determinism, and criteria of existence.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) PHIL 2330 and (c) two additional philosophy courses; junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PHIL 4510 Philosophy of Science (4 SH)
Focuses on the nature of scientific method, scientific theories, and scientific explanations. Examines the central question of why science is thought to provide the most reliable account of the nature of reality. Considers various theories about the nature and reliability of science.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) PHIL 1115 or PHIL 1215 and (c) three additional philosophy courses; junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PHIL 4515 Advanced Logic (4 SH)
Studies the major results in the metatheory of first-order logic. Examines consistency, completeness, and decidability. Discusses the general notion of an effectively computable process, Church’s thesis, and the existence of unsolvable problems.
• Prerequisite: PHIL 1115.
• NU Core: Mathematical/analytical thinking level 2.

PHIL 4520 Philosophy of Logic (4 SH)
Examines philosophical problems and theories about the nature of logic.

PHIL 4525 Philosophy of Social Science (4 SH)
Examines philosophical issues that arise in the social scientific study of human beings and human societies. Do the social sciences use the same means as the natural sciences? Or must human beings be understood in special ways? Are there laws of human and social behavior?
• Prerequisite: (a) PHIL 1115 or PHIL 1215 and (b) three additional philosophy courses.

PHIL 4530 Philosophy of Psychology (4 SH)
Examines issues and problems that arise in the study of the mind and consciousness.
• Prerequisite: PHIL 2330 and two additional philosophy courses.

PHIL 4535 Philosophy of Mind (4 SH)
Seeks to show what puzzles and problems result from an honest attempt to answer these questions in a reasonable way: What is the relation between mind and body? Is the mental merely a function of bodily process and behavior, or does it somehow exist “over and above” the material? How are self-knowledge and knowledge of other minds achieved, and what is the relation between words and thoughts? Examines classical sources, such as Descartes and Locke, and contemporary sources, such as Wittgenstein and Putnam. Also seeks to arrive at some answers—however tentative or provisional—to these questions. Constantly challenges students to think and write about these difficult subjects.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) PHIL 2330 and (c) two additional philosophy courses; junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PHIL 4540 Philosophy of Language (4 SH)
Examines prospects for a theory of language, its syntax, and its semantics. Examines contrasts between theory of reference and theory of meaning. Asks whether there are universals of language. Analyzes relations between linguistics and psychology. Includes readings from Frege, Quine, Russell, Chomsky, and Fodor.
• Prerequisite: (a) PHIL 1115 and (b) PHIL 1215 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: LING 4540.

PHIL 4545 Religion and Politics in South Asia (4 SH)
Analyzes how to think critically both about the ways religion is presented to us and the connections we make between political movements and religious groups. Explores questions such as: What could it mean for politics to be religious and for religions to be political? Are “religious conflicts” essentially religious? What is the relationship between socioeconomic movements and religion? Do religions take the blame for political movements? Focuses on two South Asian communal conflicts that are couched in terms of religious identity: the Hindu-Muslim conflicts and Hindu-Sikh conflicts. Uses primary and secondary sources to study these conflicts to analyze the workings of religious rhetoric and political rhetoric about religions.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: RELS 4545.
PHIL 4546 Advanced Biblical Studies: Hebrew Bible (4 SH)
Studies a book or genre of texts of the Hebrew Bible in English translation. Designed for the student who has successfully completed course work in biblical studies at the college level, it addresses questions of authorship, form, original meaning, setting, and purpose.
• Prerequisite: PHIL 1275 or RELS 1275.
• Equivalent: RELS 4546.

PHIL 4547 Seminar: Apocalypticism (4 SH)
Designed to explore Jewish and Christian apocalypticism from the time it bursts onto the scene c. 165 BCE through its contemporary popular expressions. Begins with an in-depth look at the biblical materials contained in Daniel and Revelation, explores apocryphal and pseudepigraphal texts, and examines millenarian and messianic expectations in their historical perspectives.
• Prerequisite: Two courses in philosophy or religion recommended.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: PHIL 3415, RELS 3415, and RELS 4547.

PHIL 4605 Advanced Seminar: Spinoza (4 SH)
Examines the political, religious, and philosophical writings of Spinoza. Emphasizes understanding Spinoza’s work in its historical context as well as examining his thought for insights applicable to our own time.
• Prerequisite: Junior or senior standing and 16 SH of philosophy and religion.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PHIL 4606 Seminar: Theories and Methods in Religious Studies (4 SH)
Focuses on the history of the study of religion as it developed during the nineteenth and twentieth centuries. Examines readings from a wide range of foundational thinkers and contemporary scholarship to illustrate the roots of religious studies and the state of the field today. Designed to simultaneously acknowledge the interdisciplinary nature of religious studies by asking students to read in several methodological schools while allowing each student to pursue a particular school in more depth. Includes theorists from anthropology, comparative method, cultural studies, hermeneutics, history of religions, mythology, phenomenology, philosophy of religion, ritual and performance studies, sociology, psychology, and visual theology. Offers an opportunity for students to see the ways religious studies methodologies speak to each other and how they might be used to examine particular religious phenomena.
• Prerequisite: 16 SH of philosophy and religion.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: RELS 4606.

PHIL 4901 Topics in Philosophy Seminar (4 SH)
Focuses on one specific problem or issue in philosophy. Topics vary, and students may register for the course more than once.
• Prerequisite: Junior or senior standing and four philosophy courses.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.

PHIL 4902 Great Philosophers Seminar (4 SH)
Focuses on the writings of a major philosopher. Subjects include Plato, Aquinas, Locke, Hegel, and Heidegger. Specific philosophers vary, and students may register for the course more than once.
• Prerequisite: Junior or senior standing and four philosophy courses.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.
PHIL 4903 Seminar in Religion (4 SH)
Examines topics including theodicy, cosmogony, contemporary issues in religion, and comparative ethics. Topics vary, and students may register for the course more than once.
• Prerequisite: Junior or senior standing and three religious studies courses.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.
• Equivalent: RELS 4903.

PHIL 4904 Major Figures in Religious Studies (4 SH)
Focuses on the work of one figure important in the field of religion. Subjects include Augustine, Calvin, Luther, Weber, and Eliade. Topics vary, and students may register for the course more than once.
• Prerequisite: Junior or senior standing and four religious studies courses.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.
• Equivalent: RELS 4904.

PHIL 4906 Topics in Religious Studies (4 SH)
Focuses on a topic of special importance in the study of religion. Topics vary and students may take the course more than once.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Repeatability: May be repeated without limit.
• Equivalent: RELS 4906.

PHIL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

PHIL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: PHIL 4970.
• Repeatability: May be repeated without limit.

PHIL 4991 Research (4 SH)
Offers an opportunity to do research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

PHIL 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHIL 4994 Internship (4 SH)
Offers an opportunity for an internship.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHIL 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHIL 5001 Global Justice (4 SH)
Explores the theoretical, political, and philosophical foundations of the obligations that underlie global justice. Theoretical approaches include human rights, human capabilities, cosmopolitanism, particularism, and universalism. Examines nationalism and the particular set of obligations that it generates. Following the theoretical component, the course considers social issues that arise in a global context: (1) the duties to the distant poor, (2) global philanthropy and problems of donee accountability, (3) global health and essential medicines and issues in environmental justice, and (4) issues in international law.
• Prerequisite: Junior, senior, or graduate standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Understanding societies and institutions, employing ethical reasoning, writing intensive in the major, demonstrating thought and action in a capstone.

PHIL 5003 Ethics, Justice, and Global Climate Change (4 SH)
Explores normative dimensions of policy and action regarding global climate change. Addresses whether climate change mitigation or adaptation should be prioritized, the just distribution of climate change mitigation and adaptation responsibilities in climate change policy, the responsibility of individuals to reduce their greenhouse gas emissions, whether some forms of mitigation are preferable to others on ethical or justice grounds, and under what conditions is geoengineering justifiable. Considers theories of justice, the moral standing of future generations, the value of nonhuman species, and the basis and nature of human rights.
• Prerequisite: (a) Senior or graduate standing or (b) junior standing and permission of instructor.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
PHIL 5011 Comparative Religious Ethics (4 SH)
Offers a comparative approach to Eastern and Western ethical traditions. Examines primary texts from a variety of religious cultures as well as theoretical works in comparative religious ethics and moral philosophy that engage in and critique the project of cross-cultural dialogue. Investigates ideals of human flourishing, notions of virtue and vice, and conceptions of selfhood and community. Discusses issues of pluralism; orientalism (a mode of thinking, constructed and disseminated by the West, that projects a vision of the East as irrational, mystical, and primitive, which suits the ideological and political purposes of the West); and methods of comparative philosophy as a way of understanding the context of the academic study of non-Western traditions.

• Prerequisite: (a) Senior or graduate standing or (b) junior standing and permission of instructor.
• NU Core: Capstone, experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
• Equivalent: RELS 5001.

PHIL 7240 Ethics and Public Policy (4 SH)
Focuses on the role of ethical values and principles in public policy debates. Examines works by both classical and contemporary philosophers, considers key ethical theories, and assesses arguments about the scope and limits of legitimate governmental authority. Offers students an opportunity to strengthen their skills in applying relevant ethical principles to specific policy issues.

PHIL 7270 Ethics and Health Policy (3 SH)
Examines some of the values implicit in healthcare policy from both theoretical and applied perspectives. Considers the role medical ethics can and should play in forming health policy and studies the tension between the moral interests of populations and those of individuals. Possible issues for study include the ethics of managed care and consumer-driven healthcare, the pricing and marketing of medicines, and the role of medicines in global justice.

PHIL 7976 Directed Study (1 to 4 SH)
Offers an individualized course of study or project.
• Repeatability: May be repeated without limit.

PHYSICAL THERAPY (PT)

PT 1000 College: An Introduction (1 SH)
Provides an introduction to the University, college, and health professions to enhance students’ understanding of self and the decisions they make academically and socially as members of the University’s diverse, multicultural community. Group activities and individual assignments along with active participation in a learning community help students adjust to life on an urban campus, develop a better understanding of the learning process, acquire essential academic skills, and make connections with the faculty and students in the college.

PT 1880 Introduction to Sports Medicine (4 SH)
Offers an introductory course intended for students interested in sports, coaching, medicine, and exercise. Exposes students to the field of sports medicine. Emphasizes orthopedic anatomy, exercise principles, and a basic introduction to prevention of injury and illness related to athletes. Includes a cadaveric lab and lectures.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

PT 2000 Professional Development Co-op (1 SH)
Introduces the Bouvé Cooperative Education Program. Offers students an opportunity to develop job-search and career-management skills. Students perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Offers students an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Familiarizes students with workplace issues relative to their field of study and presents the MyNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.

PT 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PT 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PT 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Repeatability: May be repeated without limit.
PT 5101 Foundations of Physical Therapy (3 SH)
Introduces basic patient-care procedures and professional behaviors used in physical therapy practice. Prepares students for co-op education experiences and discusses implications for career planning.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5102.

PT 5102 Lab for PT 5101 (1 SH)
Accompanies PT 5101. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5101.

PT 5103 Human Skills Development (2 SH)
Examines typical skill development and maturation from intrauterine life through old age (senescence). Considers the interaction of system development on acquisition of and changes in skill development. Students apply developmental concepts to case studies and hypothetical clinical situations. Emphasizes childhood and early adult development as a foundation to the changes that occur later in adulthood and senescence.
• Prerequisite: Junior, senior, or graduate standing.

PT 5104 Therapeutic Modalities (1 SH)
Provides application of physical agents to treat a variety of impairments found during a physical therapy examination. Covers the theory, rationale, and application of thermal, electrical, light, and mechanical agents.
• Prerequisite: PT 5131 and junior, senior, or graduate standing.
• Corequisite: PT 5105.

PT 5105 Lab for PT 5104 (1 SH)
Accompanies PT 5104. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5104.

PT 5111 Professional Development for Bouvé Graduate Co-op (1 SH)
Introduces graduate students to the Bouvé Cooperative Education Program and offers an opportunity to develop job-search and career-management skills. Students perform assessments of their workplace skills, interests, and values and discuss how they impact personal career decisions. Offers students an opportunity to prepare a professional-style résumé, learn proper interviewing techniques, and gain an understanding of the opportunities available to them for co-op. Introduces career paths, choices, and career decision making. Seeks to familiarize students with workplace issues relative to their field of study and to teach them to use myNEU COOL database in the job-search and referral process. Presents and discusses co-op policies, procedures, and expectations of the Bouvé Cooperative Education Program and co-op employers.
• Prerequisite: Junior, senior, or graduate standing.

PT 5112 Lab for PT 5101 (1 SH)
Accompanies PT 5111. Covers topics from the course through various activities.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5111.

PT 5113 Human Skills Development (2 SH)
Examines typical skill development and maturation from intrauterine life through old age (senescence). Considers the interaction of system development on acquisition of and changes in skill development. Students apply developmental concepts to case studies and hypothetical clinical situations. Emphasizes childhood and early adult development as a foundation to the changes that occur later in adulthood and senescence.
• Prerequisite: Junior, senior, or graduate standing.

PT 5131 Gross Anatomy (4 SH)
Covers the structure and function of the human body with particular emphasis on the skeletal, muscular, nervous, and cardiovascular systems and clinical application to these systems. Considers basic abnormalities of structure and function. Involves lectures, cadaver prosection, osteology, and surface anatomy labs.
• Prerequisite: (a) BIOL 1119 with a grade of C and junior or senior standing or (b) graduate standing; physical therapy students only.
• Corequisite: PT 5132.

PT 5132 Lab for PT 5131 (1 SH)
Accompanies PT 5131. Covers topics from the course through various activities.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5131.

PT 5133 Kinesiology (3 SH)
Studies normal movement through the analysis of muscle and joint function. Introduces fundamental examples of pathokinesiology, aberrant motions, and postures. Emphasizes analysis of the major joints and regions of the body as related to the field of physical therapy, including aspects of gait analysis. Encourages critical thinking and integrates material learned in prior course work, including, but not limited to, anatomy and physiology.
• Prerequisite: PT 5131 with a grade of C and junior, senior, or graduate standing; physical therapy students only.
• Corequisite: PT 5134.
• NUpath: Engaging with the natural and designed world.

PT 5134 Lab for PT 5133 (1 SH)
Offers students an opportunity to measure skills of goniometry and manual muscle testing to assess joint mobility and muscle performance. Also covers assessment of posture and gait. Integrated with PT 5133 and builds upon the foundation of gross anatomy.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5133.

PT 5138 Neuroscience (4 SH)
Covers the structure and physiological function of the human nervous system with emphasis on the clinical aspects of motor and somatosensory systems. Studies the anatomy of the brain, brain stem, and spinal cord in specimens and on slides and integrated with the basic physiology of motor and sensory systems. The application of neuroscience to clinical neurological cases is a foundation of this course.
• Prerequisite: PT 5131 with a grade of C and junior, senior, or graduate standing.
• Corequisite: PT 5139.
PT 5139 Lab for PT 5138 (1 SH)
Accompanies PT 5138. Covers topics from the course through various experiments.
  - Prerequisite: Junior, senior, or graduate standing.
  - Corequisite: PT 5138.

PT 5140 Pathology (4 SH)
Covers general medicine, lab medicine, and pathology as related to conditions commonly treated by healthcare professionals. Provides the foundation for PT 6240.
  - Prerequisite: PT 5131 with a grade of C and junior, senior, or graduate standing.
  - Corequisite: PT 5141.

PT 5141 Recitation for PT 5140 (0 SH)
Provides small-group discussion format to cover material in PT 5140.
  - Prerequisite: Junior, senior, or graduate standing.
  - Corequisite: PT 5140.

PT 5145 Introduction to the Healthcare System (2 SH)
Offers students an opportunity to obtain the foundation to understand and appreciate the framework of the U.S. healthcare system. Compares other selected global healthcare systems. Examines historical events, policy changes, and current issues that impact the delivery of healthcare services.
  - Prerequisite: PT 5101 with a grade of C and junior, senior, or graduate standing.

PT 5150 Motor Control, Development, and Learning (4 SH)
Covers three broad areas—motor control, motor development, and motor learning. Examines neural, behavioral, and physical mechanisms that contribute to the control of movement in humans. Focuses on motor control in healthy persons, with some discussion of alterations associated with musculoskeletal and neural impairment. Addresses motor development and maturation from intrauterine life through old age (senescence). Considers the interaction of body-system development and growth on acquisition of and changes in typical skill development. Examines factors that influence the learning of new motor skills (motor learning) as a result of practice.
  - Prerequisite: PT 5133 with a grade of C, PT 5138 with a grade of C (the latter may be taken concurrently), and junior, senior, or graduate standing; physical therapy majors only.
  - Corequisite: PT 5151.

PT 5151 Lab for PT 5150 (1 SH)
Offers students an opportunity to apply knowledge gained in PT 5150 to activities designed to illustrate various principles and concepts related to motor control, motor development, and motor learning. Uses a series of guiding questions/activities in each laboratory and analyzes associated literature to offer students an opportunity to apply class concepts to healthy individuals and to those with clinical problems related to motor control, motor development, or motor learning.
  - Corequisite: PT 5150.
  - NUpath: Analyzing and using data.
  - Equivalent: PT 5171.

PT 5160 Psychosocial Aspects of Healthcare (3 SH)
Examines interpersonal relationships among patients, families, health professionals, and society, with reference to the impact of and reaction to illness and disability. Identifies personal and societal beliefs, values, and attitudes that affect the role of people with illness or disabilities in our culture and the healthcare system; how patients’ beliefs, values, and experiences affect their expectations and interactions with healthcare professionals; and how beliefs, values, and experiences shape professional development and affect relationships with patients.
  - Prerequisite: (a) PT 5101 with a grade of C (may be taken concurrently by graduate students) and (b) ENGW 1111, ENGW 1102, ENGL 1111, ENGL 1102, or graduate standing; physical therapy majors only with junior, senior, or graduate standing.
  - Corequisite: PT 5161.
  - NU Core: Comparative study of cultures, writing intensive in the major.
  - Equivalent: PT 5135.

PT 5161 Psychosocial Aspects of Healthcare Seminar (1 SH)
Offers students an opportunity to engage in hands-on service roles and address the needs/interests of community partners. Students also have an opportunity to reflect on their learning through service during on-campus and online activities/assignments.
  - Corequisite: PT 5160.

PT 5165 Sports Medicine: Managing the Injured Athlete (4 SH)
Offers students an opportunity to obtain in-depth knowledge in sports medicine. Covers taping and bracing procedures and techniques to assess concussions with various current protocols. Exposes students to current common pathologies within the athletic population. Discusses return-to-play criteria for an athlete once an injury has occurred and has subsequently been treated and rehabilitated.
  - Prerequisite: PT 5505 with a grade of C.
PT 5170 Motor Control (3 SH)
Focuses on the theories and models of neuromuscular control and learning of human movement. Examines the relationship between theory and practice and how motor function may be altered by a variety of factors.
- Prerequisite: PT 5133 and junior, senior, or graduate standing.
- Corequisite: PT 5171.

PT 5171 Lab for PT 5170 (1 SH)
Accompanies PT 5170. Covers topics from the course through various experiments.
- Prerequisite: Junior, senior, or graduate standing.
- Corequisite: PT 5170.
- Equivalent: PT 5151.

PT 5172 Recitation for PT 5170 (0 SH)
Provides small-group discussion format to cover material in PT 5170.
- Prerequisite: Junior or senior standing.

PT 5209 Neurological Rehabilitation 1 (4 SH)
Covers the foundations of the physical therapy examination, evaluation, and intervention with patients with neurological deficits. Presents examination skills, theoretical bases, and clinical applications of integrated intervention approaches for the patient with a neurological diagnosis. Includes the etiology, pathology, and physical therapy management of common neurological disorders affecting the pediatric population.
- Prerequisite: PT 5515 with a grade of C, PT 5540 with a grade of C, and junior, senior, or graduate standing.
- Corequisite: PT 5210.

PT 5210 Lab for PT 5209 (1 SH)
Accompanies PT 5209. Covers topics from the course through various experiments.
- Prerequisite: Junior, senior, or graduate standing.
- Corequisite: PT 5209.

PT 5226 Physical Therapy Professional Seminar 2 (2 SH)
Continues PT 5135 and builds on concepts introduced in the earlier course. Affords students the opportunity to reflect on issues in experiential education and prepare for future experiential learning.
- Prerequisite: PT 6000 with a grade of C and junior, senior, or graduate standing.

PT 5227 Physical Therapy Project 1 (3 SH)
Provides students with the opportunity to conduct an independent project under the mentorship of physical therapy faculty in areas such as research, education, clinical practice, administration, or service learning.
- Prerequisite: PT 5515 with a grade of C, PT 5540 with a grade of C, PT 6243 with a grade of C, and junior, senior, or graduate standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Exploring creative expression and innovation, conducting formal and quantitative reasoning.

PT 5229 Physical Therapy Project 2 (2 SH)
Provides students with a continued opportunity to work with individual faculty on scholarship activities to create a scholarly work in partial fulfillment of the requirement for a Doctor of Physical Therapy degree. Allows students to continue the research or education project that was initiated in PT 5227. Guides students as necessary to enable them to complete their capstone project.
- Prerequisite: PT 5227 with a grade of C and junior, senior, or graduate standing.
- NU Core: Capstone, writing intensive in the major.
- Equivalent: PT 4513.

PT 5230 Pediatric and Geriatric Aspects of Life Span Management (3 SH)
Incorporates analysis and comparison of methods of physical therapy (PT) management of selected populations across the life span, which includes pediatrics and geriatrics. Focuses on utilizing evidenced-based rationale for clinical decision making within the context of PT examination, evaluation, PT diagnosis, prognosis, and plan of care. Discusses how patient/client management seeks to reflect core professional values, as well as topics of prevention and wellness in these patient populations.
- Prerequisite: PT 5209 with a grade of C, PT 5505 with a grade of C, PT 6241 with a grade of C, and senior or graduate standing; DPT students only.
- Equivalent: PT 5228.

PT 5351 Physical Therapy Business Management (2 SH)
Introduces students to the strategy and business-planning principles, tools, and resources related to developing a new business, service, or product relevant to the physical therapy profession. The goal is for students to develop a business, implementation, and a marketing plan. Covers issues related to business, finance, law, regulations, licensure, real estate, and marketing.
- Prerequisite: PT 6219 and junior, senior, or graduate standing; physical therapy majors only.
PT 5410 Functional Human Neuroanatomy (4 SH)
Examines the detailed structure of the human nervous system, linking structure to function at both the clinical and neurobiological level. Offers students an opportunity to obtain a solid functional anatomical foundation for neuroscience. Reviews basic neuroanatomy and then provides a detailed look into the structure of the nuclei within the central nervous system and their connectivity. Examines the role of these structures in motor and sensory function as well as in complex cognitive functions at a physiological and clinical level.
• Prerequisite: (a) either BIOL 1103 or BIOL 1113, either PSYC 3458 or BIOL 3405, and junior or senior standing or (b) BIOL 1117, either PSYC 3458 or BIOL 3405, and junior or senior standing or (c) graduate standing or (d) permission of instructor; students in Bouvé College of Health Sciences and the College of Science only.
• Corequisite: PT 5411.

PT 5411 Lab for PT 5410 (1 SH)
Examines the detailed structure of the human nervous system in specimens of the human brain and spinal cord as well as in images of stained sections of these tissues and magnetic resonance images (MRI). The structure of individual nuclei and the main sensory and motor tracts of the nervous system are examined and discussed by students working in small groups. Although focusing on anatomical details, the lab introduces the student to clinical diagnosis of neurological cases.
• Corequisite: PT 5410.

PT 5500 Pharmacology for Physical Therapy (4 SH)
Offers a clinically oriented course covering knowledge of clinical pharmacology in the physical therapy profession. Discusses prescription and over-the-counter drugs and common herbal supplements. Drug classification, pharmacokinetics, pharmacodynamics, mechanism of action, drug interactions, and common side effects are brought into the clinical perspective of patient management. Explores recognition of expected drug effects, side effects, idiosyncratic reactions, and signs of abuse or nonadherence. Emphasizes the therapist’s proper incorporation of pharmacoanalytic knowledge into patient assessment, differential diagnosis, and design of treatment regimens.
• Prerequisite: PT 5140 and senior or graduate standing; physical therapy students only.

PT 5503 Cardiovascular and Pulmonary Management (4 SH)
Discusses physical therapy examination evaluation, interventions, and outcome assessment of common cardiac and pulmonary dysfunctions. Discusses etiology and pathology of common cardiac and pulmonary disorders. Uses case-based learning to promote synthesis of the material.
• Prerequisite: PT 5133 with a grade of C, PT 5140 with a grade of C, and junior, senior, or graduate standing.
• Corequisite: PT 5504.

PT 5504 Lab for PT 5503 (1 SH)
Accompanies PT 5503. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5503.

PT 5505 Musculoskeletal Management 1 (4 SH)
 Discusses physical therapy examination evaluation, interventions, and outcome assessment of common musculoskeletal dysfunctions. Uses case-based learning to promote synthesis of the material.
• Prerequisite: PT 5515 with a grade of C, PT 5540 with a grade of C, and junior, senior, or graduate standing.
• Corequisite: PT 5506.

PT 5506 Lab for PT 5505 (1 SH)
Accompanies PT 5505. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5505.

PT 5515 Integumentary Systems and Advanced Modalities (2 SH)
Applies anatomy, physiology, epidemiology, and pathology to explore the issues of medical, surgical, pharmacological, and psychological and physical therapy management of individuals throughout the life span with integumentary system impairments. Provides students with the opportunity to develop examination skills to derive diagnoses, prognoses, evaluations, and effective physical therapy interventions based on relevant evidence. Builds on information from PT 5104 to include electrophysiological testing and interpretation. Uses case studies to integrate the information learned in class.
• Prerequisite: PT 5150 with a grade of C, PT 5500 with a grade of C, PT 5503 with a grade of C, and junior, senior, or graduate standing.
• Corequisite: PT 5516.

PT 5516 Lab for PT 5515 (1 SH)
Accompanies PT 5515. Covers topics from the course through various experiments.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5515.
PT 5520 Clinical Integration 1: Evidence and Practice (2 SH)
Prepares physical therapy students to safely manage patients in all inpatient settings, such as the acute and critical care settings and the acute rehabilitation and skilled nursing home settings. Focuses on integrative analysis of multiple disease processes (spanning all practice patterns of musculoskeletal, neuromuscular, cardiovascular, pulmonary, and integumentary) and their respective medical and surgical management that is relevant to physical therapy management encountered in these settings. Helps to enhance the student’s understanding of the scientific basis of physical therapy through a review of current scientific research, thereby helping the student to develop a foundation for evidence-based practice in these inpatient settings.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5521.
• Equivalent: PT 5540.

PT 5521 Case Studies for PT 5520 (1 SH)
Discusses case studies relevant to the topics of PT 5520.
• Prerequisite: Junior, senior, or graduate standing.
• Corequisite: PT 5520.

PT 5540 Clinical Integration 1: Evidence and Practice (2 SH)
Designed to prepare physical therapy students to integrate previous courses taught in the curriculum to safely manage patients in the acute-care setting, including the intensive-care unit, the critical-care unit, and step-down settings. Uses a combination of lecture, instruction in the simulation center, and standardized patient interactions. Follows the “Guide to Physical Therapy Practice for Evaluation and Intervention” in these settings. Offers students an opportunity to learn to perform an examination; to evaluate examination data to formulate a plan of care; to provide interventions; to determine a discharge plan for individuals in the acute-care environment; and to demonstrate core professional values in classroom, recitation, and standardized patient interactions.
• Prerequisite: PT 5150 with a grade of C, PT 5500 with a grade of C, PT 5503 with a grade of C, and junior, senior, or graduate standing; physical therapy students only.
• Equivalent: PT 5540.

PT 5600 Ergonomics and the Work Environment (3 SH)
Builds upon the public health definition that ergonomics is the applied science that optimizes overall human-systems performance and well-being within the work environment. Emphasizes a public health approach suited for healthcare professionals building on their strengths and training in analytical diagnostic skills and interventions, ranging from primary to tertiary approaches. Covers topics including epidemiology, job hazard analysis, and intervention methods and research. Offers students an opportunity to obtain the knowledge and skills to improve the physical ergonomic factors in a workplace in order to increase the health and well-being of workers.
• Prerequisite: Senior or graduate standing.

PT 5601 Project for PT 5600 (1 SH)
Focuses on a project to accompany PT 5600.
• Prerequisite: Senior or graduate standing.

PT 5610 Workplace Wellness and Health Promotion (3 SH)
Focuses on the skills needed to create, implement, and evaluate workplace health promotion and injury prevention programs. Studies the National Institute of Occupational Safety and Health’s (NIOSH) essential elements of workplace health programs, utilizing and reviewing the literature in support of these essential elements throughout the semester. Workplace factors have strong associations with the health and health behaviors of workers. Builds upon basic wellness and organizational ergonomic principles to offer students an opportunity to develop the skills needed and to obtain the knowledge of the work environment and health promotion.
• Prerequisite: Senior or graduate standing.

PT 5710 Psychosocial Aspects of Disability (4 SH)
Explores the psychological, social, and cultural factors that underlie responses and adaptations to chronic illness and disability by individuals and families. Offers a foundation for nonjudgmentally ascertaining and supporting clients’ needs. Includes coping needs and strategies that are used by those without complicating factors, as well as those that may be used by individuals who have comorbid conditions such as psychiatric disorders; substance abuse; or cultural, gender, or age differences. Presents best practices on interviewing skills, assessment, and interventions to support the needs of people affected by chronic illness or disability.
• Prerequisite: Junior, senior, or graduate standing.

PT 5720 Legal and Policy Issues Surrounding Disability (4 SH)
Offers an interprofessional course addressing the issues of disability relative to the law, public policy, rights, and advocacy. Often there is a discrepancy between the level of funding supplied to people with disabilities (PWD) and the actual costs of caring for these individuals in order to maximize their independence. The laws and policies that currently exist are often complex and lead to varied interpretations and applications, leaving some PWD without access to services to which they are entitled. This course offers students an opportunity to gain a broad understanding of the complex, dynamic, legal, and policy issues concerning PWD. In addition, this course explores access to available resources and legal limits of service delivery systems.
• Prerequisite: Junior, senior, or graduate standing.
PT 5730 Global Perspectives in Disability and Health (4 SH)
Addresses the issues of disability relative to culture, public policy, rights, and advocacy. People with disabilities are less likely to receive necessary healthcare and rehabilitation services and as a consequence experience poorer health outcomes and mortality. Explores the effects of cultural beliefs, social attitudes, and stigma toward people with disabilities. Evaluates the impact of poverty, sociopolitical conditions, health economics, and resource allocation issues. Analyzes charitable contributions, by human rights and other organizations, to the needs of people with disabilities in underserved areas to identify both desirable and undesirable impacts. This interprofessional course offers students an opportunity to gain a broad understanding of complex and dynamic issues concerning people with disabilities in underserved and globally diverse settings.
• Prerequisite: Junior, senior, or graduate standing.

PT 5740 Disabilities Practicum (4 SH)
Offers students an opportunity to work with a public agency, volunteer group, school system, parent collaborative, charitable organization, or other group that provides services for adults and/or children with disabilities. Designed to provide experiential learning while working with individuals or groups who have unmet needs in achieving their mission or objectives. The student, practicum coordinator, and a site supervisor develop a contract detailing the expected outcome(s) to be achieved. Examples include developing a new policy, performing a needs assessment, performing a literature search, writing a position paper addressing an important question, developing a training manual, or developing an advocacy plan. Requires working a minimum of sixty hours.
• Prerequisite: (a) PT 5710, PT 5720, or HLTH 5280 and (b) junior, senior, or graduate standing.

PT 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PT 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PT 6000 Leadership, Administration, and Management (2 SH)
Offers students an opportunity to develop the ability to analyze and evaluate changes in the healthcare system, health policy, and the impact on the delivery of services with a focus on physical therapy. Appraises key business and management concepts, including personnel, insurance, finance, marketing, productivity, and financial and legal regulations within the context of ethical practice. Emphasizes and examines leadership concepts in the areas of advocacy, legislation, and the promotion of the profession.
• Prerequisite: PT 5145 with a grade of C, PT 6243 with a grade of C, and senior or graduate standing; physical therapy students only.

PT 6215 Assistive Technology (3 SH)
Studies theory and current practice in the use of prosthetics, orthotics, and assisted-living devices.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, PT 6223 with a grade of C, and senior or graduate standing; physical therapy students only.
• Corequisite: PT 6216.

PT 6216 Lab for PT 6215 (1 SH)
Acompanies PT 6215. Covers topics from the course through various experiments.
• Prerequisite: Senior or graduate standing; physical therapy students only.
• Corequisite: PT 6215.

PT 6219 Physical Therapy Administration (4 SH)
Explores concepts in administration and management applied to physical therapy. Involves seminar and discussion groups.
• Prerequisite: Senior or graduate standing.

PT 6221 Neurological Rehabilitation 2 (4 SH)
Focuses on the physical therapy management of adults with neurological dysfunctions. Concentrates on management of functional activity limitations, participation restrictions, and impairments resulting from neurological disease and/or trauma. Offers students an opportunity to learn about the etiology, pathology, clinical signs, and medical management of adults with neurological disorders; to learn to perform an examination, evaluate the examination data to formulate a plan of care, and provide interventions; and to use evidence-based decision making.
• Prerequisite: PT 5209 with a grade of C and PT 6241 with a grade of C.
• Corequisite: PT 6222.

PT 6222 Lab for PT 6221 (1 SH)
Accompanies PT 6221. Covers topics from the course through various experiments.
• Corequisite: PT 6221.
PT 6223 Musculoskeletal Management 2 (4 SH)
Provides an in-depth analysis of musculoskeletal management. Compares intervention protocols as an integral component of this course. Allows, in the lab component, for practical application of spinal joint mobilization, modalities, ergonomic assessment, functional training, and therapeutic exercise. Uses case-based learning to promote synthesis of the material.
• Prerequisite: PT 5505 with a grade of C and PT 6241 with a grade of C and senior or graduate standing; physical therapy students only.
• Corequisite: PT 6224.

PT 6224 Lab for PT 6223 (1 SH)
Accompanies PT 6223. Covers topics from the course through various experiments.
• Corequisite: PT 6223.

PT 6231 Advanced Physical Therapy Topics in Pediatrics (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in pediatrics and physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5230 with a grade of C and senior or graduate standing.
• Repeatability: May be repeated without limit.

PT 6232 Advanced Physical Therapy Topics in Spine (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in spine and physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 6223 with a grade of C.
• Repeatability: May be repeated without limit.

PT 6233 Advanced Physical Therapy Topics in Orthopedics (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in orthopedics and physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5505 with a grade of C and senior or graduate standing.
• Repeatability: May be repeated without limit.

PT 6234 Advanced Physical Therapy Topics in Alternative Medicine (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in alternative medicine and physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, and PT 6223 with a grade of C.
• Repeatability: May be repeated without limit.

PT 6235 Advanced Physical Therapy Topics in Geriatrics (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in geriatrics and physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, and PT 6223 with a grade of C; physical therapy majors only.
• Repeatability: May be repeated without limit.

PT 6236 Advanced Physical Therapy Topics in Cardiovascular/Pulmonary (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in cardiovascular/pulmonary physical therapy. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, PT 6223 with a grade of C, and senior or graduate standing.
• Repeatability: May be repeated without limit.

PT 6237 Advanced Special Topics in Physical Therapy (2 SH)
Provides students with an opportunity to obtain in-depth knowledge in a specific physical therapy topic area. Course topics vary each semester offered. Topics are determined by significant events and changes in the field. This course may be taken more than once, as long as topics are different.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, PT 6223 with a grade of C, and senior or graduate standing.
• Repeatability: May be repeated without limit.
PT 6239 Intercultural Healthcare Delivery Systems—Physical Therapy (4 SH)
Engages students with the culture, civilization, and people of the countries studied and visited. Seeks to provide students with an in-depth and on-site experience, exposing them to the history, anthropology, philosophy, culture, and arts with a special focus on the healthcare system in the country of study. Encourages students to connect with their peers in each country/society and gain a “global experience” designed to enhance their academic studies on campus in Boston. The experience culminates in an independent service project conducted by the students before, during, and after their time in-country.
• Repeatability: May be repeated without limit.

PT 6240 Differential Diagnosis in Physical Therapy (3 SH)
Teaches physical therapy students how to conduct comprehensive physical therapy evaluations on a variety of patient populations across the life span, in order to determine the need for further medical consultation and/or to develop an accurate physical therapy diagnosis. Emphasizes developing efficiency through skillful sequencing of examination techniques along with providing rationale during the diagnostic process.
• Prerequisite: PT 6221 and senior or graduate standing.
• Equivalent: PT 6241.

PT 6241 Screening for Medical Conditions in Physical Therapy Practice (4 SH)
Designed to prepare physical therapy students to recognize the signs and symptoms of medical conditions and adverse drug reactions as they relate to patient examination and to triage appropriately. Emphasizes screening for medical conditions with the goal of recognizing red, yellow, and green flags as they relate to patient care. Stresses medical referral to other healthcare practitioners in an efficient and effective manner.
• Prerequisite: PT 5515 with a grade of C, PT 5540 with a grade of C, and senior or graduate standing: physical therapy students only.
• Equivalent: PT 6240.

PT 6243 Health Education, Promotion, and Wellness (3 SH)
Covers health promotion, wellness, disease, impairment, functional limitations, disability, and health risks. Offers students an opportunity to explore their consultative role to business, schools, government agencies, and other organizations.
• Prerequisite: (a) HLTH 5450 with a grade of C and PT 5160 with a grade of C or (b) graduate standing: physical therapy majors with senior or graduate standing.
• Corequisite: PT 6244.

PT 6244 Recitation for PT 6243 (0 SH)
Provides small-group discussion format to cover material in PT 6243.
• Corequisite: PT 6243.

PT 6250 Clinical Integration 2: Evidence and Practice (2 SH)
Offers students an opportunity to practice demonstrating core professional values in classroom, recitation, and standardized patient interactions and to learn how to skillfully manage complex patients across the life span and across practice patterns in a variety of clinical settings. Integrates evidence-based content from previous courses in the curriculum. Introduces special topics in physical therapy, including bariatric care, home care, and hospice.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, and PT 6223 with a grade of C: physical therapy students only.

PT 6251 Diagnostic Imaging (3 SH)
Designed to integrate diagnostic imaging principles and techniques relevant to physical therapy practice. Reviews commonly used diagnostic imaging techniques and discusses clinical case studies in a case-based online course.
• Prerequisite: PT 6215 with a grade of C and PT 6250 with a grade of C.

PT 6441 Clinical Education 1 (6 SH)
Provides students with opportunities to practice examination, evaluation, and intervention skills previously learned in the classroom and on co-op. Students work under the supervision and guidance of a licensed physical therapist.
• Prerequisite: PT 5230 with a grade of C, PT 6221 with a grade of C, PT 6223 with a grade of C, and senior or graduate standing.
• NU Core: Experiential learning.

PT 6442 Clinical Education 2 (6 SH)
Continues PT 6441. Provides students with additional opportunities to practice examination, evaluation, and intervention skills learned in the classroom and during the previous course. Students are expected to function at a higher level requiring less supervision and guidance from a licensed physical therapist than was needed during their first clinical education experience.
• Prerequisite: PT 6441.
• NU Core: Experiential learning.

PT 6448 Clinical Education 3 (9 SH)
Designed to provide students with the opportunity to meet entry-level requirements to practice as physical therapists. Supervised and guided by a licensed physical therapist, students practice examination, evaluation, intervention, documentation, and administrative skills and are expected to function at the level of a new graduate by the completion of this experience. Includes a written assignment. Helps students, through reflection of what they have learned, identify who they are as professionals, establish early career goals, and provide insight for the need to be a lifelong learner.
• Prerequisite: PT 6442.
• NU Core: Experiential learning.
PT 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.

PT 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
* Repeatability: May be repeated without limit.

PT 6978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
* Repeatability: May be repeated without limit.

PHYSICIAN ASSISTANT (PA)

PA 6200 Anatomy and Physiology 1 (3 SH)
Considers the structure of the human body, highlighting features of clinical importance. Covers the musculoskeletal, neurologic, cardiovascular, respiratory, gastrointestinal, endocrine, and renal systems. Also includes cadaver laboratory sessions.
* Prerequisite: Physician assistant students only.

PA 6201 Anatomy and Physiology 2 (3 SH)
Continues PA 6200. Considers the structure of the human body, highlighting features of clinical importance. Covers the musculoskeletal, neurologic, cardiovascular, respiratory, gastrointestinal, endocrine, and renal systems.
* Prerequisite: PA 6200; physician assistant students only.

PA 6203 Physical Diagnosis and Patient Evaluation 1 (3 SH)
Presents techniques to elicit accurate medical histories, perform appropriate physical examinations, make case presentations, and document patient information. Covers such issues as confidentiality and use of supervision. Emphasizes cultural issues in dealing with patients and working with terminally ill patients.
* Prerequisite: Physician assistant students only.

PA 6204 Physical Diagnosis and Patient Evaluation 2 (3 SH)
Continues PA 6203.
* Prerequisite: PA 6203; physician assistant students only.

PA 6205 Pharmacology 1 (2 SH)
Covers the classification, mechanisms of action, and uses of a spectrum of therapeutic agents. Emphasizes dose response, side effects, adverse reactions, the meaning of taking medications, and the role of culture. Required for all students.
* Prerequisite: Physician assistant students only.

PA 6206 Pharmacology 2 (2 SH)
Continues PA 6205. Examines the classification, mechanisms of action, and use of a broad spectrum of therapeutic agents. Focuses on dose response, side effects, adverse reactions, and the role of patient compliance in medication effectiveness.
* Prerequisite: PA 6205; physician assistant students only.

PA 6207 Clinical Laboratory and Diagnostic Methods (4 SH)
Covers radiology, clinical laboratory tests, and electrocardiography. Includes basic principles of radiology and interpretation of clinical laboratory diagnostic tests, demonstration and practice of various laboratory methods, and EKG theory and interpretation.
* Prerequisite: PA 6203; physician assistant students only.

PA 6208 Professional Issues for Physician Assistants (2 SH)
Offers students the opportunity to understand their professional environment, community resources, legal parameters, and ethical situations they may face. Also addresses interpersonal dynamics in working with physicians and other healthcare providers. Some material is covered in problem-based learning sessions.
* Prerequisite: Physician assistant students only.

PA 6311 Principles of Medicine 1 (4 SH)
Presents a systems approach to the principles of disease processes in people. Topics include physiology, pathophysiology, the natural history of disease, diagnostic procedures, and nutritional and therapeutic measures. Usually covers pulmonology, hematology, immunology, rheumatology, endocrinology, and cardiology.
* Prerequisite: Physician assistant students only.

PA 6312 Principles of Medicine 2 (4 SH)
Continues PA 6311. Usually covers infectious disease, oncology, gastroenterology, and dermatology.
* Prerequisite: PA 6311; physician assistant students only.

PA 6313 Principles of Medicine 3 (4 SH)
Continues PA 6312. Uses a case study format to involve students in planning the management of common disease states. Helps students understand the clinical use of common therapeutic agents and how to maximize compliance.
* Prerequisite: PA 6312; physician assistant students only.
PA 6320 Principles of Obstetrics and Gynecology (2 SH)
Presents the anatomy and physiology of the human reproductive system and the methods, effectiveness, and contraindications of contraception. Emphasizes the causes, signs, and treatments of common gynecological problems, including the significance of early cancer detection. Addresses diagnosing and treating sexually transmitted diseases. Presents physiologic and psychological changes, nutrition, prenatal care, and medical and surgical complications during pregnancy, labor, and delivery. Also covers the emotional aspects and management of the pre- and postnatal periods.
• Prerequisite: PA 6200, PA 6203, and PA 6311; physician assistant students only.

PA 6321 Principles of Surgery (2 SH)
Studies major and minor surgical conditions, emphasizing indications for surgical intervention and pre- and postoperative management in both ambulatory and inpatient settings, and patients’ emotional responses to major surgery.
• Prerequisite: PA 6200 and PA 6203; physician assistant students only.

PA 6322 Principles of Orthopedics (2 SH)
Discusses common orthopedic problems, including those of the hand, knee, shoulder, and back. Examines special problems of acute trauma and managing uncomplicated orthopedic cases. Also considers such topics as how to complete an adequate patient medical history and perform a physical examination of an orthopedic patient.
• Prerequisite: PA 6201 and PA 6204; physician assistant students only.

PA 6323 Clinical Neurology (2 SH)
Presents the clinical application of neuroanatomy and neurophysiology. Offers the opportunity to develop an understanding of the nervous system’s normal functioning as well as a clinical approach to assessing and managing nervous system disorders and disease states, and their effects on patients and their families.
• Prerequisite: PA 6200 and PA 6311; physician assistant students only.

PA 6324 Principles of Pediatrics (2 SH)
Presents the physiological and psychological fundamentals of child development. Focuses on the major common pediatric illnesses, including their signs, symptoms, and treatment regimens; various immunizations and medications used in pediatrics and their indication and dosage in relation to specific disorders; and management of such pediatric emergencies as cardiac arrest, anaphylaxis, convulsions, coma, and high fevers. Covers such issues as child abuse, school phobias, and childhood sexuality.
• Prerequisite: PA 6200 and PA 6311; physician assistant students only.

PA 6325 Principles of Psychiatry (2 SH)
Provides an opportunity to understand how to work with patients and families exhibiting psychiatric problems. Includes such topics as psychological growth and development, psychiatric diagnoses, and the effect of social milieu on behavior, the psychological bases of drug and alcohol abuse, the dynamics of psychosomatic problems, the role of culture in self-concepts, and family attitudes toward mental illness as well as appropriate psychotropic medications.
• Prerequisite: Physician assistant students only.

PA 6326 Aspects of Primary Care (4 SH)
Studies approaches to and management of the patient in a primary care setting. Discusses specific diseases and medical conditions common to primary care, including HIV/AIDS. Considers psychosocial aspects of disease as well as aspects of prevention.
• Prerequisite: PA 6204 and PA 6312; physician assistant students only.

PA 6327 Emergency Medicine and Critical Care (2 SH)
Presents the principles of life-support techniques. Focuses on the initial management of acute medical and traumatic conditions in hospital and prehospital situations. Instructs students in basic cardiopulmonary resuscitation techniques including BLS and ACLS. Includes such topics as airway management, hemodynamic monitoring and management, dysrhythmia recognition and treatment, cardiac arrest, hypovolemic states and management, invasive procedures, multiorgan system failure, nutritional support, and metabolic management of the ICU patient.
• Prerequisite: PA 6206 and PA 6312; physician assistant students only.

PA 6328 Aging and Rehabilitation Medicine (2 SH)
Studies techniques of effective planning and decision making for patients with significant acute and chronic problems. Discusses the purposes, techniques, and potential of rehabilitation medicine. Also focuses on biological changes of aging and appropriate theories of management.
• Prerequisite: PA 6312; physician assistant students only.

PA 6329 Healthcare Delivery (2 SH)
Explores the principal components of the healthcare delivery system, emphasizing its social, political, and economic evolution and development. Discusses trends and their implications.

PA 6330 Research Design (2 SH)
Considers research methods and designs used in varied professional settings. Emphasizes development of research techniques, including the ability to define research problems; write hypotheses; review and interpret literature; apply research designs; organize, analyze, and present data; and draw relevant conclusions.
PA 6400 Applied Study in Medicine (5 SH)
Offers students the opportunity to take and record medical histories and perform physical examinations during this inpatient hospital rotation. Familiarizes students with the assessment and management of varied medical problems by attending medical rounds and conferences, performing diagnostic procedures, presenting case write-ups, recording progress notes, and working under the supervision of a physician. Emphasizes the skills of collecting, assessing, and presenting patient data for physician review; ordering appropriate laboratory and diagnostic studies; counseling patients about therapeutic procedures; and helping to coordinate the contributions of other health professionals involved in management of the patient.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6401 Applied Study in Ambulatory Medicine (5 SH)
Exposes students to aspects of ambulatory medical practice, emphasizing the patient as an individual and family member. Students typically encounter such common medical problems as hypertension, diabetes, and heart disease. Patient education, disease prevention, counseling, and integration of community services, as well as medical diagnosis and management, are a major part of this rotation.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6402 Applied Study in Family Practice (5 SH)
Affords students the opportunity to participate in providing healthcare to outpatients under the supervision of a primary care physician. Allows students to become involved in the initial assessment and management of individuals, as well as the ongoing assessment and management of patients with established diagnoses. Exposes students to common primary care problems and upper respiratory illness, constitutional complaints, and orthopedic injuries. Emphasizes assessing and managing both acute and chronic medical problems.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6403 Applied Study in Emergency Medicine (5 SH)
Familiarizes students with problems encountered in an emergency room. Students are responsible for taking medical histories and performing physical examinations on acute as well as nonemergent patients and presenting these to the medical preceptor. When appropriate, students perform necessary diagnostic and therapeutic measures. Exposes students, through clinical training and didactic sessions at the clinical site, to the emergency management and treatment of such conditions as trauma, shock, burns, asthma, poisoning, allergic reactions, seizures, and respiratory failure.
• **Prerequisite:** Physician assistant students only.

PA 6404 Applied Study in Obstetrics and Gynecology (5 SH)
Enables students to become involved with obstetrical and gynecological services provided by teaching hospitals. Emphasizes pre- and postnatal care, monitoring labor, assisting in deliveries, and developing the necessary skills to deliver a child in an emergency situation. Provides opportunities to take obstetrical histories and perform obstetrical examinations. During this rotation, students study how to assess and manage a variety of common gynecological problems and to counsel patients on family planning.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6405 Applied Study in Pediatrics (5 SH)
Develops students’ familiarity with outpatient pediatric problems in training clinics and private pediatric offices. Emphasizes caring for a child from birth through adolescence. Provides opportunities to take medical histories and perform pediatric physical examinations. Stresses diagnosing and managing common childhood illnesses and evaluating growth and development. Assists students in developing skills to counsel parents about immunizations, child visits, growth and development parameters, common psychosocial problems, nutrition, and accident and poisoning prevention. Students may also have the chance to learn how to administer immunizations and perform audio and visual screening.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6406 Applied Study in Surgery (5 SH)
Allows students to participate in varied surgical patient-care responsibilities under the supervision of a surgical resident or staff surgeon. Emphasizes general surgery, though students may have some exposure to other surgical specialties and subspecialties. Allows students to assist in surgical patients’ initial assessment, which includes obtaining accurate medical histories and performing physical examinations. As members of the surgical team, students participate in preoperative management, including patient education and procedures necessary to prepare patients for surgery. Allows students to assist surgeons in the operating room, when appropriate, and have an opportunity to become familiar with operating room procedures and equipment. Involves students in patients’ postoperative evaluation and management. When possible, students attend surgical grand rounds and other surgically oriented educational meetings.
• **Prerequisite:** Successful completion of first-year physician assistant curriculum; physician assistant students only.
PA 6407 Applied Study in Mental Health (5 SH)
Exposes students to varied mental health problems in such settings as wards, clinics, and multiservice centers. Students are expected to perform mental status examinations and cognitive testing. Emphasizes recognizing various types of mental health problems that require referral to a specialist and managing problems that can be handled by the nonspecialist. Assists students in furthering their understanding of effective patient interactions and the mental health components of health, disease, and disability.
• Prerequisite: Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6408 Applied Study Elective (5 SH)
Provides exposure to an area of clinical medicine in which a student has a particular interest. Allows students to choose additional experience in an area covered in required rotations or select a subspecialty, such as orthopedics, cardiology, or geriatrics. Each elective rotation selection is reviewed and must be approved by the associate director.
• Prerequisite: Successful completion of first-year physician assistant curriculum; physician assistant students only.

PA 6990 Thesis (1 to 4 SH)
Offers theoretical and experimental work conducted under the supervision of a departmental faculty.
• Repeatability: May be repeated without limit.

PHYS 1000 Physics at Northeastern (1 SH)
Intended for freshmen in the College of Science. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
• Prerequisite: Majors in physics, applied physics, and biomedical physics only.
• Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, and PSYC 1000.

PHYS 1111 Astronomy (4 SH)
Introduces modern astronomical ideas designed for nonscience majors. Topics include an introduction to the cosmos, Earth and its relation to the universe, our solar system (planets, moons, asteroids, and comets), the sun and how it works, stars and their classification, and the life and death of stars. Introduces various tools of the astronomer (the nature of light and radiation, telescopes, the types of spectra, and what they tell us).
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

PHYS 1121 Introduction to Science (4 SH)
Provides nonscience majors with an interdisciplinary treatment of the basic ideas of the natural sciences. Discusses concepts such as particles and waves, heat, optics, energy, gravity, and the atom, followed by a consideration of the ways in which atoms combine to form the substances that compose matter.
• NU Core: Science/technology level 1.

PHYS 1125 Introduction to Network Science: From the Human Cell to Facebook (4 SH)
Introduces network science as a way to understand complex patterns of connections and relationships in increasingly complex social, infrastructure, transportation, information, and biological networks, as well as business and consumer networks. Describes basic conceptual and computational tools to model networks and discusses applications of those tools through a wide range of examples from the World Wide Web to protein and gene networks to massive social networks such as Twitter and Facebook. Discusses both network structures and dynamical phenomena on networks, such as spreading of information, rumors, gossip, and epidemics.
• NU Core: Science/technology level 1.
• NUpath: Analyzing and using data.

PHYS 1130 Computing, Data, and Science (4 SH)
Introduces how to deal with data and computation problems through the use of computer languages commonly used in the sciences. Focuses on manipulating data, but symbolic calculations are also covered. Intended for science majors during the first summer, when such a course can act as a foundation for later work.
• NUpath: Analyzing and using data.
PHYS 1132 Energy, Environment, and Society (4 SH)
Seeks to provide nonscience students with a practical knowledge of our present use of the Earth’s energy resources and the environmental consequences. Topics include fossil fuels for transportation and electrical power, global warming, nuclear energy, solar energy, wind power, biomass, electric and hybrid vehicles, and air pollution. No previous knowledge of physics is assumed; nevertheless, because of the nature of the subject, a significant part of the course includes simple quantitative reasoning.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world, understanding societies and institutions.

PHYS 1141 General Physics (4 SH)
Covers mechanics, fluids, and vibrations and waves. Emphasizes the application of physics to a variety of problems in structural engineering. Mechanics topics include one-dimensional motion, forces, vectors, Newton’s laws, equilibrium, work, energy, and power. Fluids topics include density, pressure, buoyancy, and fluids in motion. Vibrations and waves topics include mechanical vibrations and sound.
• Prerequisite: Knowledge of algebra.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.

PHYS 1145 Physics for Life Sciences 1 (4 SH)
Covers mechanics, fluids, and temperature and kinetic theory. The application of physics to a variety of problems in the life and health sciences is emphasized. Mechanics topics include one-dimensional motion, forces, vectors, Newton’s laws, equilibrium, work, energy, and power. Fluids topics include density, pressure, buoyancy, fluids in motion, viscosity, and surface tension. Temperature and kinetic theory topics include temperature, thermal equilibrium, gas laws, ideal gas law, kinetic theory, vapor pressure, and diffusion. A laboratory is included.
• Corequisite: PHYS 1146.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: PHYS 1149.

PHYS 1146 Lab for PHYS 1145 (1 SH)
Accompanies PHYS 1145. Covers topics from the course through various experiments.
• Corequisite: PHYS 1145.
• NUpath: Analyzing and using data.
• Equivalent: PHYS 1150.

PHYS 1147 Physics for Life Sciences 2 (4 SH)
Continues PHYS 1145. Covers heat, electricity, vibrations and waves, sound, geometrical optics, and nuclear physics and radioactivity. The application of physics to a variety of problems in the life and health sciences is emphasized. Electricity topics include electrostatics, capacitance, resistivity, direct-current circuits, and RC circuits. Vibrations and waves topics include simple harmonic motion and wave motion. Sound topics include wave characteristics, the ear, Doppler effect, shock waves, and ultrasound. Optics topics include reflection, mirrors, refraction, total internal reflection, fiber optics, lenses, the eye, telescopes, and microscopes. Nuclear physics and radioactivity topics include atomic nucleus, radioactivity, half-life, radioactive dating, detectors, nuclear reaction, fission, fusion, radiation damage, radiation therapy, PET, and MRI. A laboratory is included.
• Prerequisite: PHYS 1145, PHYS 1149, PHYS 1151, PHYS 1161, or PHYS 1171.
• Corequisite: PHYS 1148.
• NUpath: Engaging with the natural and designed world.

PHYS 1148 Lab for PHYS 1147 (1 SH)
Accompanies PHYS 1147. Covers topics from the course through various experiments.
• Corequisite: PHYS 1147.
• NUpath: Analyzing and using data.

PHYS 1149 Physics for Pharmacy (4 SH)
Offers an integrated lecture and laboratory course for pharmacy students.
• Corequisite: PHYS 1150.
• NUpath: Engaging with the natural and designed world.
• Equivalent: PHYS 1145.

PHYS 1150 Lab for PHYS 1149 (1 SH)
Accompanies PHYS 1149. Covers topics from the course through various experiments.
• Corequisite: PHYS 1149.
• NUpath: Analyzing and using data.
• Equivalent: PHYS 1150.
PHYS 1151 Physics for Engineering 1 (3 SH)
Covers calculus-based physics. Offers the first semester of a two-semester integrated lecture and laboratory sequence intended primarily for engineering students. Covers Newtonian mechanics and fluids. Stresses the balance between understanding the basic concepts and solving specific problems. Includes topics such as one-dimensional and three-dimensional motion, Newton’s laws, dynamics friction, drag, work, energy and power, momentum and collisions, rotational dynamics, forces, torque and static equilibrium, pressure, fluids, and gravity.
- Prerequisite: MATH 1241, MATH 1251, MATH 1340, or MATH 1341 (the latter two may be taken concurrently).
- Corequisite: PHYS 1152 and PHYS 1153.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: PHYS 1161 and PHYS 1171.

PHYS 1152 Lab for PHYS 1151 (1 SH)
Accompanies PHYS 1151. Covers topics from the course through various experiments.
- Corequisite: PHYS 1151 and PHYS 1153.
- NUpath: Analyzing and using data.
- Equivalent: PHYS 1162 and PHYS 1172.

PHYS 1153 Interactive Learning Seminar for PHYS 1151 (1 SH)
Offers interactive problem solving for PHYS 1151. Emphasizes organized approaches and use of mathematical techniques, including calculus, to solve a wide range of problems in mechanics. Topics include static equilibrium, applications of Newton’s laws and conservation principles, rotational dynamics, and fluids.
- Corequisite: PHYS 1151 and PHYS 1152.
- Equivalent: PHYS 1173.

PHYS 1155 Physics for Engineering 2 (3 SH)
Continues PHYS 1151. Offers integrated lecture and laboratory. Covers electrostatics; capacitors; resistors and direct-current circuits; magnetism and magnetic induction; RC, LR, and LRC circuits; waves; electromagnetic waves; and radiation.
- Prerequisite: (a) MATH 1252 or MATH 1342 (either of which may be taken concurrently) and (b) PHYS 1151, PHYS 1161, or PHYS 1171.
- Corequisite: PHYS 1156 and PHYS 1157.
- NUpath: Engaging with the natural and designed world.
- Equivalent: PHYS 1165 and PHYS 1175.

PHYS 1156 Lab for PHYS 1155 (1 SH)
Accompanies PHYS 1155. Covers topics from the course through various experiments.
- Corequisite: PHYS 1155 and PHYS 1157.
- NUpath: Analyzing and using data.
- Equivalent: PHYS 1166 and PHYS 1176.

PHYS 1157 Interactive Learning Seminar for PHYS 1155 (1 SH)
Offers interactive problem solving for PHYS 1155. Emphasizes organized approaches and use of mathematical techniques, including calculus, to solve a wide range of problems in electricity, magnetism, and waves.
- Corequisite: PHYS 1155 and PHYS 1156.
- Equivalent: PHYS 1177.

PHYS 1161 Physics 1 (4 SH)
Covers calculus-based physics. Offers the first semester of a two-semester integrated lecture and laboratory sequence intended primarily for science students. Covers Newtonian mechanics and fluids. Emphasizes the underlying concepts and principles. Takes applications from a wide variety of fields, such as life sciences and medicine, astro- and planetary physics, and so on. Includes topics such as forces, torque and static equilibrium, one-dimensional and three-dimensional motion, Newton’s laws, dynamics friction, drag, work, energy and power, momentum and collisions, rotational dynamics, oscillations, pressure, fluids, and gravity.
- Prerequisite: MATH 1241, MATH 1251, MATH 1341, MATH 1342, or MATH 2321 (the latter three may be taken concurrently); physics, biochemistry, chemistry, and mathematics majors and physics combined majors only.
- Corequisite: PHYS 1162 and PHYS 1163.
- NU Core: Science/technology level 1.
- NUpath: Engaging with the natural and designed world.
- Equivalent: PHYS 1155 and PHYS 1175.

PHYS 1162 Lab for PHYS 1161 (1 SH)
Accompanies PHYS 1161. Covers topics from the course through various experiments.
- Corequisite: PHYS 1161 and PHYS 1163.
- NUpath: Analyzing and using data.
- Equivalent: PHYS 1152 and PHYS 1172.

PHYS 1163 Recitation for PHYS 1161 (0 SH)
Accompanies PHYS 1161. Offers an opportunity for interactive problem solving.
- Corequisite: PHYS 1161 and PHYS 1163.
- Equivalent: PHYS 1152 and PHYS 1172.

PHYS 1165 Physics 2 (4 SH)
Continues PHYS 1161. Offers the second semester of a two-semester integrated lecture and laboratory sequence intended primarily for science students. Includes topics such as electrostatics; capacitors; resistors and direct-current circuits; magnetism and magnetic induction; RC, LR, and LRC circuits; waves; electromagnetic waves; and fluids.
- Prerequisite: (a) MATH 1342 or MATH 2321 (either of which may be taken concurrently) and (b) PHYS 1151, PHYS 1161, or PHYS 1171.
- Corequisite: PHYS 1166 and PHYS 1167.
- NUpath: Engaging with the natural and designed world.
- Equivalent: PHYS 1155 and PHYS 1175.
PHYS 1166 Lab for PHYS 1165 (1 SH)
Accompanies PHYS 1165. Covers topics from the course through various experiments.
• Corequisite: PHYS 1165 and PHYS 1167.
• NUpath: Analyzing and using data.
• Equivalent: PHYS 1156 and PHYS 1176.

PHYS 1167 Recitation for PHYS 1165 (0 SH)
Accompanies PHYS 1165. Offers an opportunity for interactive problem solving.
• Corequisite: PHYS 1165 and PHYS 1166.

PHYS 1171 Physics 1 for Bioscience and Bioengineering (3 SH)
Designed for students in engineering and science majors with a biologically related curriculum. Studies the fundamentals of calculus-based physics through a relationship with living systems. Includes topics such as kinematics of living systems, stress/strain/strength of biomaterials, fluid flow and boundary layers, aspiration and circulatory models, diffusion and random motion, and thermodynamics with examples from living systems.
• Prerequisite: MATH 1241, MATH 1251, MATH 1340, or MATH 1341 (any of which may be taken concurrently).
• Corequisite: PHYS 1172 and PHYS 1173.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: PHYS 1151 and PHYS 1161.

PHYS 1172 Lab for PHYS 1171 (1 SH)
Accompanies PHYS 1171. Experiments include measurement and error, forces in one dimension, work and energy on an air track, fluid flow, Brownian diffusion, uniform circular motion, and ideal gas laws.
• Corequisite: PHYS 1171 and PHYS 1173.
• NUpath: Analyzing and using data.
• Equivalent: PHYS 1152 and PHYS 1162.

PHYS 1173 Interactive Learning Seminar for PHYS 1171 (1 SH)
Offers interactive problem solving for PHYS 1171. Emphasizes organized approaches to solve a wide range of problems in the course.
• Corequisite: PHYS 1171 and PHYS 1172.
• Equivalent: PHYS 1153.

PHYS 1175 Physics 2 for Bioscience and Bioengineering (3 SH)
Continues PHYS 1171. Includes topics such as wave motion and hearing; electric fields (including application to biological membranes); direct current electrical circuits (including biological circuits); RC circuit models of ion channels; bioelectricity in marine organisms; electromagnetic waves and optics; modern physics (including radioactive decay, applications of radioactivity in nuclear medicine, and carbon 14 dating).
• Prerequisite: (a) PHYS 1151, PHYS 1161, or PHYS 1171 and (b) MATH 1252 or MATH 1342 (either of which may be taken concurrently).
• Corequisite: PHYS 1176 and PHYS 1177.
• NU Core: Science/technology level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: PHYS 1155 and PHYS 1165.

PHYS 1176 Lab for PHYS 1175 (1 SH)
Accompanies PHYS 1175. Experiments include standing waves, electric charge/field, DC circuits, gel electrophoresis, geometric optics, light spectroscopy, and radioactive decay.
• Corequisite: PHYS 1175 and PHYS 1177.
• NUpath: Analyzing and using data.
• Equivalent: PHYS 1156 and PHYS 1166.

PHYS 1177 Interactive Learning Seminar for PHYS 1175 (1 SH)
Offers interactive problem solving for PHYS 1175. Emphasizes organized approaches to solve a wide range of problems in the course.
• Corequisite: PHYS 1175 and PHYS 1176.
• Equivalent: PHYS 1157.

PHYS 2303 Modern Physics (4 SH)
Reviews experiments demonstrating the atomic nature of matter, the properties of the electron, the nuclear atom, the wave-particle duality, spin, and the properties of elementary particles. Discusses, mostly on a phenomenological level, such subjects as atomic and nuclear structure, properties of the solid state, and elementary particles. Introduces the special theory of relativity.
• Prerequisite: (a) MATH 2321 (which may be taken concurrently) and (b) PHYS 1155, PHYS 1165, or PHYS 1175.
• NUpath: Engaging with the natural and designed world.

PHYS 2305 Thermodynamics and Statistical Mechanics (4 SH)
Focuses on first and second laws of thermodynamics, entropy and equilibrium, thermodynamic potentials, elementary kinetic theory, statistical mechanics, and the statistical interpretation of entropy.
• Prerequisite: (a) MATH 2321 (which may be taken concurrently) and (b) PHYS 1155, PHYS 1165, or PHYS 1175.
• NUpath: Engaging with the natural and designed world.
PHYS 2371 Electronics (3 SH)
Covers the physics underlying computers and our modern electronic world. Focuses on principles of semiconductor devices (diodes, transistors, integrated circuits, LEDs, photovoltaics); analog techniques (amplification, AC circuits, resonance); digital techniques (binary numbers, NANDs, logic gates, and circuits); electronic subsystems (operational amplifiers, magnetoelectronics, optoelectronics); and understanding commercial electronic equipment. Lab experiments are designed to investigate the properties of discrete and integrated devices and use them to design and build circuits.
• Prerequisite: PHYS 1155, PHYS 1165, or PHYS 1175.
• Corequisite: PHYS 2372.
• NUpath: Engaging with the natural and designed world.

PHYS 2372 Lab for PHYS 2371 (1 SH)
Accompanies PHYS 2371. Illustrates topics from the lecture course through various hands-on experimental projects. Covers the process of electronics design from a goal-oriented perspective. Students are expected to consider their own electronics design project and build a prototype device that accomplishes a specific purpose.
• Corequisite: PHYS 2371.
• NUpath: Exploring creative expression and innovation.

PHYS 3600 Advanced Physics Laboratory (4 SH)
Introduces research through experiments that go beyond the simple demonstration of basic physical principles found in introductory physics courses. Data are taken to higher precision and the analysis is more in-depth. Experiments focus on lasers, fiber-optic communication, spectroscopy, Faraday rotation, speed of light, semiconductor physics, Hall effect, fuel cells, and Fourier analysis of music and sound. Lab reports are assessed on organization, format, grammar, and style. Offers students an opportunity to significantly improve their abilities in written scientific communication.
• Prerequisite: (a) PHYS 2303 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Engaging with the natural and designed world, analyzing and using data, writing intensive in the major.

PHYS 3601 Classical Dynamics (4 SH)
Covers advanced topics in classical mechanics including vector kinematics, harmonic oscillator and resonance, generalized coordinates, Lagrange’s equations, central forces and the Kepler problem, rigid body motion, and mathematical methods in physics.
• Prerequisite: (a) MATH 2341 or MATH 2351 (either of which may be taken concurrently) and (b) PHYS 1155, PHYS 1165, or PHYS 1175.
• NUpath: Engaging with the natural and designed world.

PHYS 3602 Electricity and Magnetism (4 SH)
Covers electrostatics and dielectric materials, magnetostatics and magnetic materials, currents in conductors, induction, displacement currents, computer solutions of EM problems, and Maxwell’s equations.
• Prerequisite: (a) MATH 2341 or MATH 2351 (either of which may be taken concurrently) and (b) PHYS 1155, PHYS 1165, or PHYS 1175.
• NUpath: Engaging with the natural and designed world.

PHYS 3603 Electromagnetic Waves and Optics (4 SH)
Focuses on electromagnetic waves in vacua and matter, electrodynamics and radiation, and computer visualization of electromagnetic fields. Also considers special relativity.
• Prerequisite: PHYS 3602.
• NUpath: Engaging with the natural and designed world.

PHYS 3606 Mathematical and Computational Methods for Physics (4 SH)
Covers advanced mathematical methods topics that are commonly used in the physical sciences, such as complex calculus, Fourier transforms, special functions, and the principles of variational calculus. Applies these methods to computational simulation and modeling exercises. Introduces basic computational techniques and numerical analysis, such as Newton’s method, Monte Carlo integration, gradient descent, and least squares regression. Uses a simple programming language, such as MATLAB, for the exercises.
• Prerequisite: (a) PHYS 2303 and (b) MATH 2321 and (c) MATH 2341 or MATH 2351.
• NU Core: Conducting formal and quantitative reasoning.
• Equivalent: MATH 4606.

PHYS 4601 Biological Physics 1 (4 SH)
Offers an introduction to biophysics focusing on development and implementation of physical models for various biophysical processes that occur in living organisms and in living cells. Topics covered, some of which are explored through computational examples, include thermodynamics of solutions and cells, randomness, diffusion, entropy, membranes, electrostatics, and electricity in cells.
• Prerequisite: PHYS 2303.
• NUpath: Engaging with the natural and designed world.

PHYS 4606 Medical Physics (4 SH)
Introduces the physical principles and basic mathematical methods underlying the various modalities of medical imaging. These include computed tomography (CT), magnetic resonance (MRI), positron emission tomography (PET), single-photon emission tomography (SPECT), and ultrasound. Covers nuclear physics and the interaction of radiation with biological matter with application to radiation therapy.
• Prerequisite: MATH 2321.
PHYS 4651 Medical Physics Seminar 1 (4 SH)
Offers the first part of a seminar series conducted by expert practitioners from Boston-area hospitals. Examines the clinical applications of medical imaging methods (CT, MRI, and PET), the clinical applications of radiation therapy, and the clinical applications of lasers and optical techniques. Includes site visits to local hospitals and medical instrumentation companies.
• Prerequisite: PHYS 4623.

PHYS 4652 Medical Physics Seminar 2 (4 SH)
Continues PHYS 4651. Further examines the clinical applications of medical imaging methods (CT, MRI, and PET), the clinical applications of radiation therapy, and the clinical applications of lasers and optical techniques.
• Prerequisite: PHYS 4623.

PHYS 4673 Project Laboratory (4 SH)
Allows students to select and carry out individual projects involving instrumentation and computation. Involves the development of some aspect of instrumentation and/or computation in an ongoing research project and the preparation of a final report. The student is supervised by the project leader and the course instructor.

PHYS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

PHYS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: PHYS 4970.
• Repeatability: May be repeated without limit.

PHYS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

PHYS 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of a member of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

PHYS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHYS 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHYS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PHYS 5111 Astrophysics and Cosmology (4 SH)
Introduces current ideas in astrophysics and cosmology, with emphasis on recent advances in this field. Topics include tools of the astronomer (telescopes, spectroscopy, and methods of distance measurement); the solar system; stellar properties (stellar spectra, stellar energy sources including gravitational or nuclear); Hertzsprung-Russell diagram; evolution of stars (birth, life, and ultimate collapse); our Milky Way galaxy; and extragalactic objects (galaxies, clusters of galaxies, radio galaxies, and quasars); cosmology (Olber’s paradox, recession of galaxies, big bang theory, cosmic background radiation, formation of galaxies, and the future of the universe).
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world.

PHYS 5113 Introduction to Particle and Nuclear Physics (4 SH)
Introduces the physics of atomic nuclei and elementary particles. Topics include classification of nuclei, strong and weak nuclear forces, mesons and nucleons, quarks and gluons, and unified theories of elementary particle interactions.
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world.

PHYS 5114 Physics of Advanced Materials (4 SH)
Explores the physical properties of materials and how such properties are essential for developing advanced applications. Models the fundamental properties of semiconductors, superconductors, and magnetic materials by elementary theories. Introduces the ideas motivating the need for a quantum theory of solids and uses these theories to explain the electronic, optical, and magnetic properties of advanced materials, with a direct relevance to their applications in nanoscale electronic devices, solar cells, laser diodes, quantum computers, etc.
• Prerequisite: (a) PHYS 2303, PHYS 2305, PHYS 3602, and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world.
PHYS 5115 Quantum Mechanics (4 SH)
Focuses on observations of macroscopic and microscopic bodies. Covers the uncertainty principle and wave-particle duality; probability amplitudes; Schrödinger wave theory and one-dimensional problems, Schrödinger equation in three dimensions; and angular momentum and the hydrogen atom.
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world, conducting formal and quantitative reasoning.

PHYS 5116 Complex Networks and Applications (4 SH)
Introduces network science and the set of analytical, numerical, and modeling tools used to understand complex networks emerging in nature and technology. Focuses on the empirical study of real networks, with examples coming from biology (metabolic, protein interaction networks), computer science (World Wide Web, Internet), or social systems (e-mail, friendship networks). Shows the organizing principles that govern the emergence of networks and the set of tools necessary to characterize and model them. Covers elements of graph theory, statistical physics, biology, and social science as they pertain to the understanding of complex systems.
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world.

PHYS 5260 Introduction to Nanoscience and Nanotechnology (4 SH)
Focuses on reviewing the basic scientific concepts relevant to this field and also gives a broad overview of the current state-of-the-art in research and technology. Nanotechnology promises to transform twenty-first century technology by exploiting phenomena exhibited by nanoscaled materials. This technology is expected to have significant impact in diverse areas such as computers, electronics, health, etc. Successful technological advancement of this field requires that we have a fundamental understanding of the “science” of these materials. This course comprises a series of lectures on various topics: development of nanofabrication methods, advanced microscopy techniques, fabrication of novel nanomaterials, investigation of their fundamental properties and device applications. Provides a strong introduction for students interested in nanoscience and technology.
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NUpath: Engaging with the natural and designed world.

PHYS 5318 Principles of Experimental Physics (4 SH)
Designed to introduce students to the techniques of modern experimental physics. Topics include communication and information physics, signal processing and noise physics, applied relativity physics, detector techniques, semiconductor and superconductor physics, nanoscale microscopy and manipulation, and lasers and quantum optics.
• Prerequisite: (a) PHYS 2303 and junior or senior standing or (b) graduate standing.
• NU Core: Capstone.
• NUpath: Engaging with the natural and designed world, analyzing and using data, demonstrating thought and action in a capstone.

PHYS 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of a member of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PHYS 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PHYS 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PHYS 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

PHYS 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

PHYS 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

PHYS 7200 Methods of Advanced Problem Solving (4 SH)
Designed to improve the ability of students to solve physics problems, which are of the same degree of difficulty as problems that often appear on the qualifying exam.
PHYS 7210 Introduction to Research in Physics (0 SH)
Offers a weekly seminar to introduce first- and second-year physics graduate students to research being done in the Physics department by advanced physics graduate students and faculty.
• Repeatability: May be repeated without limit.
• Equivalent: PHYS 7211, PHYS 7212, PHYS 7221, PHYS 7222, PHYS 7231, and PHYS 7232.

PHYS 7211 Introduction to Research 1 (1 SH)
Offered to first-year students during the fall semester, this one-unit course introduces new students to the various fields of current research undertaken in the department and elsewhere. Students attend seminars given by faculty and advanced graduate students engaged in cutting-edge research. Students are required to evaluate and provide constructive feedback to the seminar speakers. Students also present research articles, chosen through interactions with the faculty and with advanced graduate students. Students receive a letter grade.
• Equivalent: PHYS 7210, PHYS 7212, PHYS 7221, PHYS 7222, PHYS 7231, and PHYS 7232.

PHYS 7212 Introduction to Research 2 (1 SH)
Offered during the spring semester, this one-unit course introduces a first-year student to one of the fields of current research undertaken in the department. Students can select a particular thrust area and join the adviser’s group on a temporary basis. The purpose is to acquaint students with a group’s field of research, establish close ties with advanced graduate students, and gain some hands-on research experience. Students are expected to attend group meetings, participate in group projects, and in some cases complete a project of their own. Students receive a letter grade from the individual faculty member.
• Equivalent: PHYS 7210, PHYS 7211, PHYS 7221, PHYS 7222, PHYS 7231, and PHYS 7232.

PHYS 7221 Research 1 (1 SH)
Offered to second-year students in the fall semester, this one-unit seminar course helps students select a potential field of research for a PhD thesis topic. Students attend seminars given by faculty and advanced graduate students engaged in cutting-edge research. Students are required to evaluate and provide constructive feedback to the seminar speakers. Students also present research articles, chosen through interactions with faculty and with advanced graduate students. Students receive a satisfactory/unsatisfactory grade.
• Equivalent: PHYS 7210, PHYS 7211, PHYS 7212, PHYS 7222, PHYS 7231, and PHYS 7232.

PHYS 7222 Research 2 (1 SH)
Offered to second-year students in the spring semester, this is a one-unit seminar course. Students at this time are expected to have selected a PhD thesis topic and a thesis adviser. Students present seminars on material related to their proposed thesis topic. Faculty and advanced graduate students evaluate and provide constructive feedback to the seminar speakers. Students receive a satisfactory/unsatisfactory grade.
• Equivalent: PHYS 7210, PHYS 7211, PHYS 7212, PHYS 7221, PHYS 7231, and PHYS 7232.

PHYS 7231 Research Seminar 1 (1 SH)
Offered in the fall semester, this one-unit seminar course is taken by students with advanced standing who have passed the qualifying exam and are registered for PHYS 9990 or PHYS 9996. Students are required to give oral presentations on current research topics (typically their thesis research). The course is designed to promote interactions between faculty, advanced graduate students, and beginning graduate students and to broaden their intellectual outlook from one that is simply focused in a specific research area. Gives students the opportunity to learn to give lively and understandable presentations, a necessary skill in their professional development and an important component of their experiential education. Student and faculty listeners give feedback via an “evaluation” form. Students receive a satisfactory/unsatisfactory grade based on their participation.
• Equivalent: PHYS 7210, PHYS 7211, PHYS 7212, PHYS 7221, PHYS 7222, and PHYS 7232.

PHYS 7232 Research Seminar 2 (2 SH)
Offered in the spring semester, this one-unit seminar course is taken by students with advanced standing who have passed the qualifying exam and are registered for PHYS 9990 or PHYS 9996. Advanced graduate students attend oral presentations on current research topics and/or thesis topics proposed by the second-year students who have just started their PhD thesis research and also give oral presentations on current research topics (typically their thesis research). The course is designed to promote interactions between faculty, advanced graduate students, and second-year graduate students and to broaden their intellectual outlook from one that is simply focused in a specific research area. Student and faculty listeners give feedback via an “evaluation” form. Students receive a satisfactory/unsatisfactory grade based on their participation.
• Equivalent: PHYS 7210, PHYS 7211, PHYS 7212, PHYS 7221, PHYS 7222, and PHYS 7231.

PHYS 7301 Classical Mechanics/Math Methods (4 SH)
Covers mathematical methods of physics and classical mechanics. Topics include differential equations, boundary value problems, functions of a complex variable, linear vector spaces, Green’s functions, Lagrangian and Hamiltonian mechanics, linear oscillators, and scattering. May include additional topics as time permits.
PHYS 7302 Electromagnetic Theory (4 SH)
Analyzes Maxwell’s equations in vacuum and special relativity. Topics include electric and magnetic fields due to known sources with boundary conditions, radiation fields, bremsstrahlung, synchrotron radiation, the energy-momentum tensor for the electromagnetic field, fields in material media, boundary conditions at the interface between two media, and scattering of radiation. May include additional topics as time permits.

PHYS 7305 Statistical Physics (4 SH)
Briefly reviews thermodynamics. Topics include the principles of statistical mechanics and statistical thermodynamics; density matrix; theory of ensembles; Fermi-Dirac and Bose-Einstein statistics, application to gases, liquids, and solids; theory of phase transitions; and thermodynamics of electric and magnetic systems, transport phenomena, random walks, and cooperative phenomena.

PHYS 7315 Quantum Theory 1 (4 SH)
Explores the experimental basis of quantum theory, the Schrödinger equation, and probability interpretation of wave mechanics. Topics include the uncertainty principle, application to one-dimensional problems, the harmonic oscillator, orbital angular momentum, and the central force problem.

PHYS 7316 Quantum Theory 2 (4 SH)
Continues PHYS 7315. Topics include quantum theory of scattering; Born approximation; phase-shift analysis; introduction to S-matrix theory; general formulation quantum mechanics in Hilbert space; spin; identical particles and symmetrization principle; time-independent and time-dependent perturbation theory; semiclassical theory of radiation and atomic spectra; addition of angular momentum; Wigner-Eckart theorem; quantum theory of radiation; and absorption, emission, and scattering of photons. Also introduces free particle Dirac equation.
• Prerequisite: PHYS 7315.

PHYS 7321 Computational Physics (4 SH)
Covers basic numerical methods for differentiation, integration, and matrix operations used in linear algebra problems, discrete Fourier transforms, and standard and stochastic ordinary and partial differential equations. Specific applications of these methods may include classical chaos, computation of eigenstates of simple quantum systems, classical phase transitions, boundary value problems, pattern formation, and molecular dynamics and classical/quantum Monte Carlo methods to simulate the equilibrium and nonequilibrium properties of condensed phases.

PHYS 7323 Elementary Particle Physics (4 SH)
Presents a survey of the present state of elementary particle physics, suitable for all graduate students. Topics include overview of strong interactions and their connection to nuclear physics; nonrelativistic quark structure of strongly interacting particles (hadrons); color and the SU(3) Yang-Mills theory of strong interactions; coupling constant renormalization and asymptotic freedom; and the parton model of scattering. Covers weak interactions including phenomenology of the Fermi V-A theory; universality; and neutrino scattering. Studies the Glashow-Weinberg-Salam theory including unification of weak and electromagnetic interaction, neutral currents, the Higgs mechanism, quark masses and mixing, neutrino masses, and neutrino oscillation. Offers experimental support for the standard model. Also examines supersymmetry including the hierarchy problem and broken supersymmetry; role of supersymmetry in cosmology.

PHYS 7324 Condensed Matter Physics (4 SH)
Explores condensed matter physics. Topics include Drude and Sommerfield models of electrons in metals, crystal structure, one-electron states in crystal lattices, Bloch’s theorem, semiclassical theory of conduction, semiconductors and semiconducting devices, effects of electron-electron interactions, lattice vibrations and the classical and quantum theories of specific heat, optical properties of solids, investigation of crystal structure and excited states of crystals by x-ray and neutron scattering, simple transport theory based on the Boltzmann equation, and magnetic properties of solids.

PHYS 7331 Network Science Data (4 SH)
Offers an overview of data mining and analysis and techniques in network science. Introduces students to network data analysis. Presents algorithms for the characterization and measurement of networks (centrality based, decomposition, community analysis, etc.) and issues in sampling and statistical biases. Reviews visualization algorithms and specific software tools. Offers students an opportunity to learn about working with real-world network datasets.

PHYS 7335 Dynamical Processes in Complex Networks (4 SH)
Immerses students in the modeling of dynamical processes (contagion, diffusion, routing, consensus formation, etc.) in complex networks. Includes guest lectures from local and national experts working in process modeling on networks. Dynamical processes in complex networks provide a rationale for understanding the emerging tipping points and nonlinear properties that often underpin the most interesting characteristics of socio-technical systems. The course reviews the recent progress in modeling dynamical processes that integrates the complex features and heterogeneities of real-world systems.
• Prerequisite: PHYS 5116 and PHYS 7331.
PHYS 7731 Biological Physics 1 (4 SH)
Introduces the major classes of biological macromolecules and the physics underlying their structure, interaction, and biological function. Emphasis is on physical techniques for characterizing the structure and dynamics of proteins. Students are required to present a written and oral report on a focused research topic in molecular biophysics, based on a critical review of current scientific literature. Topics may include introduction to biomolecular structure, aqueous solution physics and hydrophobic interactions, chemical thermodynamics and reaction dynamics, spectroscopic techniques, molecular force measurements, and protein dynamics.

PHYS 7733 Topics: Elementary Particle Physics and Cosmology (4 SH)
Covers unified theories including evidence for supersymmetric SU(5) unification of couplings, and the grand unified scale and proton decay. Discusses particle physics and cosmology including a brief introduction to Einstein’s theory of general relativity, candidates for dark matter, inflation and the primordial fluctuations, and the problem of the cosmological constant. Examines developments leading to string theory including normal mode expansion; open and closed strings; deduction of D-26 for bosonic and D-10 for superstrings; scattering amplitudes in strings; heterotic string; compactifications on the torus, orbifolds, and Calabi-Yau manifolds; 4-D strings; and superstring phenomenology. Explores physics with extra dimensions including gravity at small distances, branes, and new approaches to the hierarch problem.
• Repeatability: May be repeated without limit.

PHYS 7734 Topics: Condensed Matter Physics (4 SH)
Covers selected advanced topics in the theory of solids to be chosen each time by the interested students and instructor. Topics may include theory of normal metals, Hartree-Fock and random phase approximations, optical and transport properties, solid-state plasmas, Raman spectroscopy, quasiparticles and collective excitations, quantum solids, and amorphous solids.
• Prerequisite: PHYS 7324.
• Repeatability: May be repeated without limit.

PHYS 7735 Nonlinear Dynamics (4 SH)
Offers various topics, depending on the instructor. Covers introduction to the Hamilton-Jacobi equation; action-angle variables, and Liouville’s integrability theorem; nonlinear oscillators; chaos in Hamiltonian systems; and continuous media via the sine-Gordon equation, solitons/antisolitons, and nonsolitonic solutions, Lagrangian derivation of the field equations, and Klein-Gordon equation.
• Prerequisite: PHYS 7321.

PHYS 7736 Material Physics (4 SH)
Studies the physical properties and applications of materials. Topics include crystalline and amorphous materials, metals, ceramics, glasses, polymers, materials characterization methods, such as x-ray diffraction, microscopies (optical, tunneling, and electron), susceptibilities (electric, magnetic), electronic transport in metals, semiconductors, superconductors, diffraction, defects, dislocations, specific heat, phonons, and thermal and electrical conductivities.
• Prerequisite: PHYS 7324.

PHYS 7741 Biological Physics 2 (4 SH)
Continues PHYS 7731. The first part of the course provides a foundation necessary to construct and implement models of neurons and networks of neurons. Topics include Hodgkin-Huxley form of the kinetical equations, single neuron models, dynamics of synapses, plasticity of synaptic strength, and neuromodulators. The second part covers nonlinear time series analysis and nonlinear dynamics in neuroscience. The goal is to provide a set of tools to analyze and model large multidimensional data sets encountered in many biological/neuroscience experiments. Topics include data testing of nonlinearity construction of linear and nonlinear models; spike sorting using independent component analysis and clustering algorithms; and analysis of continuous time series.
• Prerequisite: PHYS 7731 and PHYS 7321.

PHYS 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of a member of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHYS 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PHYS 7990 Thesis (1 to 4 SH)
Undertakes a master’s thesis in a selected topic in experimental or theoretical physics. Written thesis required.
• Repeatability: May be repeated without limit.

PHYS 7996 Thesis Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
• Prerequisite: PHYS 7990.

PHYS 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.
PHYS 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
  • Repeatability: May be repeated without limit.

PHYS 8982 Readings (1 to 4 SH)
Offers reading course, or theoretical or experimental work, under individual faculty supervision.
  • Repeatability: May be repeated without limit.

PHYS 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • Repeatability: May be repeated without limit.

PHYS 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
  • Repeatability: May be repeated without limit.

PHYS 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

PHYS 9984 Advanced Research (1 to 8 SH)
Provides an opportunity for advanced students to work with an individual instructor on a topic related to current research. The instructor and student negotiate a written agreement as to what topic(s) are covered and what written or laboratory work forms the basis for the grade. Viewed as a lead-in to thesis research.
  • Repeatability: May be repeated without limit.

PHYS 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
  • Repeatability: May be repeated without limit.

PHYS 9990 Dissertation (0 SH)
Offers experimental and theoretical work for PhD candidates. Requires written thesis and final oral exam.
  • Repeatability: May be repeated once.

PHYS 9996 Dissertation Continuation (0 SH)
Offers experimental and theoretical work for PhD candidates. Requires written thesis and final oral exam.
  • Prerequisite: PHYS 9990.
  • Repeatability: May be repeated without limit.

POLITICAL SCIENCE (POLS)

POL 1000 Political Science at Northeastern (1 SH)
Introduces first-year political science majors to the discipline, the department, and the University as a whole; familiarizes students with the skills needed for success as a university student.
  • Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, INTL 1000, LANG 1000, PHIL 1000, and SOCL 1000.

POL 1140 Exploring Politics and Political Science (4 SH)
Introduces students to basic concepts and principles in politics and political science. Combines a study of contemporary political events with appropriate readings that provide a conceptual and theoretical context for understanding the political world.
  • NU Core: Social science level 1.

POL 1150 American Government (4 SH)
Analyzes the system of politics and government in the United States. Topics include the philosophical basis, historical origins, design, and functioning of the Constitution as well as formal government institutions. Examines the influence of public opinion, political behavior and participation, parties, and interest groups.
  • NU Core: Social science level 1.
  • NUpath: Understanding societies and institutions.

POL 1151 Recitation for POLS 1150 (0 SH)
Provides small-group discussion format to cover material in POLS 1150.

POL 1155 Comparative Politics (4 SH)
Presents a comparative study of political organization and behavior in a range of countries beyond the United States. Topics includes political culture, political economy, governing institutions, leadership, and political participation.
  • NU Core: Comparative study of cultures, social science level 1.

POL 1156 Recitation for POLS 1155 (0 SH)
Provides small-group discussion format to cover material in POLS 1155.

POL 1160 International Relations (4 SH)
Introduces a broad study of international relations, encompassing both theoretical perspectives and empirical knowledge. Reviews the role of states as well as international and nongovernmental organizations in dealing with security and war, terrorism, human rights, trade, globalization, and environmental protection, among other important contemporary issues.
  • NU Core: Social science level 1.
  • NUpath: Understanding societies and institutions.

POL 1161 Recitation for POLS 1160 (0 SH)
Provides small-group discussion format to cover material in POLS 1160.
POLS 2325 Ancient Philosophy and Political Thought (4 SH)
Examines the philosophers of classical Greece, primarily Socrates, Plato, and Aristotle. These philosophers examined the nature of the material world, of the city, and of the person. The course takes up both the moral and political writings as well as the metaphysical writings. Devotes considerable attention to major works such as Plato’s Republic. Some time is given to early Greek philosophers, to the Sophists, and to later developments. Requires written analysis of philosophical texts.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Cross-list: PHIL 2325.
- NU Core: Interpreting culture, writing intensive in the major.
- Equivalent: PHIL 2325.

POLS 2326 Premodern Political Thought (4 SH)
Presents an analytical and historical examination of the great political thinkers and the main trends of political thought from classical Greece to the Renaissance.

POLS 2328 Modern Political Thought (4 SH)
Introduces students to a range of authors who are considered to be most influential in shaping Western political thought and who remain highly relevant in informing contemporary political debate. Offers students an opportunity to think critically about some of the fundamental questions pertaining to political practice—the nature of ideas, institutions, and processes and how to understand and evaluate them.

POLS 2330 American Political Thought (4 SH)
Analyzes the fundamental ideas in U.S. political thought that have shaped U.S. political institutions and policies, including liberalism, neoliberalism, conservatism, and nationalism. Examines the historic roots of each viewpoint and their impact. Major topics may include Locke and the liberal tradition, republicanism, Puritan political thought, the American Revolution, the writing of the Constitution, the growth of federal power, executive power, judicial review, and the debate over slavery. Explores the ongoing interaction of political thought and the political process in contemporary U.S. society.

POLS 2332 Contemporary Political Thought (4 SH)
Introduces students to a range of positions in contemporary political theory, familiarizing them with key texts, authors, and debates, such as those concerning critiques of power, global justice, and pluralism. Explores a range of methodological and theoretical approaches associated with these texts and examines some of their implications in the assessment of modern societies, their values, and institutional arrangements. Offers students an opportunity to develop the ability to critically reflect on the nature and scope of political discourse.

POLS 2333 Politics and Film (4 SH)
Analyzes interconnections between politics and film. Considering film as a political tool, includes such topics as political satire, propaganda, war, censorship, and nationalism. Case examples emphasize current events and contemporary issues.
- NU Core: Interpreting culture, understanding societies and institutions.

POLS 2334 Bureaucracy and Government Organizations (4 SH)
Examines the general principles underlying the structures, processes, and operation of public organizations. Examines the role of bureaucracies within the larger political system as well as how public agencies develop and change over time.
- Prerequisite: POLS 1150.

POLS 2335 Budgeting and Taxation (4 SH)
Surveys the relationship between economics and politics in the United States. Considers the role of government in a market economy including the efforts to manage economic growth, prevent monopoly, promote social welfare, and balance the power of business with the demands of democracy.
- Prerequisite: POLS 1150.

POLS 2336 Politics and the Arts (4 SH)
Explores the various ways in which the visual (painting, sculpture, architecture, design, etc.) and performing (music, theater, film, etc.) arts relate to, and interact with, political and governing actors, institutions, and systems. Topics covered in this broad-based multimedia course include policy and administrative issues related to government patronage of the arts, how different political ideologies view art and artists, the arts and political legitimacy, propaganda and "official art," censorship, issues in civil liberties and artistic freedom, art and political dissent, political and ethnic minorities in the arts, and feminist art. Many of the specific cases examined come from the United States, but the overall focus of the course is global and historical.

POLS 2340 Business and Government (4 SH)
Surveys the relationship between economics and politics in the United States. Considers the role of government in a market economy including the efforts to manage economic growth, prevent monopoly, promote social welfare, and balance the power of business with the demands of democracy.
- Prerequisite: POLS 1150.

POLS 2345 Urban Policies and Politics (4 SH)
Analyzes the political, administrative, economic, and social dynamics of urban areas. Highlights the diversity of political institutions and practices in American cities. Introduces key policy areas at the city level such as land use, economic development, and education.
- Prerequisite: POLS 1150.
POLS 2350 State and Local Politics (4 SH)
Examines the political and administrative context of the state and local government in the United States; surveys the structure, function, and politics of states and localities within the context of the U.S. federal system; and highlights the diversity of political institutions and practices at the state and local levels.
• Prerequisite: POLS 1150.

POLS 2355 Intergovernmental Relations (4 SH)
Analyzes the relationship among national, state, and local levels of government in the United States and the changing patterns of those relationships. Highlights the political, legal, and fiscal nature of intergovernmental relations.
• Prerequisite: POLS 1150.

POLS 2357 Growth and Decline of Cities and Suburbs (4 SH)
Introduces students to the field of urban studies. Focuses on these central issues: how cities and suburbs evolve, what makes a city or suburb a good place to live, and how cities and suburbs are (or are not) planned. Students review the ways in which urban scholars and practitioners study cities and suburbs, their research methodologies, definition of issues, and division of labor among different disciplines. Students explore the roles of individuals, communities, the private sector, and government in planning and shaping the city.
• Prerequisite: Sophomore standing or above.
• Equivalent: SOCL 2357 and URBS 2357.

POLS 2360 Politics of Poverty (4 SH)
Explores how and why there is poverty, how it affects people’s lives, and how it can be eliminated. Examines the relations between poverty, racial and ethnic factors, and the economic, political, and administrative systems. Evaluates a number of alternatives and provides an opportunity for clarifying individual assumptions and feelings about poverty.
• Equivalent: AFAM 2360.

POLS 2368 Music and Politics (4 SH)
Explores the role of music in politics and the extent to which songs and their performers shape, frame, or otherwise influence political thought among audiences and listeners. Emphasizes contemporary themes and genres, with particular attention to protest songs. Examples are taken both from the United States and abroad.
• Prerequisite: Sophomore standing or above.

POLS 2370 Religion and Politics (4 SH)
Explores the role of religion to domestic and international politics. Examines religion as a source of political tension and strife. Draws examples from the United States and the developing world. Covers Islamic fundamentalism in Africa and the Near East, Orthodox Jewish parties in Israel, Catholic liberation theology in Latin America, and Protestant fundamentalism and the religious right in the United States.
• Prerequisite: POLS 1150, POLS 1155, or INTL 1101.
• NU Core: Comparative study of cultures.

POLS 2375 Gender and Politics (4 SH)
Explores the relation between what is and what ought to be-and why-in the roles of women in American politics. Examines the traditional roles of women in politics, the suffrage movement, the woman as citizen and voter, the role of gender in achieving power and in political efficacy, and the place of women in politics. Also covers political action to promote women’s issues and modern feminism.
• NU Core: Comparative study of cultures.

POLS 2380 Latino Politics in the United States (4 SH)
Focuses on the largest minority in the United States, Latinos. Explores the unique aspects of this group within the U.S. political system in addition to shared experiences with other minority groups, particularly African Americans. Topics include bilingualism, immigration, relations with other racial and ethnic groups, and relations with other countries of origin.
• NU Core: Comparative study of cultures.

POLS 2385 U.S. Health and Welfare Policy (4 SH)
Introduces students to U.S. social welfare policy. Emphasizes contemporary debates over welfare, mental health, healthcare, education, and Social Security reform. Examines key issues and processes related to the politics, design, and implementation of public policy in the context of the American governmental system. Incorporates multiple media and methods of instruction into the course, including lectures, in-depth class discussions, and documentary films.
• NUpath: Understanding societies and institutions, engaging difference and diversity.

POLS 2390 Science, Technology, and Public Policy (4 SH)
Considers the role of science and technology in the policymaking process, not only as a tool but also as a subject of policymaking. Cases include government involvement in innovation and economic growth, the role of the military in the development of science and technology, the governance and regulation of the effects of scientific and technological progress, public funding of science and technology, and ethical aspects of science and technology, including the emerging focus on anticipatory and participatory governance.
POLS 2395 Environmental Politics and Policy (4 SH)
Examines the political forces, governmental institutions, socioeconomic factors, and global trends that shape environmental policy at national and subnational levels in the United States. A spectrum of different environmental issues is discussed, with some comparison of policy activity in the U.S., other nations, and at the global level.
• NUpath: Understanding societies and institutions.

POLS 2399 Research Methods in Political Science (4 SH)
Examines the range of research methods and designs used in political science, based on applying the logic of social scientific inquiry. Reviews experimental research, comparative methods, case studies, interviewing, surveys, program evaluation, and other topics relevant to the discipline, as well as questions related to the practice of research ethics. Course activities include intensive writing assignments by students.
• Prerequisite: (a) At least two of the following courses: POLS 1150, POLS 1155, and POLS 1160 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

POLS 2400 Quantitative Techniques (4 SH)
Studies methods of quantitative analysis including descriptive statistics, hypothesis testing, cross-tabulation, analysis of variance, bivariate regression and correlation, and multiple regression. Examines how to generate and interpret statistical findings through use of Excel, SPSS, and/or other software programs. Uses examples from political behavior, public policy analysis, public opinion, comparative and international politics, and other areas of political and social-science inquiry to emphasize practical applications.
• Prerequisite: MATH 1213, MATH 1215, MATH 1231, MATH 1241, MATH 1251, or MATH 1341.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.
• Equivalent: CRIM 3700, INSH 2104, and SOCL 2320.

POLS 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

POLS 3100 Gender, Social Justice, and Transnational Activism (4 SH)
Introduces issues, themes, and debates in feminist transnational theory, practice, and activism in contemporary contexts and how it has changed under the processes of globalization. Examines differences among women relating to race, class, sexuality, national identity, and political economy in reckoning with possibilities for sustainable social justice. Students interrogate the relationship between the local and global; the production of knowledge in different regions; the pragmatics of political mobilization; the varying contours of “social justice”; and other issues. Offers students an opportunity to discuss the impact of globalization, neoliberalism, and intimate violence on gendered politics and relations and to contend with the politics of difference, to debate its challenges, and to imagine possible futures for transnational gender justice.
• Cross-list: SOCL 3100 and WMNS 3100.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: SOCL 3100 and WMNS 3100.

POLS 3160 Campaign Strategy (4 SH)
Introduces students to the art of political campaigning in primary or general elections. Utilizes a case-study format to approach various aspects of campaign strategy by analyzing successful and unsuccessful campaigns.
• Prerequisite: POLS 1150.

POLS 3162 Local Campaigns and Elections (4 SH)
Introduces students to the politics of local campaigns and elections. Studies the history of local electoral systems. Utilizing outcomes of recent local elections, offers students an opportunity to analyze the role of voting behavior, campaign strategies, and money in shaping local campaigns and elections.
• Prerequisite: POLS 1150.

POLS 3300 The U.S. Congress (4 SH)
Explores the structures, dynamics, and styles inherent in public policymaking within the U.S. Congress. Focuses on elections; representations of constituents’ interests; the roles that participants play: the president, interest groups, and others; and how all of this is affected by the structure of Congress and the process embedded in the legislative body.
• Prerequisite: POLS 1150.
POLS 3302 Judicial Process and Behavior (4 SH)
Examines the nature of the judiciary in the United States. Focuses on courts and various aspects of the judicial process, including judicial selection, judicial decision making, the impact of judicial decisions on society, and public opinion of courts. After exploring, from various methodological perspectives, how and why courts behave as they do, the course turns its attention to questions about the role of courts in U.S. politics.
• Prerequisite: POLS 1150.

POLS 3304 Presidential Nominating Process (4 SH)
Offers students an in-depth examination of the process the two major American parties use to nominate their presidential candidates. Major topics include the history and evolution of the presidential nomination process; the contemporary rules regime; the behavior of candidates, voters, and the media; vice presidential selection; the role of the national conventions; and prospects for reform.
• Prerequisite: POLS 1150 or permission of instructor.

POLS 3305 The American Presidency (4 SH)
Examines the presidential nomination and election processes and the constitutional and extra-constitutional powers of the U.S. president. Focuses on psychological “character types” of presidents as well as the concept of “presidential power.” Considers constitutional and extra-constitutional issues related to presidential disability and succession.
• Prerequisite: POLS 1150.

POLS 3307 Public Policy and Administration (4 SH)
Analyzes the structure of and dynamics inherent in public policymaking and public administration in the United States. Introduces such concepts as problem definition, agenda development, policy formation, program implementation, and policy evaluation. Covers key issues in public administration including budgeting, personnel, and organizational design.
• Prerequisite: POLS 1150.

POLS 3309 Lesbian, Gay, Bisexual, and Transgender Issues in Public Policy (4 SH)
Examines the politics and public policies of the movement for equality and social justice for lesbian, gay, bisexual, and transgender (LGBT) people in a wide range of state and federal policy areas such as same-sex marriage, military service, family adoption rights, and employment discrimination protection. Reviews the political history of LGBT communities and the treatment of LGBT people since the 1920s in the United States and globally. Analyzes the policy debates by considering voting behavior, trends in public opinion toward LGBT issues, and the political incorporation of LGBT people in the United States and around the world.
• Prerequisite: POLS 1150 or permission of instructor.

POLS 3310 Public Opinion, Voting, and Elections (4 SH)
Analyzes how Americans think about politics, how they vote, and how the rules of the U.S. electoral system affect electoral outcomes. Major topics include the nature and content of public opinion, mass partisanship, issues and issue voting, presidential and congressional elections, turnout and participation, campaign finance, and recent trends in U.S. electoral behavior.
• Prerequisite: POLS 1150.

POLS 3315 Interest Groups and Public Policy (4 SH)
Surveys the roles of organized interests in American public policymaking. Examines why groups are formed, how they work, why they succeed or fail, and what cumulative impacts groups have on policy. Spans a variety of groups, from the traditional economic interests to social movements, public interest organizations, and professional lobbyists.
• Prerequisite: POLS 1150.

POLS 3320 Politics and Mass Media (4 SH)
Analyzes several facets of the mass media: the role of newspapers, radio, television, and the Internet in public opinion formation; their use and effectiveness in political campaigns; their objectivity and/or bias in reporting the news; and their impact on public policymaking.
• Prerequisite: POLS 1150.

POLS 3324 Law and Society (4 SH)
Examines the sociological understanding of legal phenomena. Places special emphasis on the role of the law in cultural and social conflicts in American society.
• Prerequisite: Junior or senior standing.

POLS 3402 Survey Research and Polling (4 SH)
Teaches how to conduct data collection via survey research including research design, sampling, survey instrument construction, and interviewing. Emphasizes survey research in the social and behavioral sciences, culminating in a survey conducted by the class.
• Prerequisite: POLS 2400 or similar course in statistics recommended.
• NUpath: Analyzing and using data.
**POLS 3405 International Political Economy (4 SH)**
Addresses international political economy and how we can understand the phenomenon of globalization. Introduces the interaction between international politics and international economics in industrial countries and in developing countries. Covers several theoretical approaches to international political economy. Then analyzes some of the classic issue areas of international trade relations; foreign direct investment and outsourcing; the international monetary and financial system and the role of international institutions; debt and financial crises; and poverty and inequality. Concludes with analysis of how international political economy issues relate to governance, development, and the politics of economic reform.

- **Prerequisite:** POLS 1160 (may be taken concurrently) and sophomore standing or above.

**POLS 3406 International Law (4 SH)**
Introduces international law and how it redefines and shapes world politics. Offers students an opportunity to learn about the cornerstones of this area of the law: the state, organizations and their legal personality, diplomatic relations, treaties, extraterritorial jurisdiction, extradition, human rights and humanitarian law, the law of the sea trade/economic law, and international criminal law with a focus on the world courts. Considers the degree to which international law is pervasive in the life of individuals and states alike.

- **Prerequisite:** POLS 1160 and junior or senior standing.
- **Equivalent:** POLS 4510.

**POLS 3407 International Organizations (4 SH)**
Explores the powers, functions, and effectiveness of international institutions in the context of the growing interdependence of states. Examines international organizations such as the United Nations and European Union in their roles as part of international regimes that address issues such as international security, the international political economy, and human rights.

- **Prerequisite:** POLS 1160.

**POLS 3408 International Security (4 SH)**
Examines pressing problems in international security that are on the agenda of nation-states and international and nongovernment organizations. Examples include armed violence, terrorism, organized crime, nuclear proliferation, poverty, infectious diseases, energy security, and environmental degradation. Responses are typically sought through international cooperation and the establishment of international norms that apply to complex problems reaching beyond the borders of any one state.

- **Prerequisite:** POLS 1160.
- **NUpath:** Understanding societies and institutions.

**POLS 3409 Global Governance (4 SH)**
Introduces the concept of global governance, summarizes the core architectural elements of global governance, and examines the key policy purposes and processes, as well as the principal challenges that affect international security. Prior to the creation of the United Nations, global governance hardly existed—relations among states were largely characterized by power politics, and international cooperation was circumscribed to a few areas. Since the foundation of the United Nations, ever denser networks of international regimes were formed encompassing security policy, trade, finance, environment, human rights, the oceans, and diplomacy and covering all aspects of the life of states, which affects and alters international relations.

- **Prerequisite:** POLS 1160 or permission of instructor.

**POLS 3410 Nontraditional Security Issues (4 SH)**
Focuses on nontraditional security issues and the importance of moving toward sustainability in a finite world. Emphasizes the challenge of balancing limited energy options, powerful negative externalities, and potentially unlimited energy demand. Using sustainability as a central theme, examines policies affecting such areas as water, food, and energy security. Considers the environmental, political, institutional, economic, and social contexts that delimit possible policy options, both nationally and internationally.

- **Prerequisite:** Junior or senior standing.

**POLS 3412 Homeland Security Policy and Politics (4 SH)**
Examines the issues surrounding homeland security and U.S. policy responses since the attacks of September 11, 2001. Examples include terrorism, cyber-attacks, natural and man-made disasters, infectious diseases, immigration, civil liberties, and infrastructure and community resilience. Emphasizes the evolution in strategy and organization for confronting threats along and within U.S. borders.

- **Prerequisite:** (a) POLS 1150 or POLS 1160 and (b) sophomore standing or above.

**POLS 3413 Strategies of Conflict in International Relations (4 SH)**
Examines concepts and strategies in international conflict. Utilizing theories of international relations and game theory, analyzes major concepts in international conflict, the logic of state preference, and interstate competition. Offers students an opportunity to conduct conceptual and empirical examinations of different types of conflict, including manifestations of war, sanctions, and diplomacy. Introduces strategies and tactics in diplomacy, international negotiation, and bargaining from a practical and theoretical perspective.
POLS 3415 Ethnic Political Violence (4 SH)
Analyzes the causes and consequences of contemporary ethnic political violence. Uses historical case studies and current events to provide students with examples and context. Analyzes and applies various strategies for conflict resolution.
• Prerequisite: POLS 1155 or POLS 1160.
• NU Core: Comparative study of cultures.

POLS 3418 Nationalism (4 SH)
Explores contending theories of identity and nationalism—a powerful force in international and domestic politics. Examines topics such as the process of identity creation, the choice of national symbols, how group boundaries are established, the role of identity in conflict and state building, and the debate over nationalism’s constructed or primordial nature.
• Prerequisite: POLS 1155 or POLS 1160; sophomore standing or above.
• NU Core: Comparative study of cultures.
• NUpath: Interpreting culture, understanding societies and institutions.

POLS 3420 U.S. National Security Policy (4 SH)
Analyzes U.S. national security policy, with an emphasis on traditional and nontraditional threats, including threats from state and nonstate actors. Studies the national security policy process with special attention to developing countermeasures as well as resilience.
• Prerequisite: POLS 1155 or POLS 1160.

POLS 3423 Terrorism and Counterterrorism (4 SH)
Examines some of the core debates over terrorism and counterterrorism. Topics include what constitutes terrorism, why people become terrorists, which targets they attack, whether nuclear terrorism is a serious threat, the extent to which terrorism helps the perpetrators, and their motives. From there, the course introduces the student to viable counterterrorism strategies.
• Prerequisite: POLS 1150, POLS 1155, POLS 1160, or permission of instructor.

POLS 3425 U.S. Foreign Policy (4 SH)
Examines the formulation and conduct of U.S. foreign and national security policy, with major emphasis on the period following the end of the Cold War.
• Prerequisite: POLS 1150 or POLS 1160.

POLS 3427 Civil-Military Relations (4 SH)
Studies the major themes and concepts of civil-military relations. Introduces the main theories of civil-military relations to provide context for analyzing the state of this relationship in democratic, nondemocratic, and transitional states. Topics include military professionalism, praetorianism, the role of the military in civil society, and challenges faced in multiethnic states and different threat environments.
• Prerequisite: POLS 1155.

POLS 3429 U.S. Foreign Policy (4 SH)
Examines U.S. foreign policy, with an emphasis on traditional and nontraditional threats, including threats from state and nonstate actors. Studies the U.S. foreign policy process with special attention to developing countermeasures as well as resilience.
• Prerequisite: POLS 1155 or POLS 1160.

POLS 3440 Politics in Northern Ireland (4 SH)
Examines contemporary politics in Northern Ireland and the Republic of Ireland. Emphasizes the conflict in Northern Ireland with particular attention paid to the roles played by the United States and Great Britain. Considers lessons for other countries.

POLS 3442 Europe and Its Eastern Neighborhood (4 SH)
Focuses on the competing interests of the European Union (and NATO) and Russia that dominate the politics of Eastern Europe. As EU interests expand farther eastward, Russia seeks to establish a sphere of influence to its west and south. States in an emerging buffer zone (Georgia, Ukraine, Azerbaijan, Moldova, and Belarus) find themselves competing for influence between Eastern and Western powers. The EU must balance its energy dependence on Russia, its need for new markets, and geopolitical stability in Eurasia with its concern for human rights, democratic governance, and self-determination. What trade-offs are implicit in Europe’s Eastern policy? What are the best policy approaches? What are the main opportunities and obstacles in a newly divided Europe?
• Prerequisite: POLS 1155, POLS 1160, or permission of instructor.
• NU Core: Comparative study of cultures.

POLS 3445 Politics in Central and Eastern Europe (4 SH)
Studies the six former Soviet bloc socialist countries, as well as Albania and Yugoslavia, and examines political, economic, social, and international problems of postcommunist development.
• Prerequisite: POLS 1155.
• NU Core: Comparative study of cultures.
POLS 3450 Government and Politics in Russia (4 SH)
 Presents an analysis of the roots of the collapse of the Soviet Union in 1991 and studies problems of political development after communism. Emphasizes the introduction of democracy, the movement toward a market economy, the reorganization of the military, and the control of interethnic strife.
 • Prerequisite: POLS 1155.
 • NU Core: Comparative study of cultures.

POLS 3455 Russian Foreign Policy (4 SH)
 Presents an analysis of the goals, methods, and achievements of Russian policy in the post-Soviet era toward Eastern Europe, Western Europe, the Middle East, Central and East Asia, and the United States against the background of Soviet behavior toward these areas in the recent past.
 • Prerequisite: POLS 1155 or POLS 1160.

POLS 3457 Transatlantic Relations (4 SH)
 Introduces a range of issues and questions surrounding transatlantic relations by providing an overview of the key theoretical frameworks within which transatlantic relations can be made intelligible (such as concepts of power, hegemony, empire). Offers students an opportunity to develop the ability to critically reflect on the nature, scope, and implications of relations between the United States and Europe.
 • Prerequisite: POLS 1160.

POLS 3460 Contemporary Government and Politics in Africa (4 SH)
 • Prerequisite: Sophomore standing or above.
 • NU Core: Comparative study of cultures.
 • Equivalent: AFRS 3460.

POLS 3465 Government and Politics in the Middle East (4 SH)
 Examines political, economic, military, and ideological factors within the Arab states and Israel, inter-Arab politics, pan-Arabism, the Arab-Israeli conflict, and the great power rivalry in the region.
 • Prerequisite: POLS 1155.
 • NU Core: Comparative study of cultures.
 • NUpath: Understanding societies and institutions.

POLS 3470 Arab-Israeli Conflict (4 SH)
 Explores the history and politics of the Arab-Israeli conflict, examining the origins of the conflict, its development over time, the key events that have shaped it, and the different narratives and perceptions of these events. Offers students an opportunity to learn about the conflict from the emergence of Zionism and Arab nationalism up to present day. Emphasizes the Israeli-Palestinian dimension of the conflict.
 • Prerequisite: POLS 1160.

POLS 3475 Government and Politics in Latin America (4 SH)
 Focuses on political change in governmental systems, political parties, socioeconomic problems, and foreign policies of Latin American states.
 • Prerequisite: POLS 1155.
 • NU Core: Comparative study of cultures.

POLS 3480 Government and Politics in Japan (4 SH)
 Focuses on the development of Japan’s political system since World War II. Examines Japan’s political institutions and practice of democracy in the context of its political culture; the interrelationship between business and government; and Japan’s foreign policy and security issues. Raises issues concerning Japan’s economic success and the limitations of Japan as a model for other countries.
 • Prerequisite: POLS 1155.
 • NU Core: Comparative study of cultures.

POLS 3482 East Asian Politics (4 SH)
 Examines the politics of East Asian societies as they cope with a variety of challenges. Focuses on economic development, environment, energy, and security in Japan, China, and the Koreas.
 • Prerequisite: POLS 1155.

POLS 3485 China: Governance and Foreign Policy (4 SH)
 Focuses on China’s political system and the major issues confronted: leadership recruitment and succession, economic policies and development, class and class struggle, political culture and socialization, human rights, civil society, the media, and both internal and external security concerns. Examines how ideology, development, culture, and the pursuit of China’s national interest affect governance.
 • NU Core: Comparative study of cultures.

POLS 3487 Politics of Developing Nations (4 SH)
 Examines the political, governmental, social, economic, cultural, environmental, and geopolitical dimensions of change in nations regarded as “developing” by international standards. Covers a broad spectrum of types of nations including those in Eastern and Central Europe but pays particular attention to those in Asia, Africa, and Central and South America.
 • Prerequisite: POLS 1155 or INTL 1101.
 • NU Core: Comparative study of cultures.
POLS 3490 Democracy in Comparative Politics (4 SH)
Assesses the development of democracy in a variety of nations and examines the fundamental problems facing nations in establishing and maintaining democratic forms of government. Explores ways to evaluate democratic institutional performance and the difficulties inherent in making the transition from nondemocratic to democratic systems.
• Prerequisite: (a) POLS 1150 or POLS 1155 and (b) junior or senior standing.
• Equivalent: POLS 4515.

POLS 3496 International Relations and Sports (4 SH)
Examines international sports competitions and sports events from the perspective of international relations theory. Explores the process of sports diplomacy; global sports governance; and specific issues such as amateurism, competition hosting, doping, and women in sports. Considers the Olympic Games and other relevant illustrations.
• Prerequisite: POLS 1160.
• NUpath: Interpreting culture, understanding societies and institutions.

POLS 4500 U.S. Constitutional Law (4 SH)
Uses U.S. Supreme Court decisions and other reading materials to analyze theoretical, structural, and substantive issues inherent in, and relevant to, the American constitutional system.
• Prerequisite: POLS 1150 and junior or senior standing.
• NUpath: Understanding societies and institutions.

POLS 4505 U.S. Civil Liberties (4 SH)
Uses United States Supreme Court decisions and other reading material to examine the substantive and procedural guarantees of the Bill of Rights and the Fourteenth Amendment and their relation to a liberal democratic society.
• Prerequisite: POLS 1130 and junior or senior standing.

POLS 4575 Special Topics: U.S. Politics (4 SH)
Analyzes the constitutional, political, economic, and societal dimensions of selected contemporary public issues in U.S. politics.
• Prerequisite: POLS 1150 and junior or senior standing.
• Repeatability: May be repeated without limit.

POLS 4580 Special Topics: Comparative Politics and International Relations (4 SH)
Analyzes the constitutional, political, economic, and societal dimensions of selected contemporary public issues in comparative politics and international relations.
• Prerequisite: (a) POLS 1155 or POLS 1160 and (b) junior or senior standing.
• Repeatability: May be repeated without limit.

POLS 4620 Literature and Politics (4 SH)
Uses a variety of fictional readings to gain fresh insight into basic political concepts such as power, leadership, socialization, corruption, and electoral competition. Attention is also given to contemporary issues ranging from minority rights to tobacco control, abortion, or gun control.
• Prerequisite: Junior or senior standing.

POLS 4701 Political Science Senior Capstone (4 SH)
Integrates and assesses the concepts and skills developed by students throughout the political science curriculum, including both experiential and classroom-based components. Requires extensive reflection by students on their various educational experiences as well as research projects involving individual and group presentations. Topics include contemporary political issues and relevant literature in the discipline of political science. Consideration is also given to career options for political science students. Required for political science majors and fulfills part of the experiential education requirement.
• Prerequisite: Senior standing; political science majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

POLS 4702 Senior Thesis Preparation (4 SH)
Offers students an opportunity to conduct a significant research project under faculty supervision on a topic within the discipline of political science. Research question is formulated and analyzed through data gathering and a review of relevant literature in political science and related fields. This is the first semester of research for the senior thesis.
• Prerequisite: Junior or senior standing; political science majors and combined majors only.

POLS 4703 Senior Thesis (4 SH)
Continues POLS 4702. Offers students an opportunity to conduct a significant research project under faculty supervision on a topic within the discipline of political science. Research question is formulated and analyzed through data gathering and a review of relevant literature in political science and related fields.
• Prerequisite: POLS 4702 and and junior or senior standing; political science majors and combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
POLS 4910 Model United Nations (4 SH)
Introduces students to model simulations as a means of learning about international relations, diplomacy, and international organizations. Offers students an opportunity to conduct research and represent countries in current and historical simulations of the United Nations, U.N. organizations/agencies, regional international organizations, and joint cabinet crisis scenarios. Participating students have an opportunity to be selected for an off-campus competitive conference experience.
• NU Core: Experiential learning.
• NUpath: Engaging difference and diversity, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

POLS 4915 Model Arab League (4 SH)
Offers students an opportunity to participate in teams that research assigned nations and represent those nations in a model Arab League role-playing exercise. Students may be selected to represent Northeastern University at the regional or national Model Arab League conferences in Washington, D.C., and different states.
• NU Core: Experiential learning.
• NUpath: Understanding societies and institutions, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

POLS 4917 Model European Union (4 SH)
Offers students the opportunity to participate in teams and conduct research on political issues in assigned nations and then represent those nations in a model European Union role-playing exercise.
• NU Core: Experiential learning.
• Repeatability: May be repeated without limit.

POLS 4918 Model NATO (4 SH)
Offers students an opportunity to participate in teams that research assigned nations and represent those nations in a model role-playing exercise of the North Atlantic Treaty Organization (NATO). Students may be selected to represent Northeastern University at the National Model NATO program in Washington, D.C.
• Prerequisite: POLS 1160.
• NU Core: Experiential learning.
• NUpath: Understanding societies and institutions, integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 2 times.

POLS 4937 Dialogue of Civilizations: Government and Politics Abroad (4 SH)
Examines government and politics in another country or region of the world through faculty-led travel to that country or region. Offers students an opportunity to enhance their knowledge of government and politics by attending and participating in various educational activities in the country of study. The course begins in the United States with an introduction to the country or region and concludes with activities that facilitate reflection and learning related to the experience abroad.
• NUpath: Understanding societies and institutions, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

POLS 4938 Dialogue of Civilizations: International Politics Abroad (4 SH)
Examines issues in international politics through faculty-led travel outside the United States. Offers students an opportunity to enhance their knowledge of international politics by attending and participating in various educational activities in another country. Course topics cover a range of interconnected global issues that go beyond states’ borders, possibly including armed conflict, terrorism, organized crime, poverty, environmental degradation, the spread of nuclear weapons, and others. The course begins in the United States with an introduction to the relevant topics in international politics and concludes with activities that facilitate reflection and learning related to the experience abroad.
• NUpath: Understanding societies and institutions, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

POLS 4942 Internship in Politics (4 SH)
Gives students the opportunity to engage in a political or governmental internship under the supervision of a faculty member with departmental approval.
• Prerequisite: 64 SH toward degree.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.
POLS 4944 Student Leadership Practicum (4 SH)
Considers how undergraduate students make pivotal contributions to governance, services, and the quality of daily life at Northeastern University through student government and other activities, ranging from residential services to publication of the campus newspaper. Gives students involved in such on-campus leadership roles an opportunity to participate in a course-based seminar related directly to their service. The objective is to incorporate student leadership into the general framework of experiential education by such means as reflective discussions, meetings with University administrators, group projects, and exposure to academic perspectives on leadership. As part of this practicum, students participate in parts of the “President’s Leadership Institute,” a module-based exploration of leadership principles within both educational and community settings.
• NU Core: Experiential learning.

POLS 4947 Campaign and Elections Practicum (4 SH)
Offers students an opportunity to work on local and statewide political campaigns under the supervision of a member of the faculty and a campaign staff member. Students research the political climate and recent historical details of a campaign’s geographic area; apply facts, information, and campaign strategy to the process of campaigning; and discuss progress of their campaign experience in class sessions. Requires students to produce pre- and postelection analysis and reflection papers.
• Prerequisite: POLS 3160 or POLS 3162.
• NU Core: Experiential learning.
• NUpath: Exploring creative expression and innovation, integrating knowledge and skills through experience.
• Repeatability: May be repeated once.

POLS 4948 Community-Based Research Practicum (4 SH)
Involves students in applied social research projects that are defined in partnership with local civic, public affairs, and social service groups. Students collaborate on a final report that is presented to the community partner at the end of the course.
• NU Core: Experiential learning.
• Equivalent: IDSC 4949.

POLS 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• NU Core: Writing intensive in the major.
• Repeatability: May be repeated without limit.

POLS 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: POLS 4970.
• Repeatability: May be repeated without limit.

POLS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated once.

POLS 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior or senior standing.
• Repeatability: May be repeated without limit.

POLS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

POLS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

POLS 5101 Special Topics in Politics and Political Science (3 SH)
Examines current issues and special topics in the areas of political science, politics, and public affairs.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated up to 3 times.

POLS 5976 Directed Study (1 to 4 SH)
Offers assigned reading under the supervision of a faculty member.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

POLS 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

POLS 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
POLS 6400 Planning Module in Urban and Regional Policy (1 SH)
Relates a professional activity to urban and regional planning.
• Repeatability: May be repeated without limit.

POLS 6525 Institutions and Public Policy (3 SH)
Blends theoretical literature and case studies to examine problems of policymaking and governance in contemporary political systems, emphasizing the policy impacts of political institutions. Studies systematic variations across types of political institutions and regimes in developed and developing nations and extends beyond the nation-state to address policy dynamics (e.g., harmonization, multilevel governance) in supranational and international systems. Establishes the broader political system contexts within which policy formation and implementation reside. Offers students an opportunity to learn to analyze, synthesize, and apply a range of theoretical literatures relevant to policy design and impact.
• Cross-list: PPUA 6525.
• Equivalent: PPUA 6525.

POLS 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

POLS 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

POLS 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

POLS 7200 Perspectives on Social Science Inquiry (3 SH)
Explores the philosophy of science and the scientific method as applied to the social sciences and political analysis. Considers individualist perspectives (that is, rational choice), group perspectives (pluralism), structural/institutional perspectives (class analysis), and postmodern critiques.

POLS 7201 Research Design (3 SH)
Provides an overview of research methods and tools used by social scientists including survey research, elite interviews, statistical approaches, case studies, comparative analysis, use of history, and experimental/nonexperimental design.

POLS 7202 Quantitative Techniques (3 SH)
Teaches the use of social science quantitative techniques, emphasizing applications of value to public sector analysts and scholars alike. Includes descriptive statistics, hypothesis testing, cross-tabulation, bivariate regression and correlation, and multiple regression. Examines how to generate and interpret statistical analyses through use of SPSS.

POLS 7204 Seminar in Public Policy (3 SH)
Concentrates on the scope of the study of public policy, disciplinary contributions to policy analysis and the study of public policy, methods of policy analysis, and models of policy processes.
• Equivalent: SOCL 7293.

POLS 7205 Seminar in American Government and Politics (3 SH)
Focuses on major research approaches and corresponding academic literature in U.S. politics. Examines the scholarly analysis of key actors in U.S. politics, including the presidency, Congress, the judiciary, and political parties.

POLS 7206 Seminar in Comparative Politics (3 SH)
Focuses on major research paradigms within comparative politics, including political culture, structuralism, and rational choice. Examines major research fields in the discipline, including democratization, nationalism, ethnic politics, political economy, and political parties.

POLS 7207 Seminar in International Relations (3 SH)
Focuses on major research approaches and corresponding academic literature in international relations. Examines major fields of study, including international security, international regimes, international organizations, globalization, and international political economy.

POLS 7215 Advanced Quantitative Techniques (3 SH)
Covers multivariate statistical models and their applications to social science data. Covers the ordinary least squares (OLS) regression model and the assumptions underlying it in detail, as well as the techniques for analyzing data when OLS assumptions do not apply, such as simultaneous equation models, time series models, and maximum likelihood techniques for limited and discrete dependent variables. This is a second-semester course in quantitative techniques for graduate students in the social sciences.
• Prerequisite: POLS 7202 or SOCL 7210.
• Equivalent: SOCL 7215.

POLS 7216 Applied Cases in Advanced Quantitative Methodology (3 SH)
Introduces special topics and techniques in advanced statistical analysis and related research methodologies for students preparing for administrative and analytical positions in nonacademic settings. Focuses on case-study material with an applied orientation to examine such topics as index creation, demographic analysis, administrative “report cards,” content analysis, program evaluation, survey research and sampling, and planning methodology.
• Prerequisite: POLS 7202 or equivalent.
POLS 7250 American Political Institutions and Processes (3 SH)
Analyzes the constitutional system and national government institutions, focusing on the executive, legislative, and judicial branches. Examines political parties and pressure groups and their role in the policy process.

POLS 7251 Congress and Policy (3 SH)
Assesses the role of Congress in making public policy. Examines the impacts of congressional elections, the structure of the legislative branch, and the effects of other actions (the president, mass media, or interest groups) on legislative branch behavior.

POLS 7252 The American Presidency (3 SH)
Studies the institutional and personal factors that affect the exercise of presidential power as well as the development of constitutional and extraconstitutional presidential powers. Examines the role of the president in formulating and executing domestic and foreign policy.

POLS 7253 American Constitutional History and Theory (3 SH)
Examines American constitutional history, with a particular interest in constitutional change. Examines how the Constitution was written and amended, and how the Supreme Court has interpreted the Constitution over time. Also focuses on how the Constitution serves as an instrument of popular power and a symbol of political ideals.

POLS 7254 Campaigns and Elections (3 SH)
Studies campaign tactics and strategies as well as classic and contemporary scholarly literature on elections.

POLS 7255 American Political Parties and Elections (3 SH)
Focuses on American political parties and includes analyses of party organizations and decision-making systems, leader/activist differences in policy and ideology, party reform, policy commitments, campaign finance, media, voting behavior, and an overview and assessment of contemporary elections and campaigns.

POLS 7257 The U.S. Judicial Process (3 SH)
Studies the judicial process in the United States, emphasizing federal courts. Focuses on theories and empirical research regarding judicial decision making, how and why judges decide what they do, and with what political effects.

POLS 7258 Interest Groups and Social Movements (3 SH)
Surveys the role of interest groups and social movements. Emphasizes the factors motivating elites and ordinary members to organize and participate in collective action.

POLS 7280 Ancient and Medieval Thought (3 SH)
Focuses on the development of political thought from Greek antiquity to the early modern period utilizing both historical and analytical approaches. Considers the cultural, social, and intellectual context within which political theories develop.

POLS 7281 Modern Political Thought (3 SH)
Examines political thought from the early modern period to the twentieth century. Considers the cultural, social, and intellectual context within which political theories develop.

POLS 7282 Contemporary Political Thought (3 SH)
Explores the main currents of political thought during the twentieth century, with emphasis on the relations between political theory, philosophy, and political science.

POLS 7283 Trends in American Political Thought (3 SH)
Examines intellectual concepts and movements that have informed and influenced American political life from the Revolutionary period to the present, with emphasis on those ideas that animate the making of public policy.

POLS 7312 Intergovernmental Relations (3 SH)
Offers an institutional-behavioral analysis of the changing relationship among the various levels of American government-national, state, and local-relating the pattern of change to the social and economic forces that underlie it.

POLS 7313 State Government (3 SH)
Appraises the problems of contemporary state government in the United States. Emphasizes the diversity of political institutions, political processes, and public policies in the states.

POLS 7314 Urban Government and Politics (3 SH)
Explores issues and problems in urban government, such as legal dependence, government finance and administration, rapid growth of suburban and metropolitan areas, and decline and decay of the central city.

POLS 7319 Business/Government Relations (3 SH)
Extensively examines the relationship between the United States government and the private economy from an historical and a contemporary perspective. Analyzes a number of public policy areas in which public and private actors interact. Examines stabilization policy, regulation, antitrust, and social welfare policy in the context of alternative interpretations of the United States political economy.

POLS 7325 Contemporary Issues in Third World Development (3 SH)
Examines the major themes in development studies today. Explores approaches to the development and production, population growth, equity and poverty, rural and urban development, health and nutrition, education, and the international context of development assistance. Students considering a development administration concentration should try to take this course as their first in the field of development.
POLS 7331 Environmental Policy and Politics (3 SH)
Explores debates surrounding the making of environmental policy in the United States and other nations. Examines the nature of environmental problems, how the structures of political systems affect policymaking, and the competing interests at work in environmental politics. Also discusses environmental policy in cross-national and international perspectives.

POLS 7332 Gender and Politics (3 SH)
Explores the relationship between gender and politics from cross-national perspectives with a focus on major policy issues, such as women’s political equality, reproductive rights, sports, sex trafficking, and the welfare state. Emphasizes how policies based on democratic principles premised on individual equality, compared to those based on group differences, generate opportunities or obstacles for women’s political inclusion.

POLS 7333 Science, Technology, and Public Policy (3 SH)
Discusses the impacts of breakthroughs in science and technology on politics and public policy making—and how politics in turn influences scientific research and technological development. Examines differences between scientific and democratic values, competing definitions of rationality, the nature of problems, policy-making processes, questions of intellectual property rights, and debates over risk assessment, including the “precautionary principle.” Focuses primarily on the United States but with comparisons to the European Union and other areas of the world. Anchors discussion in such areas as (for example) biotechnology, nanotechnology, alternative energy sources, and artificial intelligence.

POLS 7334 Social Networks (3 SH)
Offers an overview of the literature on social networks, with literature from political science, sociology, economics, and physics. Analyzes the underlying topology of networks and how we visualize and analyze network data. Key topics include small-world literature and the spread of information and disease.

* Prerequisite: CRIM 7205, ECON 5105, POLS 7202, SOCL 7215, or permission of instructor.

POLS 7336 Social Capital and Resilience (3 SH)
Examines the role of social capital as in trust, governance, and economics. Focuses on networks and connections in disasters and resilience around the world.

* Cross-list: PPUA 7336.
* Equivalent: PPUA 7336.

POLS 7341 Security and Resilience Policy (3 SH)
Examines the post-9/11 evolution of security and the new emphasis on bolstering societal, infrastructure, system, and network resilience. Emphasizes the complex organizational; jurisdictional (international, federal, state, and local); private-sector; and civil-society issues associated with managing the risk of terrorism, cyber-attacks, and naturally occurring disasters. Topics include policy development and implementation of critical infrastructure protection, cybersecurity, supply chain security, disaster management, and community resilience.

* Corequisite: POLS 7342 required for students in the College of Engineering and students in the MS program in security and resilience.

POLS 7342 Security and Resilience Studies Toolkit (1 SH)
Develops and applies theories, concepts, and policies in security and resilience studies. Requires students to complete assignments pertaining to security and resilience supplementary to existing course material.

* Repeatability: May be repeated up to 3 times.

POLS 7343 Counterterrorism (3 SH)
Examines the most important empirical and theoretical debates on counterterrorism. Analyzes the motives and strategies of key actors in the development of approaches to counterterrorism.

POLS 7344 Hard Power, Soft Power, and Smart Power (3 SH)
Examines different forms of power in an international context. Includes conceptual and empirical examinations of the various types of power, the actors who have power, and the contexts under which power is exercised.

POLS 7345 Theories and Concepts in Civil-Military Relations (3 SH)
Examines the nature of civil-military relations in a theoretical and comparative framework. Emphasizes the state of civil-military relations as having serious ramifications for state security, political stability, and democratic governance. Topics include coercion and governance, praetorianism, the role of the military in civil society, and the nature of civil-military relations in different threat environments.

POLS 7346 Resilient Cities (3 SH)
Examines the characteristics of resilient cities, especially those located in coastal regions. Investigates the capacity of cities to respond to major disruptions to their social and ecological systems. Includes extensive use of case studies, such as the 2004 Indian Ocean tsunami and Hurricane Katrina in 2005, as well as readings on cities and social systems. Offers students an opportunity to analyze an urban area and provide recommendations for improving its resilience.

* Cross-list: PPUA 7346.
* Equivalent: PPUA 7346.
POLS 7347 Controversial Issues in Security Studies (1 SH)  
Examines important issues and challenges in security studies. Includes interaction with local and international security scholars and practitioners. Analyzes security threats and challenges in practical and theoretical terms.

POLS 7348 Strategies of Conflict in International Relations (3 SH)  
Examines different strategies and concepts in international conflict. Includes conceptual and empirical examination of the various types of conflict, including manifestations of war, sanctions, and diplomacy. Introduces students to strategies and tactics in international negotiation and bargaining.

POLS 7349 European Foreign and Security Policy (3 SH)  
Examines the main debates surrounding European foreign and security policy, from an internal, European Union (EU) perspective as well as an external, global perspective. Topics include both theory and policy. Delves into the inner workings of the EU alongside the implications for NATO.

POLS 7350 Seminar in Comparative and International Politics and Policy (3 SH)  
Highlights the nature of politics and public policy making in a comparative and global setting. Questions how policy making is affected by regime type, such as democratic or authoritarian governments. Ideology, culture, and the level of economic development are also important factors in shaping public policy. Emphasizes the role of international institutions, such as the World Bank and European Union, and the development of other transnational organizations in policy making in a global arena.

POLS 7351 Democratization and Governance (3 SH)  
Explores the post-Cold War democratic challenge to authoritarian, military, one-party, and dictatorial regimes throughout the Third World. Examines criteria for assessing the strength and success of democratization and the methods of foreign donors to promote it. Also explores the linkage between democracy and development.

POLS 7352 Democratization: Basic Approaches (3 SH)  
Examines the fundamental questions and the basic thinking that has guided approaches to the study of democratic development. Focuses on the works of such influential thinkers as Lucien Pye, Samuel Huntington, Guillermo O’Donnell, S.M. Lipset, Alfred Stepan, Robert Bates, Joseph LaPalombara, and others whose work set the parameters for study in institution building and political representation in emerging democratic societies.

POLS 7353 Comparative Democracies (3 SH)  
Reviews recent approaches to studying and understanding democratic political development in selected areas of the world. Attention is given to Africa, Latin America, Eastern Europe, and Asia in differing degrees in various years and depending on ongoing developments. Focuses on the current research on institution-building including legislative assemblies, political parties and elections, and the democratic values of elites and masses, among other things, as they impact on the process of democratic representation.

POLS 7354 Comparative Political Parties and Electoral Systems (3 SH)  
Examines the critical linkage function of political parties and elections in democratic societies. Explores materials on political parties in comparative perspective, including those in advanced democratic societies and emerging democratic nations. Focuses on the organization, coalitional nature, activities, and policymaking impact of political parties in furthering democratic ends and of electoral systems in providing different levels of political representation. Also analyzes the influence of comparative electoral arrangements and systems in shaping nature and quality of political representation.

POLS 7355 Comparative Constitutionalism (3 SH)  
Compares dimensions of American constitutional law and civil liberties with developments in courts from around the world. Key readings include cases from Canada’s Supreme Court, Germany’s Bundesverfassungsgerichts, France’s Conseil Constitutionnel, Britain’s House of Lords, South Africa’s Constitutional Court, and the European Court of Human Rights, dealing with freedom of expression, federal-state relations, church-state relations, freedom of conscience, equality and social welfare rights, and privacy and personal autonomy.

POLS 7356 Comparative Political Economy (3 SH)  
Compares national economic policies in such areas as banking regulation, taxes, welfare, environmental protection, and privatization in up to five countries each semester. Examines the impacts of the type of political system (presidential democracy, parliamentary democracy, modernizing military regime, and so on) and the organization of the central government bureaucracy on public policy choices. Countries studied include both advanced industrial nations (the United States, Britain, Japan, France, or Germany) and developing countries (Mexico, Brazil, South Korea, or India).
POLS 7357 International Political Economy (3 SH)
Addresses international political economy and how we can understand the phenomenon of globalization. Offers a graduate-level introduction to the interaction between international politics and international economics in both industrial countries and developing countries. Introduces several theoretical approaches to international political economy and analyzes some of the classic issue areas of international trade relations, such as the international monetary and financial system; foreign direct investment and multinational corporations, debt, and development; the role of international political, economic, and financial institutions; and globalization.

POLS 7359 International Law (3 SH)
Investigates the development of legal principles and norms in relation to the international political system, particularly focusing on the role and interpretation of law within the United Nations and World Court contexts. Examines issues such as sovereignty and international jurisdiction, treaty interpretation, the peaceful resolution of disputes, and the use of U.N. peacekeeping forces.

POLS 7360 Ethnic Political Conflict (3 SH)
Analyzes ethnic political violence from an international perspective. Undertakes in-depth analysis of key international examples. Focuses on causes and consequences of ethnic conflict as well as policy options for conflict resolution.

POLS 7361 U.S. National Security Policy (3 SH)
Analyzes U.S. national security policy, with emphasis on the various forms of war that threaten the United States and world security.

POLS 7362 Nationalism (3 SH)
Focuses on contending theories of nationalism and nationalist movements. Topics include cultural objectification and the establishment of group boundaries, ethnic elites and cultural hegemony, mass mobilization, intergroup socioeconomic disparities, nationalism and modernity, nationalist parties and their policy strategies, and the “constitution” of race, particularly in the Americas.

POLS 7363 Politics of Revolution and Change (3 SH)
Analyzes revolution and political change with attention to both theory and practice. Discusses revolution, major trends in contemporary politics, and the relationship between political change and technological, scientific, or social change.

POLS 7364 Terrorism, Violence, and Politics (3 SH)
Analyzes the theory and practice of terror, violence, coercion, force, and threats in political life.

POLS 7365 Totalitarianism and Oppressive Government (3 SH)
Analyzes totalitarianism and dictatorship including a study of their historical background and fundamental characteristics, as well as theories of the origin, nature, and significance of totalitarianism.

POLS 7366 Genocide in a Comparative Perspective (3 SH)
Takes an interdisciplinary approach (that is, history, political science, and sociology) to the study of genocide. Examines the meaning of the concept in historical and philosophical terms, the societal and psychological causes of genocide, and specific cases throughout history, with emphasis on more recent episodes.

POLS 7367 U.S. Foreign Policy (3 SH)
Examines the theory and practice of U.S. foreign and national security policy. Focuses on selected issues since the end of the Second World War, with emphasis on contemporary policies and challenges.

POLS 7368 International Security (3 SH)
Examines key problems in international security that are faced by nation-states and international and nongovernment organizations. Examples include armed violence, terrorism, organized crime, nuclear proliferation, poverty, and energy security. Explores responses that include international cooperation and the establishment of international norms. Analyzes related literature and theoretical perspectives.

POLS 7369 International Security (3 SH)
Examines the development of legal principles and norms in relation to the international political system, particularly focusing on the role and interpretation of law within the United Nations and World Court contexts. Examines issues such as sovereignty and international jurisdiction, treaty interpretation, the peaceful resolution of disputes, and the use of U.N. peacekeeping forces.

POLS 7370 Europe and European Union Governance (3 SH)
Surveys the institutions, processes, and value constructs that structure political, economic, military, monetary, financial, and cultural activity in Europe, with an emphasis on the effect of the European Union and the challenges it presents.

POLS 7371 Government and Politics of Central and Eastern Europe (3 SH)
Analyzes the politics of the former Soviet Bloc countries since the prospects for stable political development and successful economic growth in the postcommunist era.

POLS 7372 Government and Politics of Russia (3 SH)
Examines the roots and causes of the disintegration of the former Soviet Union. Focuses on postcommunist Russia’s development of democracy, introduction of the free market, and maintenance of interethnic peace and national unity.

POLS 7373 Government and Politics of the Middle East (3 SH)
Examines the political and economic structures of the Arab states, Iran, Turkey, and Israel as well as inter-Arab politics and interstate conflict in the area. Emphasis is on Islam and politics, gender politics, and civil society.

POLS 7374 Arab-Israeli Conflict (3 SH)
Explores the history and politics of the Arab-Israeli conflict. Examines the origins of the conflict, its development over time, the key events that have shaped it, and the different narratives and perceptions of these events. Covers the conflict from the emergence of Zionism and Arab nationalism up to the present day. Examines the entire Arab-Israeli conflict but particularly emphasizes the Israeli-Palestinian dimension of the conflict.
POLS 7379 Chinese Politics and Foreign Policy (3 SH)
Examines the impact of ideology, development, and culture on the major issues in Chinese politics since the Communist Party took control in 1949. Issues include leadership recruitment and succession, economic development, class and class struggle, political culture, education, socialist democracy, socialist legality, and the evolving definition of socialism in the context of Chinese culture. Also examines major principles and issues in China’s foreign relations, such as trade, investment, technology transfer, military and strategic policy, and China’s role in the United Nations and other international organizations.

POLS 7380 Japanese Politics and Foreign Policy (3 SH)
Examines the development of Japan’s political system since World War II. Focuses on Japan’s institutions and democratic practices in the context of political culture, the interrelationship between business, politics, and government, Japan’s foreign policy and international trade practices, as well as its business practices and media. Also looks at major social and political issues including the treatment of foreigners and minorities, the educational system, and the role of women.

POLS 7381 U.S.-East Asia Relations (3 SH)
Analyzes U.S. relations with the east Asian countries of Japan, Korea, and China. Topics include trade issues, human rights concerns, security arrangements, development and democratization, and investment and aid programs. Also discusses regional economic, trade, security, and development institutions—such as ASEAN, APEC, and ARF—as well as the role of the Asian Development Bank, the World Bank, and the International Monetary Fund in east Asia.

POLS 7382 Politics of Developing Nations (3 SH)
Considers the process of political development in the Third World including both internal and international issues such as leadership patterns, the role of the military and political parties, and underlying economic and social factors.

POLS 7383 Government and Politics of Latin America (3 SH)
Investigates contemporary Latin American politics, emphasizing formal political institutions and informal political processes under alternate national political “games,” such as traditional authoritarianism, populism, modernizing military rule, the postrevolutionary regime, and elite or mass democracy.

POLS 7384 Government and Politics of Africa (3 SH)
Compares the political systems and foreign policies of selected African nations south of the Sahara.

POLS 7385 Transatlantic Relations (3 SH)
Explores the issues and questions surrounding E.U.-U.S. relations. Offers an overview of different approaches and perspectives designed to help students to understand the transatlantic relationship. Examines specific themes and issue areas for E.U.-U.S. relations, such as those arising from the political, economic, security, foreign policy, and environmental spheres.

POLS 7386 Europe and Its Eastern Neighborhood (3 SH)
Examines competing interests of the European Union, NATO, and Russia in Eastern Europe. Offers students an opportunity to analyze Eastern European politics in many issue areas, including self-determination, democratic governance, human rights, domestic and international security, and economic growth and stability.

POLS 7387 Global Governance (3 SH)
Introduces the concept of global governance and the core architectural elements of the current system of global governance. Examines the key policy purposes and tasks carried out by global governance processes.

POLS 7388 Public Diplomacy (3 SH)
Explores the intersection of international relations theory and public diplomacy to explain how a nation’s government or society seeks to project itself to external audiences in ways that improve these foreign publics’ perception of that nation. Takes a comparative, case-study approach that includes the public diplomacy of China, India, the European Union, the United States, and others. Offers students an opportunity to obtain a foundation to understand the intersection of foreign policy, identity, and images of nations.

POLS 7389 International Relations of the Middle East (3 SH)
Examines the international politics of the Middle East region. Covers methodological and theoretical issues involved in the study of the Middle East as well as formation of the modern Middle East state system and the region’s history in the Cold War and post–Cold War periods. Addresses major themes and issues, including political economy, globalization, and the impact of states outside the Middle East on the region’s international relations.

POLS 7390 Topical Seminar in American Politics (3 SH)
Examines current issues in the area of American government and politics.
• Repeatability: May be repeated without limit.

POLS 7391 Topical Seminar in Political Thought (3 SH)
Examines current issues in the area of political thought.
• Repeatability: May be repeated without limit.

POLS 7392 Topical Seminar in Public Policy and Administration (3 SH)
Examines current issues in the area of public administration.
• Repeatability: May be repeated without limit.
POLS 7393 Topical Seminar in Comparative Politics (3 SH)
Examines current issues in the area of comparative government and politics.
• Repeatability: May be repeated without limit.

POLS 7394 Topical Seminar in International Relations (3 SH)
Examines current issues in the area of international relations.
• Repeatability: May be repeated without limit.

POLS 7407 Internship in Politics and Public Administration (1 to 6 SH)
Offers work experience (at least fifteen hours per week) that includes planning, research, policy development, and other administrative aspects in a government or nonprofit organization.
• Repeatability: May be repeated up to 5 times for up to 6 total semester hours.

POLS 7441 Cyberconflict in the International System (3 SH)
Examines the literature, policy reports, and important news stories about the domain of cybersecurity and conflict. Analyzes contending perspectives on the role and impact of cybersecurity in the international system. Utilizes social science theories and methods to explore this method of conflict.

POLS 7442 Homeland Security and Resilience Law and Policy (3 SH)
Examines homeland security and resilience policy through the lens of its legal framework. Analyzes security and federal emergency management legislation, executive actions, and related case law in their effects on decision making related to homeland security and advancing societal resilience. Examines the multijurisdictional challenges associated with federalism as it relates to the development of security- and resilience-related law and policy.

POLS 7704 Critical Infrastructure Resilience (4 SH)
Explores the growing vulnerability of our human-made built environment to a range of risks. Using the new paradigm centered on the concept of resilience, examines how best to safeguard the critical foundations that provide transport, communications, water, energy, and other essential functions in the face of disasters, growing urbanization, climate change, and globalization. Identifies solutions that are scientifically credible, informed by data and sound engineering principles, while concurrently grounded in an understanding of social and policy imperatives. Offers students an opportunity to apply the skills and knowledge acquired in the course to a real-life example through a group project.

POLS 7976 Directed Study (1 to 4 SH)
Offers assigned reading under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

POLS 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

POLS 7980 Capstone Project (3 to 6 SH)
Offers students an opportunity to complete a specialized research or applied project in political science or security studies as part of the master’s degree. Designed to meet the specific learning and research interests of the student. Learning experience is based on group or individual activities that meet agreed-upon benchmarks with the instructor and may involve activities with government or nongovernment organizations. Scope of the project varies by credit hours earned.

POLS 7990 Thesis (1 to 6 SH)
Offers thesis supervision by individual members of the department.
• Repeatability: May be repeated without limit.

POLS 7996 Thesis Continuation (0 SH)
Offers continued thesis supervision by individual members of the department.

POLS 8400 Planning Module in Urban and Regional Policy (1 SH)
Relates a professional activity to urban and regional planning.
• Prerequisite: Architecture majors only.
• Repeatability: May be repeated without limit.

POLS 8407 Internship (3 or 6 SH)
Offers work experience (at least fifteen hours per week) that includes planning, research, policy development, and other administrative aspects in a government or nonprofit organization.
• Repeatability: May be repeated without limit.

POLS 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

POLS 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

POLS 8968 Practicum (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
• Repeatability: May be repeated without limit.

POLS 8982 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Repeatability: May be repeated without limit.
POLS 8986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
- Repeatability: May be repeated without limit.

POLS 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

POLS 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Repeatability: May be repeated without limit.

POLS 9986 Research (0 SH)
Offers an opportunity to conduct full-time research under faculty supervision.
- Repeatability: May be repeated without limit.

POLS 9988 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
- Repeatability: May be repeated without limit.

POLS 9990 Dissertation (0 SH)
Offers dissertation supervision by individual members of the department.
- Repeatability: May be repeated once.

POLS 9996 Dissertation Continuation (0 SH)
Offers continued dissertation supervision by individual members of the department.
- Repeatability: May be repeated without limit.

PORTUGUESE (PORT)

PORT 1101 Elementary Portuguese 1 (4 SH)
Designed for students with very little or no prior knowledge of Portuguese. Presents essentials of Portuguese as it is spoken in Brazil through acquisition of basic skills in speaking, reading, writing, and aural comprehension.

PORT 1102 Elementary Portuguese 2 (4 SH)
Continues the study of Brazilian Portuguese at the elementary level. Includes completion of basic grammatical usage, reading of contemporary Brazilian material, and increased emphasis on oral and aural skills.
- Prerequisite: PORT 1101 or PORT 1301.

PORT 1301 Elementary Portuguese Immersion 1 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
- Prerequisite: PORT 1101 or PORT 1301.

PORT 1302 Elementary Portuguese Immersion 2 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
- Prerequisite: PORT 1102 or PORT 1302.

PORT 2101 Intermediate Portuguese 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Portuguese materials.
- Prerequisite: PORT 2101 or PORT 2301 and (a) PORT 2101 or PORT 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

PORT 2102 Intermediate Portuguese 2 (4 SH)
Builds on PORT 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary Portuguese materials.
- Prerequisite: PORT 2101 or PORT 2301 and (a) PORT 2101 or PORT 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- NU Core: Writing intensive in the major.
- NUpath: Writing intensive in the major.

PORT 2301 Intermediate Portuguese Immersion 1 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

PORT 2302 Intermediate Portuguese Immersion 2 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

PORT 2501 Portuguese for Spanish Speakers (4 SH)
Introduces Portuguese to native and heritage speakers of Spanish and/or students who have completed at least one level of intermediate Spanish. Focuses on fundamental communication skills—speaking, aural comprehension, reading, and writing—with particular emphasis on those features of Portuguese that are most difficult for Spanish speakers, such as pronunciation, idioms, and grammatical structures particular to Portuguese. Also explores cultural elements of the Portuguese-speaking countries, with special emphasis on Brazil.
- Prerequisite: SPNS 2101, SPNS 2301, or permission of instructor.
PORT 2900 Specialized Instruction in Portuguese (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.

PORT 3101 Advanced Portuguese 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: PORT 2102 or PORT 2302.

PORT 3102 Advanced Portuguese 2 (4 SH)
Builds on PORT 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: PORT 3101 or PORT 3301.

PORT 3301 Advanced Portuguese Immersion 1 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Focuses on standard Portuguese as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

PORT 3302 Advanced Portuguese Immersion 2 (4 SH)
Designed for students who are in a Portuguese-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

PORT 3800 Special Topics in Portuguese (1 to 4 SH)
Focuses on a unique aspect of the Portuguese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an intermediate level of skill in the language.
• Repeatability: May be repeated up to 3 times.

PORT 3900 Specialized Instruction in Portuguese (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
• Prerequisite: At least an advanced level of competence in the language.
• Repeatability: May be repeated without limit.

PORT 4800 Special Topics in Portuguese (1 to 4 SH)
Focuses on a unique aspect of the Portuguese language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an advanced level of skill in the language.
• Repeatability: May be repeated up to 4 times.

PORT 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PORT 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

PORT 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated up to 3 times.

PORT 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PORT 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
PSYC 1000 Psychology at Northeastern (1 SH)
Introduces students to the major and to the professional and academic resources available to students at Northeastern University. Introduces students to their faculty, advisors, and fellow students; educates students about the cooperative education program; familiarizes students with undergraduate research and technological resources; and introduces problem-solving and leadership skills, which students need to succeed in school and in their professional endeavors.
• Prerequisite: First-year psychology majors only or permission of instructor.
• Equivalent: BIOC 1000, BIOL 1000, BNSC 1000, CHEM 1000, ENVR 1000, INSC 1000, LING 1000, MATH 1000, and PHYS 1000.

PSYC 1101 Foundations of Psychology (4 SH)
Surveys the fundamental principles, concepts, and issues in the major areas of contemporary scientific psychology. Approaches the study of psychology as a method of inquiry as well as a body of knowledge. Emphasizes the biological, behavioral, cognitive, and social factors that influence and regulate learning and motivation; personality dynamics; psychopathology and its treatment; life-span development; sensory and perceptual processes; and communication and social behaviors. The influence of cultural factors on psychological studies and theories is also explored.
• NU Core: Social science level 1.
• NUpath: Engaging with the natural and designed world, understanding societies and institutions.

PSYC 1200 Psychology of Women (4 SH)
Introduces students with little or no background in psychology to the current theories and research on the psychology of women. Critically examines psychological, biological, and social influences on gender differences, gender roles, and gender stereotypes in the light of scientific evidence and individual experience. Assesses their consequences for society. Uses the unique perspective generated in the field of the psychology of women to evaluate the traditional research methods in psychology as well as the major psychological theories formulated to explain women and the differences between women and men. Emphasizes critical thinking skills.
• Equivalent: PSYC 2302.

PSYC 1204 Psychology of Prejudice (4 SH)
Searches for universal characteristics of prejudice by examining its expression toward various minorities including colonized peoples, culturally Deaf people, Hispanic and African Americans, women, gays and lesbians, people with disabilities, and those with status in multiple minorities. Reviews research in social psychology on stereotyping and ethnocentrism for the insight it gives into the nature of prejudice. Uses selected films and student minority advocates to allow class members to hear the authentic voice of targets of prejudice.
• NU Core: Comparative study of cultures.

PSYC 1208 Psychology and the Law (4 SH)
Traces the effects of psychological factors through the course of a trial including such issues as accuracy of eyewitness identification, plea bargaining, jury selection, persuasion tactics in the courtroom, presumption of innocence, jury size, jury decision rules, and sentencing and punishment.
• Equivalent: PSYC 2308.

PSYC 1210 Sports Psychology (4 SH)
Studies the physical, affective, and cognitive behaviors associated with sport participation and also examines the psychological theories and research related to sport and exercise behavior. Introduces students to the field of sport and exercise psychology by providing a broad overview of the major topics in the area, including the history of sport and exercise psychology, leadership, self-confidence, youth sports, aggression, moral development, team dynamics, anxiety and arousal, goal setting, imagery, and motivation. Covers the psychological makeup of athletes, how psychological factors influence involvement and performance in sport, and helps students acquire the skills and knowledge about sport and exercise psychology that they can apply to their everyday lives.
• Equivalent: PSYC 2310.

PSYC 1214 The Moral Mind: The Science Underlying Ethical Decision-Making and Virtuous Character (4 SH)
Offers a scientific lens through which to analyze the mental mechanisms and processes that guide moral and ethical decision making. Although the majority of the evidence and perspectives covered stem from psychological and neuroscientific work, the course is interdisciplinary in nature by incorporating relevant perspectives from behavioral economics, evolutionary biology, and philosophy. The primary goal is to offer insight, not only into how the human mind automatically parses ethical issues in given situations but also how control can be gained over such mechanisms, thereby allowing greater efficacy in guiding morality according to consciously embraced principles.
• NUpath: Employing ethical reasoning.
PSYC 1250 Drugs and Behavior (4 SH)
Provides beginning students with a general overview of the effects of drug use/abuse in many segments of society with particular attention placed on the collegiate population. Describes historical aspects of drug use for treatments of clinical disease states along with psychological theories of drug abuse and strategies for prevention of drug use/abuse. Covers biological effects emanating from several drug categories and the clinical use of drugs to promote positive therapeutic outcomes.

PSYC 2101 Love and Hate: Social, Psychological, and Literary Approaches (4 SH)
Studies materials that define and describe love and hate from the fields of literature and literary criticism, social psychology, and criminology and criminal justice. “Love” and “hate” are small words describing powerful emotions with profound effects on individuals and on social groups. Focusing largely on contemporary examples, offers students an opportunity to analyze the differences and areas of overlap in the above fields’ approaches to love and hate, to discuss societal responses to these emotions, and to apply the methodologies of each field to research questions of their own.
• Prerequisite: (a) ENGW 1111 (which may be taken concurrently), ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• Cross-list: INSH 2101.
• NU Core: Comparative study of cultures.
• Equivalent: INSH 2101.

PSYC 2290 Inquiries in Psychological Science (4 SH)
Offers students an opportunity to learn to think like a scientist in the field of psychology. Science is not a static body of knowledge but rather a method for making new discoveries. Students consider a series of controversial issues in current psychology by reading and discussing primary research articles and reviews, critically assessing arguments on all sides, and coming to their own conclusions. Requires students to develop and present their own research proposals on topics of their choice, which encourages them to engage more deeply with the material.
• Prerequisite: PSYC 1101 and freshman standing; restricted to psychology majors and specific psychology-related majors.

PSYC 2300 Research in Psychology (4 SH)
Introduces research methods in psychology such as field research, content analysis, case research, survey methods, simulations, and laboratory experiments. Examines issues of research fairness and evaluating research methods. Explores basic statistical notions including sampling, variability, and correlation.
• Prerequisite: PSYC 1101; psychology majors only.

PSYC 2306 Food, Behavior, and Eating Disorders (4 SH)
Investigates what starts and stops eating behavior. Examines taste, nutrition, metabolism, the brain, food experiences, and societal factors that control feeding behavior. Emphasizes the biological/psychological interaction in normal eating and in pathological eating, such as anorexia, bulimia, and extreme obesity.
• Prerequisite: PSYC 1101.
• Equivalent: PSYC 1206.

PSYC 2320 Statistics in Psychological Research (4 SH)
Offers an overview of descriptive and inferential statistics with a focus on psychological applications. Covers standard material in undergraduate statistics including distributions, central tendency, variability, z-scores, the normal distributions, correlation, regression, probability, hypothesis testing (using the z, t, F, and chi-square statistics), and confidence intervals. Should be taken before the end of the sophomore year.
• Prerequisite: PSYC 1101.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.

PSYC 2352 Childhood Mental Illness (4 SH)
Focuses on mental illnesses that are first diagnosed in childhood—such as autism, phobias, conduct disorders, and attention deficit disorder. Overviews childhood depression and suicide and disorders of eating and sleeping.
• Prerequisite: PSYC 1101.

PSYC 2356 Nonverbal Communication (4 SH)
Examines the messages we send by posture, facial expression, voice quality, gestures, touch, gaze, and interpersonal distance. Examines origins and consequences of these behaviors as well as differences related to culture, personality, power, gender, and age.
• Prerequisite: PSYC 1101.

PSYC 2366 Psychology and Meditation (4 SH)
Introduces the interface between scientific psychology and meditation. Focuses on the scientific investigation of meditation, particularly mindfulness meditation. Draws upon scientific research and theory in the fields of neuroscience, cognitive science, learning and motivation, developmental psychology, and other areas to explore meditative experiences and their effects on the nervous system, behavior, intention, perception, attention, thought, and bodily functions. Also explores the practical applications and efficacy of meditation in dealing with stress, pain, and other medical and psychological problems.
• Prerequisite: PSYC 1101; restricted to students in the College of Arts, Media and Design; College of Computer and Information Science; Bouvé College of Health Sciences; College of Science; and College of Social Sciences and Humanities.
PSYC 3358 Behavior Therapies (4 SH)
Offers a study of successful projects that have provided effective remediation and rehabilitation in institutions for the mentally ill, the mentally retarded, and the developing human (schools).
• Prerequisite: PSYC 3450 or PSYC 3451.
• Equivalent: PSYC 2358.

PSYC 3400 Personality (4 SH)
Offers a systematic study of the normal personality and its development. Focuses on behavioral, dynamic, social, and cognitive determinants, assessment of personality, and current research topics; surveys the major theories of personality.
• Prerequisite: PSYC 1101.

PSYC 3402 Social Psychology (4 SH)
Provides an introductory survey of social psychology. Topics include aggression, attribution, attitude formation; and change, attraction, gender and culture, conformity, impression formation, and group processes.
• Prerequisite: PSYC 1101.

PSYC 3404 Developmental Psychology (4 SH)
Examines change throughout the life span in social relationships, emotional functioning, language, cognition, and other psychological domains, with emphasis on infancy through adolescence. Introduces major theories of development. Stresses the interaction of social and cognitive factors in development, and the interaction of the developing person with the environment. Also explores individual and cross-cultural differences in patterns of development, and research issues in developmental psychology.
• Prerequisite: PSYC 1101.

PSYC 3406 Abnormal Psychology (4 SH)
Surveys patterns of psychological abnormality. Addresses diagnosis, theoretical perspectives, anxiety, and defense mechanisms. Examines the symptomatology, etiology, and treatment of a number of disorders including anxiety, dissociative, somatoform, affective (depression, mania), and schizophrenic disorders.
• Prerequisite: PSYC 1101.

PSYC 3451 Learning Principles and Behavior Analysis (4 SH)
Introduces the basic concepts and theories of applied behavior analysis as they relate to learning and motivation. Topics include operant and classical conditioning, reinforcement, punishment, extinction, discrimination training, stimulus control, concept formation, and generalization. Throughout the course, offers students an opportunity to apply these principles to learning that occurs in their everyday lives as well as in the lives of individuals with developmental disabilities and other learning disorders.
• Prerequisite: PSYC 1101; restricted to students in the College of Arts, Media and Design; College of Computer and Information Science; Bouvé College of Health Sciences; College of Science; and College of Social Sciences and Humanities.

PSYC 3452 Sensation and Perception (4 SH)
Discusses how our five senses work to aid us in perceiving states of the body and of the world, how our perceptions are modified by what we know and expect, and how sensation and perception develop (especially in infancy). Includes discussion of neural and anatomical bases of sensation and perception.
• Prerequisite: PSYC 1101; PSYC 3458 is highly recommended.

PSYC 3458 Biological Psychology (4 SH)
Focuses on the relation between brain function and human behavior. Examines how nerve cells function individually and work together both in small networks and in the nervous system; the structure of the nervous system; how our sense organs provide the nervous system with information about the outside world; how the brain controls movement; and how psychological concepts from motivation to language and memory are represented in the brain.
• Prerequisite: PSYC 1101.

PSYC 3454 Psychology of Language (4 SH)
Provides a basic introduction to psycholinguistics. Topics include the nature and structure of languages, processes involved in the production and comprehension of language, the biological bases of language, and aspects of language acquisition. Examines current theories of language processing and related experimental findings.
• Prerequisite: PSYC 1101.
• Equivalent: LING 3464.

PSYC 3466 Cognition (4 SH)
Provides a basic introduction to human cognition. Topics include pattern recognition, attention, memory, categorization and concept formation, problem solving, and aspects of cognitive development. Examines current theories of cognitive processing and related experimental findings.
• Prerequisite: PSYC 1101.
• Equivalent: LING 3466.
PSYC 3506 Neuropsychology of Fear (4 SH)
Explores our understanding of the physiological and cognitive aspects of fear, from early theories of emotion to current research in both humans and animal models. Emphasizes linking brain structure to function—how do different brain regions contribute to fear processing and expression? Also focuses on psychiatric illnesses whose symptoms suggest a maladaptive fear response, such as post-traumatic stress disorder and phobias. What causes these illnesses, and how does our understanding of the neural basis of fear inform our treatment strategies for these disorders?
• Prerequisite: PSYC 3458 or permission of instructor; behavioral neuroscience, biology, and psychology majors only or permission of instructor.

PSYC 3508 Behavioral Endocrinology (4 SH)
Presents an overview of the field of behavioral endocrinology from a psychological perspective. Examines how hormones influence brain structure and function; how hormones affect behavior and vice versa; sex differences in brain and behavior; and the role of hormones in mood disorders, cognition, and stress.
• Prerequisite: PSYC 3458.

PSYC 3510 Brain, Behavior, and Immunity (4 SH)
Explores how our behavior is affected by (and how it affects) our immune system. The brain and the immune system regulate our behavioral responses to the world around us, which helps explain why we feel “down” when we’re sick and why we often catch a cold when we’re stressed. Offers students an opportunity to better understand how we have evolved to psychologically adapt to environmental challenges—and, importantly, how this can sometimes backfire with mental illness as an outcome.
• Prerequisite: PSYC 3458 or permission of instructor; restricted to students in the College of Computer and Information Science, Bouvé College of Health Sciences, the College of Science, the College of Social Sciences and Humanities, or permission of instructor.

PSYC 4505 Industrial/Organizational Psychology (4 SH)
Surveys the psychological fundamentals underlying performance in work settings. Topics include psychological testing; performance evaluation; training, motivating, and leading employees; and the social psychology of organizations. Emphasizes ethical and affirmative action issues.
• Prerequisite: PSYC 3402.

PSYC 4508 Assessment and Data Collection in Applied Behavior Analysis (4 SH)
Offers an overview of methods used to identify, measure, and assess the behaviors of individuals using applied behavior analysis (ABA), including behaviors targeted for increase and decrease. In-depth topics include function-based assessment and treatment in behavior analysis; design and details of the assessment process, including selection of an appropriate assessment method; and the methodology, results, and recommendations derived from a functional behavior assessment.
• Prerequisite: PSYC 3450 or PSYC 3451.

PSYC 4510 Psychopharmacology (4 SH)
Examines interactions between drugs, brain, and behavior. Focuses on such topics as synaptic transmission, behavioral functions of specific neurotransmitter systems, pharmacological treatment of mental and neurological disorders, and drug abuse.
• Prerequisite: PSYC 3458.

PSYC 4512 Neuropsychology (4 SH)
Examines the behavior of neurological patients and normal patients to develop an understanding of how the human brain works to produce higher mental functions. Topics include discussions of brain scans, human neuroanatomy, cerebral lateralization, language, memory, neurological disorders, and neural plasticity and recovery of function.
• Prerequisite: PSYC 3458.
• Equivalent: PSYC 3512.

PSYC 4514 Clinical Neuroscience (4 SH)
Explores the neurobiological, genetic, and neurochemical etiology of mental illness as described and categorized according to the DSM. In the class we discuss how psychology, neuroscience, pharmacology, and medicine come together to manage mental illness. For each specific mental illness covered we investigate how changes in physiology and biology might manifest in the aberrant behaviors that define psychopathology. Lastly, we examine how pharmacology is often used to treat these various mental illnesses and how genetic expression is involved in predisposing some people to these disorders while sparing others.
• Prerequisite: PSYC 3458.
• Equivalent: PSYC 1202 and PSYC 3514.

PSYC 4520 Language and the Brain (4 SH)
Focuses on language behavior from a neuropsychological viewpoint. Examines models of how the brain controls the production and comprehension of language. Considers localization of cerebral functions and hemispheric lateralization; experimental and clinical evidence for functional models; aphasia, dyslexia, and other language pathologies; and evidence from neuroimaging studies.
• Prerequisite: PSYC 3464 or PSYC 3466.
• Equivalent: LING 3520.
PSYC 4522 Psychology of Reading (4 SH)
Provides an overview of issues in the psychology of reading. Topics include the nature of the reading process as a perceptual and cognitive activity, eye movement patterns in reading, stages of reading development, and dyslexia. Examines current theories of reading and text comprehension.
• Prerequisite: PSYC 3464 or PSYC 3466.
• Equivalent: LING 3522.

PSYC 4524 Cognitive Development (4 SH)
Explores cognitive processes in infancy and childhood, how those processes change with age, and theoretical explanations for those changes. Topics may include understanding the physical world, memory, categorization, reasoning, problem solving, social cognition, language and conceptual development, and individual and/or group differences in cognitive development. Emphasis may vary by semester.
• Prerequisite: PSYC 3404 or PSYC 3466.
• Equivalent: LING 3524.

PSYC 4526 Categorization and Reasoning (4 SH)
Examines one of the basic goals of cognitive psychology, which is to describe categorization—how humans organize what they know—and reasoning—how they use what they know to make guesses about what they don’t know. Gives an in-depth look at psychological research and theory relevant to these issues. Topics include similarity, categorization, models of conceptual structure, inductive and deductive reasoning, mental models, problem solving, and expertise.
• Prerequisite: PSYC 3464 or PSYC 3466.
• Equivalent: PSYC 3526.

PSYC 4530 Sensory Processes (4 SH)
Studies our senses, with emphasis on vision, hearing, touch, taste, and smell. Focuses on how we measure our sensory abilities and relates findings to the functioning of sensory organs—eyes, ears, skin, mouth, and nose—and of the sensory nervous system.
• Prerequisite: PSYC 3452.
• Equivalent: PSYC 3530.

PSYC 4534 Human Factors in Psychology (4 SH)
Introduces the application of information about human characteristics and behavior to the design of machines, environments, and systems. Emphasis is on the sensory, perceptual, and cognitive characteristics of people (for example, their ability to respond to differently colored warning lights, recall instructions, and make appropriate decisions), and how those characteristics interact with technological systems. Topics may include decision making, displays and warning signals, control devices, human-computer interaction, aviation and other transportation systems, consumer products, and medical systems.
• Prerequisite: PSYC 3452.
• Equivalent: PSYC 3534.

PSYC 4570 Behavioral Genetics (4 SH)
Explores the genetic basis of behavior. Behavioral genetics is considered to lie at the intersection of psychology and genetics and is a dynamic field with plenty of possibility. Offers students an opportunity to hone and develop a stronger foundation in the principles of Mendelian, population, and quantitative genetics. Studies the genetic basis for sleep, social behavior, responses to environmental stimuli, learning, memory, addiction, and the etiology of neuropsychiatric disorders.
• Prerequisite: BIOL 2301, PSYC 3458, and junior or senior standing.

PSYC 4600 Laboratory in Research Design (4 SH)
Addresses the theoretical concepts, design, execution, analysis, and communication of research in psychology. Provides students with various methods to acquire hands-on experience performing a research project of their own creation. Students move systematically through the research process, from refining their original idea in the context of existing literature to interpreting and communicating their results.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) PSYC 2320 and (c) and research-area course; junior or senior standing.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4606 Laboratory in Biological Psychology (4 SH)
Introduces the methods of research in psychobiology. Students work in small groups, conducting three to four hands-on laboratory exercises under supervised conditions. Students read selections of the relevant scientific literature, analyze the collected data, and write experimental reports.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3458 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4610 Laboratory in Psycholinguistics (4 SH)
Provides students the opportunity to acquire firsthand experience in conducting research on issues in the psychology of language. Focuses on experiments and their implications for broader issues of language processing. Involves students in all aspects of each experiment including collecting and analyzing data and preparing lab reports.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3464 or PSYC 3466 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: LING 4610.
PSYC 4612 Laboratory in Cognition (4 SH)
Provides students the opportunity to acquire firsthand experience in conducting research on issues in human cognition. Focuses on experiments and their implications for broader issues of cognitive functioning. Involves students in all aspects of each experiment including collecting and analyzing data and preparing lab reports.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3464 or PSYC 3466 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: LING 4612.

PSYC 4614 Laboratory in Social Psychology (4 SH)
Provides an introduction to the methods of social-psychological research. Assists students in developing the ability to read published social research with a critical eye, to pose questions in a testable manner, to apply experimental methods to social research, and to express themselves in APA journal style.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3402 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4616 Laboratory in Personality (4 SH)
Provides an introduction to the methods and areas of personality research. Discusses problems of measurement, control, and interpretation. Critically examines representative published experiments. Students design, collect data for, assess, and write up several experiments.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3400 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4622 Laboratory in Sensation and Perception (4 SH)
Focuses on experiments using psychophysical methods in the various senses, typically including audition, vision, and others. Students collect data on themselves, analyze the data statistically, and write reports. Critical thinking is stressed.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3452 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (d) junior or senior standing.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4624 Laboratory in Affective Science (4 SH)
Provides instruction in the methods of affective science (i.e., the study of what emotions are and how they work). Students are expected to become members of a functioning lab team, which uses a multimethod approach combined with various theoretical frameworks to guide research in affective science. Offers students an opportunity to develop the ability to read the scientific literature; think critically about research questions; design, conduct, and analyze experiments; and write in APA journal style, as well as to gain valuable interpersonal and organizational skills that come from working on a team.
• Prerequisite: (a) PSYC 2320 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102; psychology majors and combined majors and behavioral neuroscience majors only.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4626 Laboratory in Life-Span Emotional Development (4 SH)
Studies life-span development and how emotional experience, perception, and regulation changes across the life span. Lab teams use a multimethod approach and theoretical frameworks to guide research in emotional development. Offers students an opportunity to learn how to read the scientific literature; think critically about research questions; design, conduct, and analyze experiments; write in the journal style of the American Psychological Association; and gain interpersonal and organizational skills while working on a research team.
• Prerequisite: (a) PSYC 2320 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) sophomore standing or above; PSYC 3402 highly recommended; restricted to students in the College of Computer and Information Science, Bouvé College of Health Sciences, and the College of Science.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

PSYC 4650 Seminar in Clinical Case Study (4 SH)
Offers students an opportunity to integrate clinical therapy within the larger framework of etiology, diagnosis, and treatment of specific disorders. Builds a structure within which to evaluate, critique, and clarify values around the mental healthcare delivery systems encountered, as well as to learn how to think about, discuss, and present individual cases among different clinical populations.
• Prerequisite: (a) PSYC 2320, PSYC 3406, and junior or senior standing in the College of Science or in Bouvé College of Health Sciences or (b) permission of instructor.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
PSYC 4652 Seminar in Ethics in Psychology (4 SH)
Allows students to identify and reflect upon ethical concerns (that is, related to confidentiality, animal use, racism, designing and applying research) that they encountered in their prior co-op/research experiences. Considers historical, psychological, philosophical, sociological, and spiritual perspectives. Students use reflective conversation to guide their ethical thinking, research, and problem solving. Evaluates research projects through written and oral reports. Fulfills the College of Arts and Sciences experiential education requirement for psychology majors.
- Prerequisite: (a) PSYC 2320 and (b) junior or senior standing and (c) any professional-related experience (for example, co-op, directed study) in psychology or related discipline (education or human resources management).
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4654 Seminar in Behavioral Modification (4 SH)
Discusses topics in behavior modification in a seminar format.
- Prerequisite: (a) PSYC 2320 and (b) PSYC 3358, PSYC 3450, or PSYC 3451 and (c) junior or senior standing.
- NU Core: Capstone, experiential learning, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4656 Seminar in Biological Psychology (4 SH)
Offers intensive study, discussion, and practice in lab studies of physiological variables. Covers evolution of the nervous system, neurological disorders, motivation and emotion, sleep, attention and perception, learning, and memory.
- Prerequisite: PSYC 2320, PSYC 3458, and junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4658 Seminar in Psycholinguistics (4 SH)
Offers intensive study and discussion of issues in the psychology of language. Specific topics vary by semester.
- Prerequisite: (a) PSYC 2320 and (b) PSYC 3464 or PSYC 3466 and (c) junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
- Equivalent: LING 4658.

PSYC 4660 Seminar in Cognition (4 SH)
Offers intensive study and discussion of issues in cognitive psychology. Specific topics vary by semester.
- Prerequisite: (a) PSYC 2320 and (b) PSYC 3464 or PSYC 3466 and (c) junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
- Equivalent: LING 4660.

PSYC 4662 Seminar in Personality (4 SH)
Offers intensive study and discussion of issues in personality psychology. Allows students to examine selected topics and present their findings in class.
- Prerequisite: PSYC 2320, PSYC 3400, and junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4664 Seminar in Social Psychology (4 SH)
Provides an in-depth analysis of specific topics in social psychology. Students read original research and theory papers involving these topics, make presentations, and write papers related to their readings.
- Prerequisite: PSYC 2320, PSYC 3402, and junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4666 Seminar in Clinical Psychology (4 SH)
Focuses on psychotherapy: theory, methods, and outcome research. Provides an overview of clinical psychology: history, ethical and legal issues, the therapeutic relationship, cross-cultural counseling, the process of change. Students write and present papers on a topic of interest.
- Prerequisite: PSYC 2320, PSYC 3406, and junior or senior standing.
- NU Core: Capstone, writing intensive in the major.
- NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.
PSYC 4668 Seminar in Sensation and Perception (4 SH)
Expects students to present in class on topics such as how perceptions are organized, formed, and modified by sensory, attentional, motivational, and cognitive factors, how our sensory systems extract information from the environment in a consistent and logical manner, despite large changes in environmental conditions, and how to account for this in physiological terms.
• Prerequisite: PSYC 2320, PSYC 3452, and junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4674 Seminar in Cognitive Neuroscience (4 SH)
Offers intensive study and discussion of issues in cognitive neuroscience, the study of human cognitive processes, and their underlying neural substrates. Considers both theoretical and methodological issues, as well as applications to related fields of study. Specific topics vary by semester.
• Prerequisite: (a) PSYC 2320 and (b) PSYC 3464 or PSYC 3466 and (c) junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4676 Seminar in Developmental Psychology (4 SH)
Effective Spring 2017
Offers intensive study and discussion of issues in developmental psychology, the study of how social, emotional, cognitive, and other psychological processes emerge and change over different periods of the life span. Considers both theoretical and methodological issues, as well as applications to real-world contexts. Specific topics may vary by semester.
• Prerequisite: PSYC 2320, PSYC 3404, and junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

PSYC 4965 Undergraduate Teaching Experience (4 SH)
Offers undergraduate teaching assistantships in psychology courses under the close direction of the course instructor. Assignments may include holding office hours and recitation/tutorial and review sessions, answering students’ emails, moderating discussion boards, helping to proctor exams and quizzes, (very) limited lecturing, or leading class discussions (only under faculty supervision).
• Prerequisite: Junior or senior standing, minimum overall GPA of 3.333, and grade of A– or higher in the course for which the student will be an undergraduate teaching assistant; permission to enroll is further subject to the availability of an appropriate course assignment and instructor; prior arrangements must be made with the instructor at least one term before registration; may be repeated once but may not be repeated for the same course.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated once.

PSYC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

PSYC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: PSYC 4970.
• NU Core: Experiential learning, writing intensive in the major.
• NUpath: Writing intensive in the major, integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PSYC 4991 Directed Study Research (4 SH)
Offers research experience on a chosen topic under the direction of a faculty member. Research content and requisites depend on the instructor. Prior arrangements must be made with the faculty member at least one term before registration.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 3 times.
PSYC 4993 Independent Study (1 to 4 SH)
Offers a reading course for the student who wants guidance in the archival exploration and in-depth study of a topic of interest. Conducts study through a series of individual tutorials or discussions with a faculty member that typically involve an extensive, analytical review of the literature. Interested students should consult directly with the relevant faculty member or with a department advisor for guidance in locating the most appropriate faculty person at least one semester before the study is undertaken.
• Repeatability: May be repeated without limit.

PSYC 4994 Internship in Psychology (4 SH)
Offers supervised experiences in the application of psychology in instructional, clinical, or other applied settings.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

PSYC 5100 Proseminar in Psycholinguistics (3 SH)
Serves as first-level graduate course in psycholinguistics, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussions.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5110 Proseminar in Cognition (3 SH)
Serves as first-level graduate course in cognition, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5120 Proseminar in Sensation (3 SH)
Serves as first-level graduate course in sensation, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5130 Proseminar in Perception (3 SH)
Serves as first-level graduate course in perception, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5140 Proseminar in Biology of Behavior (3 SH)
Serves as first-level graduate course in the biological basis of behavior, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5150 Proseminar in Clinical Neuroscience (3 SH)
Serves as first-level graduate course in clinical neuroscience, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5160 Proseminar in Personality (3 SH)
Serves as first-level graduate course in personality, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5170 Proseminar in Social Psychology (3 SH)
Serves as first-level graduate course in social psychology, focusing on theoretical, experimental, and methodological issues. Includes faculty lectures, student presentations, and discussion.
• Prerequisite: Psychology PhD students only or permission of instructor.
• Repeatability: May be repeated without limit.

PSYC 5180 Quantitative Methods 1 (3 SH)
Presents first course in a two-course sequence that surveys a variety of quantitative methods used in experimental psychology.
• Prerequisite: Psychology PhD students only or permission of instructor.

PSYC 5181 Quantitative Methods 2 (3 SH)
Continues PSYC 5180. Presents second course in a two-course sequence that surveys a variety of quantitative methods used in experimental psychology.
• Prerequisite: PSYC 5180; psychology PhD students only or permission of instructor.
PSYC 6130 Affective Computing (4 SH)
Studies affective computing—computing that relates to, arises from, or influences emotions. Offers an overview of the theory of human emotion (how it arises from and influences cognition, the body, and the social environment) and computational techniques for modeling human emotion processes as well as for recognizing and synthesizing emotional behavior. Discusses how these can be applied to application design. Offers students an opportunity to gain a strong background in the theory and practice of human-centered computing as it relates to games, immersive environments, and pedagogical applications. Brings together students from different disciplines to work together and learn from each other.
• Prerequisite: Restricted to students in the College of Computer and Information Science and in the College of Science.
• Cross-list: CS 6130.
• Equivalent: CS 6130.

PSYC 7200 Seminar in Psycholinguistics (3 SH)
Addresses current theoretical and empirical issues in psycholinguistics. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7210 Seminar in Cognition (3 SH)
Addresses current theoretical and empirical issues in cognition. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7220 Seminar in Sensation (3 SH)
Addresses current theoretical and empirical issues in sensation. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7230 Seminar in Perception (3 SH)
Addresses current theoretical and empirical issues in perception. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7240 Seminar in Biology of Behavior (3 SH)
Addresses current theoretical and empirical issues in the biological basis of behavior. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7250 Seminar in Clinical Neuroscience (3 SH)
Addresses current theoretical and empirical issues in clinical neuroscience. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7255 Window on the Brain: Methods and Applications in Magnetic Resonance Imaging (3 SH)
 Covers basic principles of magnetic resonance imaging (MRI) with an emphasis on brain function and preclinical research. Lectures are complemented by virtual imaging sessions at the Center for Translational NeuroImaging. Research topics include imaging integrated neural circuits involved in emotion and cognition and the application of MRI to the study of Parkinson’s and Alzheimer’s disease. In addition to functional MRI, other topics include MR spectroscopy, diffusion tensor imaging, manganese tract tracing, PET, SPECT, and CT imaging.
• Prerequisite: Psychology PhD students only or permission of instructor.

PSYC 7260 Seminar in Personality (3 SH)
Addresses current theoretical and empirical issues in personality. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7263 Seminar in Abnormal Psychology (3 SH)
Addresses current theoretical and empirical issues in abnormal psychology. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7270 Seminar in Social Psychology (3 SH)
Addresses current theoretical and empirical issues in social psychology. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.

PSYC 7275 Psychological Construction: Linking Mind to Brain (3 SH)
Examines the historical roots of the psychological construction approach (e.g., William James, Wilhelm Wundt) and traces conceptions of the mind over the past century, drawing on evolutionary arguments, neuroimaging research, and other evidence. For almost a century, psychologists have assumed that perception, cognition, emotion, and memory are separate faculties of the mind—distinctive mental states with distinct causes. Yet, there is another, earlier conception, called the psychological construction approach, in which perceptions, cognitions, emotions, and memories emerge from the stream of mental activity as momentary “gestalts” or ways of understanding the various states, actions, and feelings of waking life.
• Prerequisite: Psychology graduate students only or permission of instructor.

PSYC 7280 Seminar in Learning (3 SH)
Addresses current theoretical and empirical issues in learning. Specific topics vary by semester.
• Prerequisite: Psychology PhD students only.
• Repeatability: May be repeated without limit.
PSYC 7300 Advanced Quantitative Analysis (3 SH)
Covers selected advanced methods of quantitative analysis used in experimental psychology. Specific topics vary by semester.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 7301 Research Methodologies Psychology (3 SH)
Introduces students to a range of conceptual and methodological issues in the conduct of experimental psychology research by department faculty members. Specific course content depends on which faculty members conduct the course in a given semester.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 7302 Ethics and Professional Issues (3 SH)
Identifies and investigates ethical issues (such as privacy, fairness, social responsibility, or animal use) that research psychologists face in acquiring and using scientific knowledge. Also addresses broader professional issues relevant to pursuing a career as a research psychologist in an academic, government, or industrial setting.
  • Prerequisite: Psychology PhD students only.

PSYC 7990 Thesis (3 SH)
Conducts theoretical and experimental research for the master’s degree.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 7996 Thesis Continuation (0 SH)
Continues research for the master’s degree.
  • Prerequisite: Psychology PhD students only.

PSYC 8400 Research Lab (1 SH)
Offers laboratory work in experimental psychology.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 8401 Research Project (3 SH)
Conducts research project in selected area of experimental psychology.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 8402 Special Topics in Psychology (3 SH)
Offers in-depth analysis of critical topics in psychology. Specific topics vary by semester.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 8403 Research Issues in Psychology (3 SH)
Offers in-depth analysis of research issues in psychology. Specific topics vary by semester.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.
  • Prerequisite: Psychology PhD students only.

PSYC 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 9986 Research (0 SH)
Offers the student the opportunity to conduct doctoral research.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PSYC 9990 Dissertation (0 SH)
Conducts theoretical and experimental research for the PhD degree.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated once.

PSYC 9996 Dissertation Continuation (0 SH)
Continues research for the PhD degree.
  • Prerequisite: Psychology PhD students only.
  • Repeatability: May be repeated without limit.

PUBLIC HEALTH (PHTH)

PHTH 1120 Society and Health (4 SH)
Applies social scientific perspectives to the study of health, illness, and healthcare. Explores the ways that societal factors such as race, class, and gender interplay with health, healthcare, and health disparities. Studies neighborhoods and social networks in relation to health. Introduces basic sociological concepts relevant for the study of health and healthcare, such as social construction and medicalization. Offers students an opportunity to develop critical assessment skills while exploring a range of explanations for why, despite having the most expensive healthcare system, the United States ranks comparatively low in life expectancy and health and well-being outcomes. Uses lectures, case-based learning, and small-group workshops to explore the ways that our social environment shapes health in contemporary U.S. society.
  • Corequisite: PHTH 1121.
  • Cross-list: SOCL 1120.
  • NU Core: Social science level 1.
  • NUpath: Understanding societies and institutions.
  • Equivalent: SOCL 1120.
PHTH 1121 Society and Health Recitation (0 SH)
Provides a small-group discussion format to cover material in the corequisite lecture course.
- Corequisite: PHTH 1120.
- Cross-list: SOCL 1121.
- Equivalent: SOCL 1121.

PHTH 1260 The American Healthcare System (4 SH)
Introduces the organization and dynamics of the healthcare system and the role of consumers. Explores basic elements of healthcare including financing, personal insurance, high-risk status, and patient rights within the context of the U.S. system. Central to this exploration is an analysis of healthcare issues requiring informed consent from patients; patient bill of rights, healthcare directives, and the use of a proxy for decision making. Introduces the roles and responsibilities of various healthcare workers within the framework of an interdisciplinary model of healthcare.
- NUpath: Understanding societies and institutions.

PHTH 1261 Comparative Healthcare Systems (4 SH)
Designed to enable health profession students to develop a basic understanding of health-delivery systems and key issues confronting healthcare in the United States and in the study country in this study-abroad course. Explores issues such as the affordability of medical care, patient rights, health risks and behaviors, disease prevention, quality and access to care, the growth of managed care and corporate influence on healthcare, new medical technologies, the aging population, the impact of biotechnology, and trends in employment of health professionals. Incorporates self- and group-reflection exercises, Internet and contemporary media exploration, and in-class discussions. Compares and contrasts key healthcare issues in the study country with those in the United States using literature, Internet and contemporary media, observations in the study country, and discussions with guest speakers.
- NU Core: Comparative study of cultures.
- NUpath: Understanding societies and institutions.

PHTH 1270 Introduction to Global Health (4 SH)
Introduces global health in the context of an interdependent and globalized world focusing on four main areas of analysis: infrastructure of global health; diseases; populations; and terms, concepts, and theories. While the focus is on lower-income countries, the course examines issues in a broader global context, underscoring the interconnections between global health disparities and global health policy response. Applies case studies describing interventions to improve healthcare in resource-poor settings in sub-Saharan Africa and elsewhere to help illuminate the actors, diseases, populations, and principles and frameworks for the design of effective global health interventions.
- Cross-list: AFRS 1270.
- NUpath: Understanding societies and institutions.
- Equivalent: AFRS 1270.

PHTH 2210 Foundations of Biostatistics (4 SH)
Introduces the fundamental concepts of biostatistics. Offers students an opportunity to learn to apply statistical thinking to practical problems across several health disciplines. Draws examples and readings from clinical and public health literature. Introduces the Stata statistical software package.
- Prerequisite: Sophomore standing; health science majors only.
- Corequisite: PHTH 2211.

PHTH 2211 Recitation for PHTH 2210 (0 SH)
Offers small group discussion format to cover material in PHTH 2210.
- Corequisite: PHTH 2210.

PHTH 2300 Communication Skills for the Health Professions (4 SH)
Designed to teach students in the health professions to communicate effectively with their patients, colleagues, and other professionals. Covers interpersonal communication with patients and their families, as well as public speaking and presentations, and communicating as a leader. Students are required to make several presentations throughout the semester.
- Prerequisite: Sophomore standing or above.

PHTH 2301 Communication Skills for the Health Professions—Global (4 SH)
Studies how to communicate effectively with patients, colleagues, and other professionals—regardless of race, culture, or ethnicity—on interpersonal, organizational, and global levels. Introduces traditional and new media health communication strategies, public speaking/presentation techniques, and communication as leaders in a global environment. Compares cultures and healthcare systems in the country of study with the American system by engaging with health professionals, patients, caregivers, and communications and other specialists. Introduces students to art and techniques of health communication for informing and influencing patients, caregivers, and the community-at-large. Offers students in the health professions an opportunity to learn interpersonal, organizational, mass media, and global communication skills to empower individuals to become health literate and participate in their own healthcare.
- Repeatability: May be repeated without limit.

PHTH 2350 Community and Public Health (4 SH)
Provides students with a basic familiarity with and appreciation of public health and community-based methods for improving the health of populations. Explores the purpose and structure of the U.S. public health system, contemporary public health issues such as prevention of communicable diseases, health education, social inequalities in health and healthcare, public health responses to terrorism, and control of unhealthy behaviors like smoking, drinking, drug abuse, and violence.
- Prerequisite: Sophomore standing or above.
Course Descriptions

PHTH 4120 Global Perspectives on Discrimination and Health (4 SH)
Explores how discrimination can lead to population-level health disparities among marginalized groups globally. Topics include constructions of social categories, such as race and gender; differences in patterns of disease across populations, both intra- and internationally; how work from various disciplines, such as anthropology, medicine, and public health, inform understanding about how discrimination relates to health; and theoretical models from different disciplines that explain public health disparities.

- Prerequisite: Junior or senior standing; health science majors only.
- NUpath: Interpreting culture, engaging difference and diversity.

PHTH 4511 Healthcare Management (4 SH)
Provides an opportunity to develop skills and abilities related to management within the context of interdisciplinary study. Students explore issues in healthcare management in small-group, case-based educational experiences or problem-solving approaches. Within the context of small groups, students explore complex problems frequently encountered in clinical practice.

- Prerequisite: Bouvé students with junior or senior standing only.

PHTH 4515 Health Policy: Public Health in Crisis (4 SH)
Explores pressures facing U.S. public health practice and their implications for public health practitioners in clinical, legal, administrative, analytic, and communications disciplines. Includes increased emphasis on bioterrorism and emergency preparedness; ongoing weaknesses in disease surveillance and data collection; antiquated state and local laws; challenges to health promotion, disease prevention, and other population-level interventions; tensions between the public health and insurance systems; emerging infections, climate change, and natural disasters; significant disinvestment; and limited public health literacy among the public. This is an applied, advanced-level learning experience that requires completion of a focused, analytic public health project in service to students’ current clinical settings or to an alternative local- or state-level public or private public health agency.

- Prerequisite: Junior, senior, or graduate standing.

PHTH 4540 Health Education and Program Planning (4 SH)
Offers a writing-intensive course that introduces concepts central to health education and the program-planning process. Examines current public health issues that require intervention through health education or other types of prevention programs. Studies and applies models and theories used in health education and program planning. Offers students an opportunity to conduct a needs assessment; design and plan a program for a public health issue; create a mission statement for the program as well as goals, objectives, and strategies; and design the intervention, develop an evaluation plan, and create a budget and marketing plan.

- Prerequisite: Senior standing; health science majors only.
- NUpath: Writing intensive in the major.

PHTH 4540 Health Education and Program Planning (4 SH)
Offers a writing-intensive course that introduces concepts central to health education and the program-planning process. Examines current public health issues that require intervention through health education or other types of prevention programs. Studies and applies models and theories used in health education and program planning. Offers students an opportunity to conduct a needs assessment; design and plan a program for a public health issue; create a mission statement for the program as well as goals, objectives, and strategies; and design the intervention, develop an evaluation plan, and create a budget and marketing plan.

- Prerequisite: Senior standing; health science majors only.
- NUpath: Writing intensive in the major.

PHTH 4993 Independent Study (1 to 4 SH)
Offers students an opportunity to carry out independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

- Repeatability: May be repeated without limit.

PHTH 5120 Race, Ethnicity, and Health in the United States (3 SH)
Explores the role of economic, social, and individual factors in explaining racial and ethnic health disparities and examines intervention approaches to eliminate them. Topics include genetic and social constructions of race and ethnicity, measuring race and ethnicity, and the differences in prevalence and patterns of disease across groups; cultural and structural factors that affect healthcare delivery, such as discrimination, racism, and health status; and public health approaches to prevention and improving healthcare delivery.

- Prerequisite: Bouvé students only.

PHTH 5202 Epidemiology (3 or 4 SH)
Introduces the principles, concepts, and methods of population-based epidemiologic research. Offers students an opportunity to understand and critically review epidemiologic studies. Lectures and discussions aim to serve as a foundation for training in epidemiology, quantitative methods, and population-based health research. The course is a required introductory course for students in the Master of Public Health program and is appropriate for students who are interested in epidemiologic research.

- Prerequisite: Senior or graduate standing; MPH, BS/MPH, and exercise science students only (instructor’s permission required for students outside these programs).
PHTH 5210 Biostatistics in Public Health (3 SH)
Offers public health students an opportunity to obtain the fundamental concepts and methods of biostatistics as applied predominantly to public health problems and the skills to perform basic statistical calculations. Emphasizes interpretation and comprehension of concepts. Topics include descriptive statistics, vital statistics, sampling, estimation and significance testing, sample size and power, correlation and regression, spatial and temporal trends, small area analysis, and statistical issues in policy development. Draws examples of statistical methods from the public health practice. Introduces use of computer statistical packages.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 5212 Public Health Administration and Policy (3 SH)
Offers students an opportunity to obtain practical knowledge concerning the planning, organization, administration, management, evaluation, and policy analysis of health programs. Surveys what we know and think about public health administration and policy and what we do in practice. Introduces the main components of public health policy and administration using notable conceptual frameworks and case studies.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 5214 Environmental Health (3 SH)
Introduces the field of environmental health, which encompasses concerns related to physical, built, and social environments. Discusses the tools used to study environmental exposures and diseases. Examines environmental health hazards, the routes by which humans are exposed to hazards, various media in which they are found, and disease outcomes associated with exposures. Offers students an opportunity to become familiar with methods used to conduct environmental health research and with the federal and state agencies responsible for protecting environmental health.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 5220 Health and Human Rights (3 SH)
Addresses the growing recognition within the field of public health that attention to human rights is essential in developing effective and sustainable health policies and programs. Provides an overview of human rights and the international documents that establish them. Reviews the impact of globalization while providing an in-depth analysis of the human rights-based approach to health through the examination of multiple case studies. Offers students an opportunity to become familiar with a human-rights framework used to design and evaluate public health policies and programs. Additionally, emphasizes educational frameworks to increase awareness of the linkages between health and human rights.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 5222 Health Advocacy (3 SH)
Seeks to educate students about the role of advocacy in public health while providing tools and support to address current healthcare issues. Provides information and theory about advocacy, education, and community organizing in public health practice and skills geared toward direct application. Covers various techniques related to developing and conducting an advocacy project within a community setting. Offers students an opportunity to develop, communicate, and refine a community-based advocacy program.
• Prerequisite: Senior or graduate standing; enrollment in MPH or exercise science program or permission of instructor.

PHTH 5224 Social Epidemiology (3 SH)
Focuses on social epidemiology, which is defined as the study of the distribution and determinants of health in populations as related to the social and economic determinants of health. Includes theories, patterns, and controversies, as well as programs and policies that can be applied to address health inequalities. Readings include articles that situate one dimension of social epidemiology with articles addressing the empirical patterns, address prevailing theories and controversies regarding the causes of the inequalities, as well as address interventions or policies that may be applied to address the inequalities.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 5226 Strategic Management and Leadership in Healthcare (3 SH)
Focuses on management challenges facing healthcare organizations, particularly community-based agencies and their role in the public healthcare delivery system. Introduces strategic thinking and leadership approaches that must be considered for managing a successful healthcare organization. Selected topics include strategic planning; organizational development and the barriers to organizational change; relationship management with key internal and external constituencies; marketing, financial management, and contract negotiation; evolving principles of health insurance and the changing role of the consumer; and the key elements for effective organizational leadership in today’s evolving healthcare marketplace. When appropriate, outside experts are used to supplement readings, case studies, and lecture and discuss practical real-world challenges in leading various healthcare initiatives.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.
PHTH 5228 Advances in Measuring Behavior (3 SH)
Examines current and emerging methods of measuring human behavior known to impact human health. Discusses some of the most common instruments used to measure everyday behaviors and considers how emerging technologies may change how these behaviors are measured in the future. Explores the measurement of behaviors such as activities of daily living, dietary decision making, patterns-of-eating behavior, physical activity, sedentary behavior/posture, screen time, activity in the community, social connectedness, stress and stressful events, affective state, medication adherence, use of alcohol and addictive substances, risky behaviors, and physiological states that can be measured using wearable devices in the field (e.g., heart rate and blood pressure). This is a survey and project-oriented course.

• Prerequisite: Senior or graduate standing.

PHTH 5230 Global Health (3 SH)
Presents an overview of global health issues and focuses on less economically developed countries. Covers measures of disease burden; demography of disease and mortality; Millennium Development Goals (under the auspices of the United Nations); infectious diseases such as HIV/AIDS, tuberculosis, and malaria and their prevention; vaccine utilization and potential implications; chronic diseases; tobacco-associated disease; nutritional challenges; behavioral modification; mother and child health; health human resources; and ethical issues in global health.

• Prerequisite: Senior or graduate standing.
• Cross-list: LAW 7630.
• Equivalent: LAW 7630.

PHTH 5232 Evaluating Healthcare Quality (3 SH)
Focuses on the conceptual and methodological foundations for evaluating the quality of care of healthcare providers—both individual providers and healthcare organizations. Aimed at students pursuing careers in public health, public policy, healthcare management, and the various health professions in the growing field of quality evaluation and improvement. Also designed to give healthcare providers an appreciation for how they may be evaluated. Examines scientific issues in the measurement of quality of care as well as key quality evaluation methods. Also covers the use of risk adjustment and other methodologies for comparing the quality of healthcare providers. Focuses on mechanisms that assess quality, including licensure, accreditation, and board certification.

• Prerequisite: Senior or graduate standing.

PHTH 5234 Economic Perspectives on Health Policy (3 SH)
Uses basic economic concepts to illuminate the many factors that shape health, healthcare, and the healthcare system in the United States. Examines the role of these concepts in explaining the challenges faced in achieving three core goals of the healthcare system: increasing access, limiting cost, and improving quality. Explores how policy makers, market participants, and others can remedy access, cost, and quality deficiencies. Illustrates how economic concepts can be applied to the study of health and health behaviors.

• Prerequisite: Senior or graduate standing.

PHTH 5240 Evaluating Scientific Evidence (3 SH)
Studies how to critically and systematically evaluate the merits of published research involving human subjects. Draws from literatures in public health, medicine, and psychology. Discusses and examines principles of hypothesis testing, study design, sample selection, validity, statistical significance, effect size, systematic reviews, ethics, and multiculturalism. Covers issues of statistical methods and data analysis. Requires no computation. Seeks to help researchers and practitioners become more informed consumers and eventual contributors of scientific information.

• Prerequisite: Senior or graduate standing and completion of at least one prior course in research methods or statistics (e.g., EXSC 6263, HLTH 5450, PHTH 5202, PHTH 5210); undergraduates, nondegree graduate students, and students who have not completed these courses are strongly encouraged to consult with the instructor prior to registering.

PHTH 5280 Food, Food Policy, and Health (3 or 4 SH)
Covers the importance of food and food policy in the lives of individuals and their families; the impact of different policies and practices on health, including disease prevalence and malnutrition; and the structure and functioning of a major sector of the economy in American political discourse, particularly in the last 75 years. Emphasizes the increase of overweight individuals since the 1970s and obesity as a driver of the rise of chronic diseases; the transformation of agriculture from small, privately owned farms to large megacorporations; the transformation of Americans’ eating habits and the growth in the importance of the fast-food industry; and recent trends toward smaller, organic farms and growing interest in sustainability and consumption of locally and regionally grown foods.

• Prerequisite: Senior or graduate standing.
PHTH 5440 Community-Based Participatory Research: Environmental Health (3 SH)
Aims to prepare students for community-based participatory research (CBPR) through historical, theoretical, and methodological materials. Through visits with experienced CBPR researchers, studies the need for, benefits of, and challenges to community-grounded research. Uses the lens of local environmental justice issues to emphasize the importance of CBPR to environmental health and justice work. Offers students an opportunity to engage in hands-on labs, to develop research tools to study their own community as students, to critically analyze CBPR cases, and to develop their own strategic plan to research a pressing environmental health and justice issue through CBPR. Introduces students to critical studies of science and technology.
• Prerequisite: Junior, senior, or graduate standing.

PHTH 5540 Health Education and Program Planning (3 or 4 SH)
Focuses on underlying concepts of health education and explores current health education issues that require intervention. Covers program planning models and theories used in health education. Offers students an opportunity to develop a working knowledge of the planning process for health education through the analysis of case studies and by creating a program plan to address a health issue of their choice. Provides health science students with preparation for HSCI 4710, in which they may choose to implement and evaluate their program plan.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior, senior, or graduate standing.
• NU Core: Writing intensive in the major.

PHTH 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PHTH 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

PHTH 6200 Principles and History of Urban Health (3 SH)
Focuses on the aspects of urban development and life that impact the health and well-being of city residents. Offers students an opportunity to learn about the impact of migration patterns, built environments, occupational stratification, and other cultural and community contextual factors that impact health status and healthcare access. Examines the level of overall health and healthcare found in urban populations, particularly the urban poor, and the disproportionate impact on racial and ethnic minorities in the United States and elsewhere. Considers public policy approaches for addressing the unique health issues of urban areas. Examines urban health issues both from a national and international perspective.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 6202 Intermediate Epidemiology (3 SH)
Offers an intermediate-level course covering key principles, concepts, and methods of population-based epidemiologic research. Topics include observational study designs, measures of disease occurrence and association, validity and bias, confounding, effect modification, multivariate analysis for stratification and adjustment, critical appraisal and meta-analysis, mediation analysis, missing data analysis, and concepts and methods for strengthening causal inference. Offers graduate students unique opportunities to engage in practical applications, including critical reviews of published epidemiologic journal articles, and to conduct hands-on analyses of empirical datasets using SAS statistical software. Designed to serve as a foundation for further advanced training in specialized branches of epidemiology, quantitative methods, and epidemiologic research.
• Prerequisite: Bouvé students only.

PHTH 6204 Society, Behavior, and Health (3 SH)
Explores individual, interpersonal, and social influences on health. Offers students in public health an opportunity to learn the application of the social and behavioral sciences. Examines foundations of public health, including prevention and the prevention paradox, theories of disease causation, and public health ethics. In addition, multilevel influences on health are examined, including behavioral theories and social determinants of health. Throughout the semester, attention is paid to disparities in health. Finally, we examine strategies to reduce health disparities, such as education, interventions, and policy-level changes, and discuss their relative effectiveness.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.
PHTH 6208 Urban Community Health Assessment (3 SH)
Offers students an opportunity to develop a basic understanding of the complex public health issues confronting urban communities across the nation. Uses a community organization and development framework for public health practice. Seeks to provide skills, tools, and experiential learning opportunities that result in community assessments that may be used in public health planning, programming, and policy. Covers key principles and methods for conducting community health assessments utilizing a range of quantitative and qualitative methods, including community epidemiology, major data sets, surveillance data, behavioral risk and other population-based surveys, as well as other primary and secondary data sources. Includes collaborative and interactive exercises, including self- and group reflection, Internet and contemporary media exploration, and in-class discussions.
• Prerequisite: Enrollment in MPH or exercise science program or permission of instructor.

PHTH 6210 Applied Regression Analysis (3 SH)
Builds upon the fundamental concepts and methods of biostatistics with applications to health disciplines. Topics include hypothesis testing, analysis of variance, linear regression, multiple regression, and logistic regression. Examples and readings are drawn from the public health literature. The SAS statistical software package is introduced and used throughout the course.
• Prerequisite: PHTH 5210 or equivalent or permission of the instructor.

PHTH 6228 Public Health Nutrition (3 SH)
Covers public health nutrition issues among individuals, communities, and populations living in urban settings. Emphasizes issues about vulnerable populations, such as ethnic minorities, women, children, and the elderly. Topics include food and nutrition science; evaluation of specific nutrition programs; and the understanding of the role of public health services, policies and legislation, funding, marketing, and communication strategies for the development, evaluation, implementation, and dissemination of nutrition programs. Briefly reviews international public health nutrition issues such as world hunger and food insecurity. Incorporates a service-learning component, involving a partnership with a community-based organization. Expects students to commit two to five hours per week during the course to service-learning activities.
• Prerequisite: Public health and clinical exercise physiology students only or permission of instructor.

PHTH 6232 Neighborhood and Public Health (3 SH)
Examines how neighborhood features and processes affect population health. Introduces the sociological and health literature on neighborhood effects, segregation, and health. Addresses how social policies influence neighborhoods and, thus, population health, as well as how public health practitioners may collaborate with other disciplines to assess urban environments and enhance them to strengthen population health. Reviews a variety of assessment tools from sociology, urban planning, and public health in order to characterize neighborhoods in a systematic and rigorous manner. Covers useful data sources and measurements to examine neighborhood and health issues, as well as assessment tools used to examine whether urban environments are healthy.
• Prerequisite: Basic statistics and data analysis skills; practical experience in urban public health is a plus but not required.

PHTH 6310 Principles of Population Health 2 (3 SH)
Continues PHTH 6400, exploring additional population health research topics and methods and applying more advanced biostatistical and epidemiological analysis methods.
• Prerequisite: PHTH 6400.
PHTH 6440 Advanced Methods in Biostatistics (3 SH)
Explores in detail the analysis of complex survey design, including adjustments for cluster sampling, weighting, and stratification. Designs that incorporate clustering of data are common in health science research. These designs are characterized by data that capture nonindependent repeated measurements on primary sampling units or that collect data with schemes more complex than simple random sampling. The statistical analyses of these types of data need to include appropriate adjustments to provide proper estimates and accurate testing. The second part of the course investigates the use of mixed regression models to analyze repeated measurements on individuals, multilevel data, and growth models.
* Prerequisite: PHTH 6210.

PHTH 6800 Causal Inference in Public Health Research (3 SH)
Exposes students to causal inference approaches, including causal diagrams and counterfactual theory. Students are also asked to draw upon their own research experiences and prior epidemiology training to evaluate public health studies. Covers how to apply the fundamental concepts of counterfactuals and causal diagrams; assess threats to validity in study designs and analysis, including confounding, selection bias, and measurement error/misclassification; evaluate the validity of a public health research study’s design and analysis with respect to addressing causal questions; and critically analyze scientific literature and apply findings to clinical or policy decisions. Offers students an opportunity to think critically and rigorously about the implications of study design and analysis toward addressing public health questions.
* Prerequisite: PHTH 6202.

PHTH 6901 Capstone 1 (1 SH)
Surveys professional development issues that are relevant to successful completion of the public health capstone project and future work as a public health professional. Offers students an opportunity to integrate theory and practice experiences through discussion and reflections. Covers major topics in professional development, such as presentation skills, time management, relationship management, cross-cultural issues in the workplace, and written communication skills. Includes issues that can stall a career in the public health field.
* Prerequisite: Enrollment in MPH Program.

PHTH 6902 Capstone 2 (2 SH)
 Constitutes the second of three public health capstone courses. Students work on-site in a range of diverse public health practice settings reflective of their particular urban health focus. Offers students an opportunity to integrate their theory and practice experiences in a major research, program planning, program implementation, policy development, management, service delivery, or evaluation project. Capstone projects are student-led and designed in consultation with community partners and faculty advisors.
* Prerequisite: PHTH 6901 (may be taken concurrently) and enrollment in MPH Program.

PHTH 6903 Capstone 3 (3 SH)
 Constitutes the third of three public health capstone courses. Students work on-site in a range of diverse public health practice settings reflective of their particular urban health focus. Offers students an opportunity to integrate their theory and practice experiences in a major research, program planning, program implementation, policy development, management, service delivery, or evaluation project. Capstone projects are student-led and designed in consultation with community partners and faculty advisors.
* Prerequisite: PHTH 6902 (may be taken concurrently) and enrollment in MPH Program.

PHTH 6910 Public Health Capstone (3 SH)
Offers students an opportunity for scholarly work on-site in a range of diverse public health settings reflective of their particular urban health focus. Students have an opportunity to integrate their theory and practice experiences in a major research, program planning, program implementation, policy development, management, service delivery, or evaluation project. Student-led and designed in consultation with community partners and faculty advisors, seeks to support students in the implementation and completion of their projects.
* Prerequisite: PHTH 6966; public health students only.

PHTH 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
* Repeatability: May be repeated without limit.

PHTH 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
* Repeatability: May be repeated without limit.
PHTH 7976 Directed Study (1 to 3 SH)
Offers the student the opportunity to bring individual, concentrated attention to a particular public health topic or competency area as arranged and agreed upon in advance by a faculty member and the student. This option is generally recommended when the student desires a more intensive analysis of a particular subject.
• Repeatability: May be repeated without limit.

PHTH 8960 Exam Preparation—Doctoral (0 SH)
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.
• Prerequisite: Population health PhD students only.

PHTH 9000 Comprehensive Exam (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

PHTH 9990 Dissertation (0 SH)
Offers doctoral students an opportunity to work with their advisors and doctoral research committees to perform their doctoral research and to write their dissertation.
• Prerequisite: PHTH 9000; Bouvé doctoral candidates only.
• Repeatability: May be repeated once.

PHTH 9996 Dissertation Continuation (0 SH)
Offers continuation of dissertation research to doctoral students.
• Prerequisite: PHTH 9990; Bouvé doctoral candidates only.
• Repeatability: May be repeated without limit.

PPUA 4225 Special Topics in Public Policy and Urban Affairs (4 SH)
Covers special topics in public policy and urban affairs. Topics are selected by the instructor and vary from semester to semester.
• Prerequisite: Junior or senior standing.
• Corequisite: PPUA 4226.
• Repeatability: May be repeated once.

PPUA 4226 Recitation for PPUA 4225 (0 SH)
Accompanies PPUA 4225. Offers a discussion section for students enrolled in selected sections of the course.
• Corequisite: PPUA 4225.
• Repeatability: May be repeated once.

PPUA 4701 Food Systems Sustainability, Health, and Equity Practicum (4 SH)
Offers students an opportunity to work in teams under faculty guidance on applied projects in food systems sustainability, health, and equity. Course readings focus on the design of applied analysis and on information needed to assess a given problem and provide solutions.
• Prerequisite: Senior standing; open to students who have completed at least two courses that satisfy the minor in food systems sustainability, health, and equity or who have permission of the instructor.

PPUA 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

PPUA 5260 Ecological Economics (3 SH)
Introduces methods and tools of ecological economics, an interdisciplinary field that draws on theories, concepts, and tools from the physical, life, and social sciences; unites the relevant aspects of different disciplines; and generates new knowledge that can serve as a basis for investment and policymaking that is responsive to biophysical constraints on economic processes. Illustrates the use of ecological economics with empirical applications. Offers students an opportunity to apply ecological economics to a variety of environmental issues.
• Prerequisite: Junior, senior, or graduate standing.

PPUA 5261 Dynamic Modeling for Environmental Decision Making (3 SH)
Introduces the theory, methods, and tools of dynamic modeling for policy and investment decision making, with special focus on environmental issues. Makes use of state-of-the-art computing methods to translate theory and concepts into executable models and provides extensive hands-on modeling experience. Topics include discounting, intertemporal optimization, dynamic games, and treatment of uncertainty.
• Prerequisite: Junior, senior, or graduate standing.

PPUA 5262 Big Data for Cities (3 SH)
Investigates the city and its spatial, social, and economic dynamics through the lens of data and visual analytics. Utilizes large public datasets to develop knowledge about visual methods for analyzing data and communicating results. Offers students an opportunity to develop a critical understanding of data structures, collection methodologies, and their inherent biases.
• Prerequisite: Juniors, seniors, and graduate students only.
PPUA 5263 Geographic Information Systems for Urban and Regional Policy (3 SH)
Studies basic skills in spatial analytic methods. Introduces students to some of the urban social scientific and policy questions that have been answered with these methods. Covers introductory concepts and tools in geographic information systems (GIS). Offers students an opportunity to obtain the skills to develop and write an original policy-oriented spatial research project with an urban social science focus.
* Prerequisite: Juniors, seniors, and graduate students only.

PPUA 5265 Urban and Regional Policy in Developing Countries (3 SH)
Explores the issues facing rapidly growing cities in the developing world. By 2040, more than half of the world’s population will live in cities. Analyzes the forces driving a country’s economic development and social change. Focuses on urbanization in poorer countries by examining what causes rapid urbanization; why informal economies are so pervasive and how governments approach this issue; the implications increasing popular demands for involvement in decisions have for urban planning and policy; and how governments respond to globalization and with what distributional impacts. Addresses specific sectoral issues and approaches to urban planning and policy in such areas as housing, climate change and hazard preparedness, economic development, transportation, and urban design and public space.
* Prerequisite: Juniors, seniors, and graduate students only.

PPUA 5266 Urban Theory and Science (3 SH)
Studies the evolution of urban science, looking at some seminal theories that seeded the field and the subsequent work they inspired, including the methodologies developed to examine them. For over a century, social scientists and policymakers have sought to better understand cities, asking important theoretical questions, such as: What is a neighborhood? How does a city grow? What is a city in the first place? Culminates in an examination of urban science in the digital age, exploring how modern technological trends, including “big data,” are posing new questions and offering new ways to answer them.
* Prerequisite: Juniors, seniors, and graduate students only.

PPUA 5270 Food Systems and Public Policy (3 SH)
Explores the public policy dimensions of the contemporary food system. Utilizes scholarly readings and case studies to assess the role of governing institutions and political actors in shaping the food supply; the effects of energy, transportation, and urban policies on food access; the ecological dimensions of food production; impacts of international trade regimes on global food trade; and the potential impacts of climate change on food security. Compares the United States and other nations and explores alternatives to the dominant food system. Seeks to engage students in applied policy analysis of specific food system issues.
* Prerequisite: Junior, senior, or graduate standing.

PPUA 5275 Philanthropy and Civil Society (3 SH)
Examines the history of philanthropy in the United States and the contemporary role of private giving in the economy and civil society. A comparison of philanthropic theories and models provides context for examining philanthropy’s impact on individuals, communities, social movements, and policy. Emphasizes the relationship between wealth and power in a democratic society.

PPUA 5390 Special Topics in Public Policy and Urban Affairs (3 SH)
Covers special topics in public policy and urban affairs. Topics are selected by the instructor and vary from semester to semester.
* Repeatability: May be repeated up to 3 times for up to 12 total semester hours.

PPUA 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated without limit.

PPUA 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated without limit.

PPUA 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
* Prerequisite: Junior, senior, or graduate standing.
* Repeatability: May be repeated without limit.

PPUA 6201 The Twenty-First Century City: Urban Opportunities and Challenges in a Global Context (3 SH)
Offers multidisciplinary examination of the wonders and challenges of urban life, focusing on current dynamics of urban location and prosperity in the context of a global economy. Examines forces that shaped the evolution of cities and metropolitan regions; assesses a range of policy issues confronting metro areas today and the respective roles played by public and private sectors in addressing those challenges; explores global forces that are transforming cities and regions throughout the world; and addresses key questions of urban well-being, civility, and civic engagement.
PPUA 6204 Urban Development and Politics (3 SH)
Analyzes the creation and implementation of urban development policies and programs. Explores subsidies and taxes, housing, commercial and industrial development, and job creation and training projects in terms of their historical, political, economic, and social dimensions.
* Equivalent: POLS 7315.

PPUA 6205 Research Design and Methodology in Urban and Regional Policy (3 SH)
Examines and applies the methodology of social science research to urban and regional policy issues. Focuses on identifying and framing research questions; formulating hypotheses; and following through on the design, development, and implementation of policy-relevant research.

PPUA 6206 Research Toolkit for Urban and Regional Policy: Geographic Information Systems (1 SH)
Develops and applies techniques of geographic information systems (GIS), with primary emphasis on urban and regional policy issues.

PPUA 6207 Research Toolkit for Urban and Regional Policy: Survey Techniques (1 SH)
Develops and applies survey research techniques to urban and regional policy issues.

PPUA 6208 Research Toolkit for Urban and Regional Policy: Qualitative Techniques (1 SH)
Develops and applies qualitative research techniques to urban and regional policy issues.

PPUA 6209 Research Toolkit for Urban and Regional Policy: Working with Datasets (1 SH)
Develops and applies techniques of accessing and using available datasets to address urban and regional policy issues.

PPUA 6210 Research Toolkit for Urban and Regional Policy: Cost/Benefit Analysis (1 SH)
Develops and applies techniques of cost/benefit analysis and related techniques such as cost-effectiveness, economic impact, and social return on investment to urban and regional policy issues.

PPUA 6211 Research Toolkit for Urban and Regional Policy: Using Stata (1 SH)
Introduces the use of the statistical package Stata in social science research.

PPUA 6212 Research Toolkit for Urban and Regional Policy: Project Management (1 SH)
Introduces students to concepts of and tools used in project management as applied to urban and regional policy issues.

PPUA 6213 Research Toolkit for Urban and Regional Policy: Data Visualization (1 SH)
Focuses on how to interpret data visualization and assess the classic and emerging data visualization techniques and their strengths and weaknesses. Covers classic lessons learned from Edward Tufte to contemporary data visualization leaders such as Nicholas Felton and Jer Thorp. Offers students an opportunity to review and critique examples such as Hubway Data Challenge Visualizations to warm up for their own data visualization assignments.

PPUA 6214 Research Toolkit for Urban and Regional Policy: Excel for Policy Research Analysis (1 SH)
Covers the use of Excel workbooks for policy research and analysis. Emphasizes the more advanced features, including text manipulation functions, data arrays and array formulas, table and chart customization, data simulation, and using macros and select developer tools.

PPUA 6215 Geographic Information Systems for Urban and Regional Policy (3 SH)
Introduces students to the use of a geographic information system (GIS) and explores the practical application of GIS in urban and regional policy analysis. Topics include the geographical basis of policy issues, demographic analysis, and spatial mapping as a tool in decision support and policy making. Offers students an opportunity to gain hands-on experience with a leading commercial GIS software package. Exercises explore data gathering, database manipulation techniques, spatial overlay analysis methods, cartography principals, spatial modeling tools, and heuristic problem solving.

PPUA 6216 Research Toolkit for Urban and Regional Policy: Grant Writing (1 SH)
Seeks to prepare students to pursue grant-based funding from a variety of funding agencies and foundations. Offers students an opportunity to develop practical skills in proposal writing and budget development. Examines all aspects of the proposal-writing process, from identifying high-potential funding opportunities to writing and submitting proposals. Assignments offer students an opportunity to apply their learning to real-world interests.
PPUA 6301 Introduction to Computational Statistics (4 SH)
Introduces the fundamental techniques of quantitative data analysis, ranging from foundational skills—such as data description and visualization, probability, and statistics—to the workhorse of data analysis and regression, to more advanced topics—such as machine learning and networks. Emphasizes real-world data and applications using the R statistical computing language. Analyzing and understanding complex data has become an essential component of numerous fields: business and economics, health and medicine, marketing, public policy, computer science, engineering, and many more. Offers students an opportunity to finish the course ready to apply a wide variety of analytic methods to data problems, present their results to nonexperts, and progress to more advanced course work delving into the many topics introduced here.
• Equivalent: DSSH 6301.

PPUA 6302 Information Design and Visual Analytics (4 SH)
Introduces the systematic use of visualization techniques for supporting the discovery of new information as well as the effective presentation of known facts. Based on principles from art, graphic design, perceptual psychology, and rhetoric, offers students an opportunity to learn how to successfully choose appropriate visual languages for representing various kinds of data to support insights relevant to the user’s goals. Covers visual data mining techniques and algorithms for supporting the knowledge-discovery process; principles of visual perception and color theory for revealing patterns in data, semiotics, and the epistemology of visual representation; narrative strategies for communicating and presenting information and evidence; and the critical evaluation and critique of data visualizations.
• Prerequisite: Proficiency in R.
• Equivalent: DSSH 6302.

PPUA 6400 Planning Module in Urban Policy (1 SH)
Relates a professional activity to urban and regional planning.
• Repeatability: May be repeated without limit.
• Equivalent: PPUA 8400.

PPUA 6407 Internship in Public Policy and Urban Affairs (3 SH)
Seeks to provide relevant professional experience, to include planning, research, policy development, or implementation of policy, of at least fifteen hours per week with a public, private, or nonprofit institution that focuses on urban and regional policy.
• Repeatability: May be repeated once.
• Equivalent: PPUA 8407.

PPUA 6408 Internship Continuation (0 SH)
Offers a continued internship supervised by the faculty internship instructor.
• Prerequisite: PPUA 6407; restricted to students in the College of Social Sciences and Humanities.

PPUA 6500 Principles of Public Administration (3 SH)
Introduces students to concepts and approaches to analyzing significant factors and relationships in government agencies and public-oriented nongovernmental organizations as they function in their environments. Examines the legal and constitutional foundations of public administration, bureaucratic structure and administrative power, managerial accountability and ethics, human resource management, economics of organization, decision making, budgeting, implementation and “street-level” bureaucrats, and more recent developments in public administration, such as performance management and public management networks.

PPUA 6502 Economic Institutions and Analysis (3 SH)
Introduces the fundamentals of macroeconomics and microeconomics as well as the role of key economic institutions, such as the Federal Reserve. Includes analysis of government’s role in a market economy and introduces methods of economic analysis.
• Equivalent: POLS 7304.

PPUA 6503 Public Personnel Administration (3 SH)
Introduces students to the public personnel function from a managerial standpoint. Addresses methods of constructive leadership of government personnel, leadership that encourages a more competent, motivated, and representative public administrative work force. Employs case studies and films, along with assigned readings.
• Equivalent: POLS 7301.

PPUA 6504 Organizational Theory and Management (3 SH)
Examines the general principles underlying organizational structures and processes. Topics include models and ideal types, open systems theories, organizational technologies, decision making, and organizational development and change.
• Equivalent: POLS 7302.

PPUA 6505 Public Budgeting and Financial Management (3 SH)
Surveys governmental budgeting at the federal, state, and local levels. Surveys major revenue sources and expenditure responsibilities. Discusses budgetary processes and politics, as well as resulting policies. Considers both proposed and implemented reforms. Also introduces financial management practices including cash management, fund accounting, debt financing, endowment spending and control, cost allocation procedures, and tax expenditures.
• Equivalent: POLS 7303.
PPUA 6506 Techniques of Policy Analysis (3 SH)
Provides a systematic approach to understanding the origins, formulation, implementation, and impact of government outputs. Reviews key analytical concepts and competing theoretical perspectives. Considers both the political dimensions of public policymaking and the technical aspects of program design within the natural history of the policymaking process. Draws on case materials from a spectrum of policy areas.
• Equivalent: POLS 7203.

PPUA 6507 Institutional Leadership and the Public Manager (3 SH)
Examines the problems and techniques relevant to effective management of a public agency in a complicated and often turbulent political environment. Topics include legislative relations, media relations, role of the courts, unions and advocacy groups, policy implementation and evaluation, and setting and working with high standards of integrity.
• Equivalent: POLS 7305.

PPUA 6508 Capstone Seminar in Public Policy and Public Management (3 SH)
Offers an applied research project for students who have completed all or nearly all of their course work. Students work in teams to study a policy or public management issue currently facing a government agency. Teams conduct research and prepare an oral and written report for presentation to the agency as well as to the class. Readings focus on material needed to analyze the assigned issue as well as limited general readings on public policy and public administration. In addition, each student will complete a personal strategic plan that identifies career goals and assesses his or her current skill level and future skill needs to reach that goal.
• Equivalent: POLS 7306.

PPUA 6509 Techniques of Program Evaluation (3 SH)
Reviews methodologies for assessing the impact of public policy. Includes experimental and quasi-experimental research design, the value and limits of case studies, political and organizational barriers to evaluation research, report writing, and procedures for instituting change.
• Equivalent: POLS 7318.

PPUA 6510 Functions and Techniques of Public Management (3 SH)
Examines the problems and techniques relevant to management of a public agency, with an emphasis on internal issues that face public managers. Topics include planning and agenda setting; organizational design; agency budgeting; employee recruitment, selection, and development; and reporting, monitoring, and evaluation.
• Equivalent: POLS 7307.

PPUA 6520 Managing Information Technologies (3 SH)
Explores the opportunities and challenges of devising, implementing, and managing information technologies in the public and nonprofit sectors. Focuses on potential benefits offered by a range of technologies, from smartphone apps to “Big Data” analytical systems, to gather more real-time information and deliver more timely, responsive, and effective services. Also covers implementation and management challenges and a range of broader societal issues, from citizen privacy to public accountability, that invariably arise with such technologies.
• Equivalent: POLS 7317.

PPUA 6521 Administrative Law and Politics (3 SH)
Introduces students of American politics and policymaking with a segment of politics that concerns the relationship between administrative agencies and the courts that review them. Emphasis is on the development of important administrative law principles and the application of these principles to practical problems in public administration.
• Equivalent: POLS 7310.

PPUA 6522 Administrative Ethics and Public Management (3 SH)
Analyzes ethical problems in American public administration including discussion of ethical dilemmas frequently faced by public managers.
• Equivalent: POLS 7311.

PPUA 6523 Accountability, Performance Measurement, and Contracting in the Public Sector (3 SH)
Examines three important topics in public policy and administration: accountability, performance measurement, and contracting. These three topics are interrelated, and issues related to them often arise in contemporary public administration. Offers students an opportunity to explore these topics through assigned readings, cases, lectures, and class discussions.
• Equivalent: POLS 7335.

PPUA 6524 Case Studies in Policy Analysis (3 SH)
Focuses on detailed analyses of selected issues and episodes in public policy development. Requires students to complete oral and written analyses of cases, applying a variety of relevant techniques.
• Equivalent: POLS 7328.
PPUA 6525 Institutions and Public Policy (3 SH)
Blends theoretical literature and case studies to examine problems of policymaking and governance in contemporary political systems, emphasizing the policy impacts of political institutions. Studies systematic variations across types of political institutions and regimes in developed and developing nations and extends beyond the nation-state to address policy dynamics (e.g., harmonization, multilevel governance) in supranational and international systems. Establishes the broader political system contexts within which policy formation and implementation reside. Offers students an opportunity to learn to analyze, synthesize, and apply a range of theoretical literatures relevant to policy design and impact.
- *Cross-list: POLS 6525.
- *Equivalent: POLS 6525.

PPUA 6530 State and Local Public Finance (3 SH)
Analyzes the fiscal dimensions of state and local governments in the United States. Examines the types and ranges of tax and nontax revenues available to local and state governments and factors shaping the types of revenue sources utilized. Also assesses local and state government spending trends, use of public funds for economic development and other goals, impacts of federal mandates on local and state budgets, distinctions between operating and capital budgets, and the overall legal and political factors shaping public finance.
- * Equivalent: POLS 7316.

PPUA 6551 Nonprofit Organizations and Social Change (3 SH)
Offers an overview of fundamental principles and practice in the nonprofit sector as they relate to social change. Topics include systems change and stakeholder identification, design thinking and human-centered design, theory of change and logic models, program design and evaluation, strategic and business planning, organizational structure and capacity building, governance, and communications and social media.
- * Equivalent: POLS 7308.

PPUA 6552 The Nonprofit Sector in Civil Society and Public Affairs (3 SH)
Examines the challenges facing the nonprofit sector, particularly as it relates to civil society and public policy concerns. Emphasizes current controversies in which the nonprofit sector is involved, such as the impact of changes in government spending and tax policy, the nature and legitimacy of nonprofit advocacy, the role of faith-based organizations in providing public services, accountability and oversight of nonprofit organizations, the growth of social entrepreneurship, and the work of nonprofits in fostering social capital and supporting civic engagement.
- * Equivalent: POLS 7309.

PPUA 6553 Nonprofit Financial Resource Development (3 SH)
Offers a comprehensive overview of resource development and financial management in nonprofit organizations. Topics include fund-raising and development planning, nonprofit budgeting and financial reporting, investments and earned income for nonprofits, and government contracting and grants.
- *Equivalent: POLS 7337.

PPUA 6554 International NGOs and Transnational Activism (3 SH)
Explores the theoretical, practical, and ethical elements of the nonprofit sector, which continues to play a critical role in responding to crisis, social and economic inequality, and propelling the human rights agendas forward in a rapidly evolving geopolitical landscape. Both nationally and abroad, nonprofit organizations are addressing society’s most pressing issues. These organizations are compelled to help meet basic human needs during natural and manmade disasters and fill gaps left by government and industry. However, their involvement isn’t without implications, both on the local and international level. Encourages students to consider the complex and sometimes contradictory work being performed by international nongovernmental organizations with an eye to sound program design and leadership.

PPUA 6960 Exam Preparation—Master's (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

PPUA 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
- * Repeatability: May be repeated without limit.

PPUA 7225 The Open Classroom: Public Debates on Public Policy (3 SH)
Offers special topics built around a series of public debates on selected issues of public policy.
- * Corequisite: PPUA 7226.
- * Cross-list: LAW 7627.
- * Repeatability: May be repeated without limit.
- * Equivalent: LAW 7627.

PPUA 7226 Open Classroom Recitation (0 SH)
Provides a small-group discussion format to cover material in the corequisite lecture course.
- * Corequisite: PPUA 7225.
- * Cross-list: LAW 7628.
- * Repeatability: May be repeated without limit.
- * Equivalent: LAW 7628.
PPUA 7230 Housing Policy (3 SH)
Examines the economic, social, and legal underpinnings of housing policy in the United States across a variety of topics, including housing finance and production, public and affordable housing, home ownership, and fair housing. Housing is both an essential human need and a critical sector of the U.S. economy. Presents the complicated and evolving roles of all of those involved in housing policy, including federal, state, and local government, and the private and profit sectors. Guest speakers provide real-world insights into current housing policy challenges.

PPUA 7231 Transportation Policy (3 SH)
Examines the physical, technological, economic, social, cultural, and political underpinnings of transportation policy in the United States. Topics include intra- and interstate transportation, the comparative economics of different modes of transportation, the impacts of federal and state policies on transportation options, and the long-term effects of those choices on metropolitan development, housing, land use, energy, and the environment. Also involves comparisons with transportation systems in other countries.

PPUA 7232 Immigration and Urban America (3 SH)
Examines the policy impacts of legal and illegal immigration in the United States, emphasizing the ways immigration shapes urban America. Discusses trends in immigration; elements of U.S. immigration policy; impacts of immigration on labor markets, economic development, housing, education, healthcare, criminal justice, race relations, and social policy (e.g., welfare); and effects on broader mass culture. Also considers the range of policy tools available in addressing these impacts.

PPUA 7233 Contemporary Community Development (3 SH)
Explores the political and social dynamics of community development in urban America, with particular focus on the local politics of housing, economic development, jobs, healthcare, access to services, and community safety. Uses Boston and its region as a laboratory to examine the role of grassroots community groups in shaping their neighborhoods, set within the broader institutional contexts that affect their representation and impacts.

PPUA 7234 Land Use and Urban Growth Policy (3 SH)
Explores the evolution of land use and urban form in the United States and surveys different types of land-use and urban-growth management tools used by local, regional, and state governments. Examines the environmental, economic, spatial, and social impacts of different patterns of urban growth, including “sprawl” and “smart growth,” and the different philosophies and legal and policy approaches employed to manage those impacts. Also explores how land-use and urban-growth policy interacts with related priorities, including housing, infrastructure, and fiscal policy. Focuses on current and emerging issues and debates in land-use and urban-growth management, such as New Urbanism, livable communities, and transit-oriented development.

PPUA 7235 Urban and Regional Policy and Planning in Developing Countries (3 SH)
Explores the issues facing rapidly growing cities in the developing world. By 2040, more than half of the world’s population will live in cities. Analyzes the forces driving a country’s economic development and social change. Focuses on urbanization in poorer countries by examining what causes rapid urbanization; why informal economies are so pervasive and how governments approach this issue; the implications increasing popular demands for involvement in decisions have for urban planning and policy; and how governments respond to globalization and with what distributional impacts. Addresses specific sectoral issues and approaches to urban planning and policy in such areas as housing, climate change and hazard preparedness, economic development, transportation, and urban design and public space.

PPUA 7236 Introduction to Real Estate Development for Urban Policy Makers (3 SH)
Introduces the basic skills and knowledge of real estate development used within public-private partnerships to address policy and planning issues. Through a series of problem sets, offers students an opportunity to learn basic real estate finance and computation, including the fundamentals of pro forma modeling. Covers the entire real estate development process, from preliminary market and financial analysis through to construction management and property management using case studies and guest lecturers. Explores how public-private partnerships shape the outcomes of urban redevelopment within specific topics that may include affordable housing provision, brownfield redevelopment, transit-oriented development, sustainable urban development, and others.
PPUA 7237 Advanced Spatial Analysis of Urban Systems (3 SH)
Builds on skills covered in PPUA 5263. Offers students an opportunity to obtain greater depth in the analysis of urban spatial data focused on several urban systems (including social, built, and natural systems). Focuses on understanding the spatial relationships between various new and large urban datasets relevant to current policy challenges within cities. This is a project-based class.
* Prerequisite: PPUA 5263.

PPUA 7238 Climate Change and Urbanization in Developing Countries (3 SH)
Focuses on the climate-change-related challenges that confront rapidly urbanizing countries, particularly the low- and middle-income countries of Asia, Africa, and Latin America. Many of the largest and most rapidly growing cities in these regions are in low-lying coastal cities in river deltas and, consequently, face significant dangers of flooding and eventual inundation. Climate change also has implications for access to freshwater and for the incidence of heat waves. The impacts of climate-change-related hazards tend to fall most heavily on the poorest, raising new issues of social inequality. This course examines concepts of urban vulnerability and resilience and climate change adaptation, as well as case studies of policy approaches for addressing the impacts of climate change on cities.

PPUA 7239 Problems in Metropolitan Policymaking (3 SH)
Examines the broad challenges that confront metropolitan areas-defined as including the center city, its immediate suburbs, and the broader periphery-including economic development, land use, transportation, housing, and the provision of basic services. Considers the array of tools available to policymakers, including planning, tax policy, pooling of services, and zoning.
* Equivalent: POLS 7324.

PPUA 7240 Health Policy and Politics (3 SH)
Examines contemporary healthcare policies, programs, and politics. Discusses the structure of the healthcare system and its costs, efforts to develop universal health coverage, the spread of managed care, and related topics.
* Equivalent: POLS 7321.

PPUA 7241 Issues in Health Policy and Administration (3 SH)
Discusses selected ethical and legal issues and the topics relevant to health policy and administration, such as healthcare rationing, confidentiality of patient data, informed consent, end-of-life issues, physician-assisted suicide, and medical malpractice.
* Equivalent: POLS 7322.

PPUA 7242 Mental Health Policy Analysis and Administration (3 SH)
Examines key issues in the development of mental health policy from both U.S. and comparative perspectives. Also includes discussion of implementation processes and barriers in the establishment of comprehensive systems of community care.
* Equivalent: POLS 7323.

PPUA 7243 International Development Administration and Planning (3 SH)
Takes a “manager’s eye view” of the formulation, implementation, evaluation, and improvement of development projects in less developed countries. Also focuses on the planning dynamics of host-government, bilateral, and multilateral organizations as they analyze and tackle such problem areas as agriculture, education, health, population, and land reform. Employs simulations and case studies.
* Equivalent: POLS 7326.

PPUA 7244 Comparative Public Policy and Administration (3 SH)
Considers explanations of variation between states and solutions to administrative problems by examining such issues as culture, organization, budgeting, recruitment, accountability, reform, and the politics of bureaucracy and public policy, among others, in a cross-national, cross-cultural, and international context. Uses examples from Africa, Asia, and Latin America, as well as from the United States and Europe.
* Equivalent: POLS 7327.

PPUA 7245 Education Policy in the United States (3 SH)
Examines the major policies and political dynamics that shape the delivery of educational services in the United States. Reviews the historical role of public education in American society and examines the legal context and intergovernmental relationships that provide the political framework for public education. Explores school finance, accountability and assessment strategies, issues of race and poverty, as well as major reform initiatives. Focuses on elementary and secondary education.
* Equivalent: POLS 7330.
PPUA 7247 Doctoral Seminar in U.S. Health Policy and Management (3 SH)
Offers a high-level introduction to issues surrounding U.S. health policy and management. Focuses on aspects of the Affordable Care Act, including quality, innovation, patient engagement, workforce supply, and access. Emphasizes learning about the organization and delivery aspects of the system that inform these issues. To facilitate this, the course introduces students to organizational and sociological theories for studying the healthcare system. Covers best practices for designing publishable research to pursue health policy and management questions. Offers students an opportunity to apply course learning in practical ways. Designed to be of particular interest to doctoral students interested in healthcare and in developing a health-related dissertation proposal, pilot study, or conceptual paper.
• Prerequisite: Doctoral students only.

PPUA 7248 Urban Revitalization (3 SH)
Examines how and why cities grow and decline from both theoretical and empirical perspectives. Analyzes economic, spatial, and social aspects of growth and decline, mostly from the perspective of North American and European cities and mostly in the postwar period. Explores the conditions under which municipal governments and the private sector can revitalize declining neighborhoods and cities. Covers how cities revitalize in response to natural (e.g., hurricanes, floods) and technical (e.g., nuclear accidents, terrorist events, oil spills) disasters. Offers students an opportunity to understand how and why urban disinvestment happens; to become familiar with historical efforts to revive cities; and to be able to describe several urban revitalization strategies, critically analyze their objectives, and understand factors that are conducive to and barriers to their success.

PPUA 7249 Urban Coastal Sustainability (3 SH)
Focuses on the challenges facing coastal cities and the ecosystems on which they depend by exploring both threats such as climate change as well as adaptation measures that promote resilience. Aimed at students interested in the interface of science and public policy and those who wish to gain a deeper understanding of how coupled human-natural ecosystems operate.

PPUA 7336 Social Capital and Resilience (3 SH)
Examines the role of social capital as in trust, governance, and economics. Focuses on networks and connections in disasters and resilience around the world.
• Cross-list: POLS 7336.
• Equivalent: POLS 7336.

PPUA 7346 Resilient Cities (3 SH)
Examines the characteristics of resilient cities, especially those located in coastal regions. Investigates the capacity of cities to respond to major disruptions to their social and ecological systems. Includes extensive use of case studies, such as the 2004 Indian Ocean tsunami and Hurricane Katrina in 2005, as well as readings on cities and social systems. Offers students an opportunity to analyze an urban area and provide recommendations for improving its resilience.
• Cross-list: POLS 7346.
• Equivalent: POLS 7346.

PPUA 7380 Behavior and Public Policy (3 SH)
Examines how people behave in response to public policy incentives, how such behavior can be predicted, and how to evaluate the extent to which policies affect well-being. Predicting the impacts of policies requires that one anticipate how individuals will behave in response to change. Will income support reduce work effort or savings? Will longer sentences for convicted criminals lead to lower crime rates? Will managers maximize long-run corporate profits for shareholders? Starts with the explicit behavioral model used by economists (expected utility maximization) and its normative implications. Then seeks to understand why people do not behave as that model would predict. Finally, examines concepts about human happiness and its relation to life circumstances and assesses the guidance such concepts offer for policy design.

PPUA 7390 Special Topics in the Social Sciences (3 SH)
Examines selected topics in the social sciences and public policy.
• Repeatability: May be repeated up to 2 times.

PPUA 7673 Capstone in Public Policy and Urban Affairs (3 SH)
Offers an opportunity for student teams, in partnership with a local, state, or federal agency or nonprofit institution, to assess an urban or regional problem, produce a thorough policy analysis, and present it and recommended solutions to the agency or institution. Course readings focus on materials needed to assess the problem and provide solutions. This is a faculty-guided team project for students completing course work in urban and regional policy studies.
• Repeatability: May be repeated without limit.

PPUA 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.
PPUA 7978 Independent Study (1 to 4 SH)
Offers a reading course for the student who wants guidance in the archival exploration and in-depth study of a topic of interest. Conducts study through a series of individual tutorials or discussions with a faculty member that typically involve an extensive, analytical review of the literature. Interested students should consult directly with the relevant faculty member or with a department advisor for guidance in locating the most appropriate faculty person at least one semester before the study is undertaken.
• Repeatability: May be repeated without limit.

RUSSIAN (RSSN)

RSSN 1101 Elementary Russian 1 (4 SH)
Explores the essentials of grammar, practice in pronunciation, acquisition of basic vocabulary, and idiomatic expressions of everyday Russian.

RSSN 1102 Elementary Russian 2 (4 SH)
Continues RSSN 1101. Studies grammar and spoken and written forms of the language. Covers more advanced features of the language.
• Prerequisite: RSSN 1101 or RSSN 1301.

RSSN 1301 Elementary Russian Immersion 1 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

RSSN 1302 Elementary Russian Immersion 2 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue developing their proficiency in reading and writing, to continue to develop their understanding of the language structure and spelling rules, and to work on their vocabulary in order to develop skills to express themselves more fluently and accurately in Russian.
• Prerequisite: RSSN 1501.

RSSN 1502 Elementary Russian 2 for Heritage Speakers (4 SH)
Continues RSSN 1501. Offers students an opportunity to continue developing their proficiency in reading and writing, to continue to develop their understanding of the language structure and spelling rules, and to work on their vocabulary in order to develop skills to express themselves more fluently and accurately in Russian.
• Prerequisite: RSSN 1501.

RSSN 2101 Intermediate Russian 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Russian materials.
• Prerequisite: RSSN 1102 or RSSN 1302.

RSSN 2102 Intermediate Russian 2 (4 SH)
Builds on RSSN 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary Russian materials.
• Prerequisite: (a) RSSN 2101 or RSSN 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

RSSN 2301 Intermediate Russian Immersion 1 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

RSSN 2302 Intermediate Russian Immersion 2 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

RSSN 2900 Specialized Instruction in Russian (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.
• Repeatability: May be repeated without limit.
RSSN 3101 Advanced Russian 1 (4 SH)
Builds on RSSN 2102. Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: RSSN 2102 or RSSN 2302.

RSSN 3102 Advanced Russian 2 (4 SH)
Builds on RSSN 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.
• Prerequisite: RSSN 3101 or RSSN 3301.

RSSN 3301 Advanced Russian Immersion 1 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

RSSN 3302 Advanced Russian Immersion 2 (4 SH)
Designed for students who are in a Russian-speaking country, this is an off-campus immersion course. Offers students an opportunity to continue to develop grammatical and conversational competence.

RSSN 3800 Special Topics in Russian (1 to 4 SH)
Focuses on a unique aspect of the Russian language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an intermediate level of skill in the language.
• Repeatability: May be repeated up to 3 times.

RSSN 3900 Specialized Instruction in Russian (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
• Prerequisite: At least an advanced level of competence in the language.
• Repeatability: May be repeated without limit.

RSSN 4800 Special Topics in Russian (1 to 4 SH)
Focuses on a unique aspect of the Russian language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
• Prerequisite: At least an advanced level of skill in the language.
• Repeatability: May be repeated up to 4 times.

RSSN 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

RSSN 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
• Repeatability: May be repeated without limit.

RSSN 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated up to 3 times.

RSSN 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

RSSN 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SMFA 3000 Museum of Fine Arts Studio (2 to 12 SH)
Offers course work at the School of the Museum of Fine Arts.
• Repeatability: May be repeated without limit.
SMFA 4000 Museum of Fine Arts Capstone (2 to 12 SH)
Offers capstone course work at the School of the Museum of Fine Arts.
- NU Core: Capstone, experiential learning.
- NUpath: Demonstrating thought and action in a capstone.
- Repeatability: May be repeated without limit.

SMFA 6000 Museum of Fine Arts Studio (1 to 12 SH)
Offers course work at the School of the Museum of Fine Arts.
- Prerequisite: restricted to NU/SMFA MFA students.
- Repeatability: May be repeated without limit.

SOCIOMETRY (SOCL)

SOCL 1000 Sociology at Northeastern (1 SH)
Intended for first-year students in the College of Social Sciences and Humanities. Introduces students to liberal arts; familiarizes them with their major; develops the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps to develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.
- Equivalent: ANTH 1000, CRIM 1000, ECON 1000, FSEM 1000, HUSV 1000, INSH 1000, INTL 1000, LANG 1000, PHIL 1000, and POLS 1000.

SOCL 1101 Introduction to Sociology (4 SH)
Explores basic concepts and theories concerning the relation between individuals and society. Emphasizes the influence of culture, social structure, and institutions in explaining human activity. Discusses and analyzes social groups, socialization, community, class, power, and social change, among other substantive issues.
- NU Core: Social science level 1.
- NUpath: Understanding societies and institutions.

SOCL 1103 Women’s Studies (4 SH)
Surveys the issues and methodologies involved in the interdisciplinary study of women. Examines the political, economic, social, and historical processes that have created both the image and the reality of women in societies. Guest lecturers provide an overview of the diverse disciplinary approaches to the study of women.
- NU Core: Humanities level 1, comparative study of cultures.
- Equivalent: HIST 1103, PHIL 1103, and WMNS 1103.

SOCL 1120 Society and Health (4 SH)
Applies social scientific perspectives to the study of health, illness, and healthcare. Explores the ways that societal factors such as race, class, and gender interplay with health, healthcare, and health disparities. Studies neighborhoods and social networks in relation to health. Introduces basic sociological concepts relevant for the study of health and healthcare, such as social construction and medicalization. Offers students an opportunity to develop critical assessment skills while exploring a range of explanations for why, despite having the most expensive healthcare system, the United States ranks comparatively low in life expectancy and health and well-being outcomes. Uses lectures, case-based learning, and small-group workshops to explore the ways that our social environment shapes health in contemporary U.S. society.
- Corequisite: SOCL 1121.
- Cross-list: PHTH 1120.
- NU Core: Social science level 1.
- NUpath: Understanding societies and institutions.
- Equivalent: PHTH 1120.

SOCL 1121 Society and Health Recitation (0 SH)
Provides a small-group discussion format to cover material in the corequisite lecture course.
- Corequisite: SOCL 1120.
- Cross-list: PHTH 1121.
- Equivalent: PHTH 1121.

SOCL 1200 Sociology of Alcoholism (4 SH)
Focuses on social responses to alcohol use. Examines drinking cultures and drinking practices in the United States; processes by which people are labeled “alcoholics,” and the role of agencies of social control, such as the criminal justice system and the healthcare system, in labeling and rehabilitation.

SOCL 1215 Society and Culture in Russia (4 SH)
Focuses on contemporary Russian society. Emphasizes the current and recent social, economic, and political characteristics of Russia and the ways in which it has evolved in the post-Soviet period.
- Cross-list: INTL 1215.
- NU Core: Comparative study of cultures, social science level 1.
- NUpath: Interpreting culture, understanding societies and institutions.
- Equivalent: INTL 1215.

SOCL 1220 Sociology of Boston (4 SH)
Examines Boston from the perspectives of environmental development, neighborhood and intergroup relations, institutional services, and symbolic meanings. Explores current issues in the city through term projects. Requires field trips.
- NU Core: Social science level 1.
SOCL 1222 Special Topics in Sociology (4 SH)
Designed as a specialized themes course for students in sociology and/or anthropology. Takes advantage of unique opportunities—visiting guests, special thematic interests—that are not part of the regular curriculum.

SOCL 1225 Aging in Society (4 SH)
Focuses on aging and the consequences of population aging. The population of the United States, as in many developed societies, has registered rapid growth in its elderly population. Examines the impact of an aging population on the healthcare system, family structure, the retirement system, and the economy. The policy implications of these changes are discussed with consideration of how policies addressing the elderly may affect other groups in society.

SOCL 1228 Social Problems (4 SH)
Analyzes in both empirical and theoretical terms many of the social problems currently facing Americans. Among these are deepening inequality and poverty among working and middle-class Americans, particularly racial minorities, women, and youth; related problems of racism and sexism; growing unemployment; international ecological crisis; deterioration of the health system; crime; and war and militarism. Strategies and political options for solving these problems are considered.
* NU Core: Social science level 1.

SOCL 1232 American Society (4 SH)
Focuses on American society, culture, and major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Examines social classes and stratification, mobility, and individualism.
* Equivalent: SOCL 3403.

SOCL 1235 Social Psychology (4 SH)
Taught from a sociological perspective, social psychology represents the study of the relationship between the individual and society. Focuses on the ways human behavior is tied to social and cultural contexts, and how individuals shape and are shaped by group interaction. Topics may include socialization and how people develop a “social sense of self”; cross-cultural differences in interactional styles; pressures to conform to roles and stereotypes; identity formation and change, attitudes, interpersonal attraction, and prejudice and discrimination.

SOCL 1240 Sociology of Prejudice and Violence (4 SH)
Examines factors in the development and maintenance of prejudice and discrimination. Discusses American race relations, anti-Semitism, sex roles, and stereotyping.
* NU Core: Comparative study of cultures.

SOCL 1241 Sociology of Violence (4 SH)
Examines the notion of violence and its pervasive presence in the social institutions we create and maintain every day. Conducts sociological analysis of the issues we address, borrowing from other disciplines as they prove helpful. Sociology tells us that beliefs, values, and norms that characterize the United States legitimate the preference for violence, largely through the obvious venues of the mass media that glorify violence but also in the subtler structural arrangements collectively constructed and maintained in our everyday behaviors. Offers students an opportunity to understand how the structure of our society and its social institutions inhibit or facilitate violent behavior.
* NU Core: Social science level 1.
* NUpath: Understanding societies and institutions.

SOCL 1245 Sociology of Poverty (4 SH)
Analyzes American poverty in historical perspective, drawing on comparisons with other countries. Critically evaluates sociological research and theories relating to poverty. Considers causes and effects of poverty as well as societal responses to poverty and its consequences. Suitable for students in applied fields, such as nursing, criminal justice, education, allied health, premed, and prelaw.

SOCL 1246 Environment and Society (4 SH)
Examines the social, political, and economic forces behind the global environmental crisis. Topics include such issues as global warming and climate disruption, world resource availability and the global economic crisis, environmental justice and social inequities in the exposure to ecological hazards, science and technology, environmental degradation in the Third World, globalization and unfair trade, state power and the role of the polluter-industrial complex in the United States, the history of the environmental movement, and exemplary environmental policies and programs. This theoretically oriented course also involves practical experience in environmental problem solving.
* NU Core: Social science level 1.
* NUpath: Understanding societies and institutions, engaging difference and diversity.

SOCL 1247 Urban Social Problems (4 SH)
Focuses on the foundations of urban life in historical perspective. Analyzes relation of city life to environment, population, social organization, technology, and cultural values. Examines growth trends, urbanization, urban planning, and citizen action.
* NU Core: Social science level 1.
* NUpath: Understanding societies and institutions.
SOCL 1255 Sociology of the Family (4 SH)
Focuses on families historically and across cultures and classes. Considers changes in contemporary families in terms of gender, family composition; women’s labor force participation, divorce, cohabitation, and other transformations.
• Cross-list: WMNS 1255.
• NU Core: Social science level 1.
• Equivalent: WMNS 1255.

SOCL 1256 Violence in the Family (4 SH)
Examines physical, emotional, and sexual violence in families. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence as well as social policy issues and problems of legal intervention.
• Cross-list: WMNS 1256.
• NU Core: Social science level 1.
• Equivalent: WMNS 1256.

SOCL 1260 Gender in a Changing Society (4 SH)
Considers why and how gender is socially constructed in U.S. society and looks at different theories of gender. Explores gender as an institution as well as different (cultural) expressions of masculinities and femininities. Includes topics of gender in everyday life as well as gender as an organizing principle in the institutions of families, education, workplaces, sexualities, religion, the media, politics, and forms of gender violence.
• Cross-list: WMNS 1260.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: WMNS 1260.

SOCL 1272 Social Roles in the Business World (4 SH)
Analyzes the social structure of corporate and business life in contemporary America. Presents and discusses case studies from major accounting and/or industrial firms. Examines the “career line” in the world of business and management, with a special focus on age/sex, racial/ethnic, and class/income barriers.

SOCL 1273 Sociology of Gender and Work (4 SH)
Explores how gender both shapes and is shaped by experiences in the labor market. Considers the extent to which work is “gendered” and the ways in which this influences the jobs that men and women perform, the rewards they receive for their efforts, and their experiences in the workplace and at home. Underscores the relationship between paid and unpaid work (especially household labor).
• Cross-list: WMNS 1273.
• Equivalent: WMNS 1273.

SOCL 1275 Social Stratification (4 SH)
Explores the causes and consequences of the unequal distribution of prestige, power, and wealth in human societies. Topics may include theories of social stratification; varieties of human stratification systems; various dimensions of stratification (race gender, class); and the ideologies used to justify (and criticize) inequalities. While the features of multiple societies are considered, primary emphasis is on the development and contemporary structure of the American class system.

SOCL 1276 Sociology of Occupations and Professions (4 SH)
Focuses on the meanings of work; division of labor and specialization; analysis of occupational structure and patterns of recruitment, training, and career preferences; and the classic professions and new trends in professionalization.

SOCL 1280 The Twenty-First-Century Workplace (4 SH)
Analyzes dramatic changes occurring in the work lives of Americans and considers the future of American workers within the global economy. Explores emerging labor markets, gender, race, and technology in shaping contemporary American work settings.
• NU Core: Social science level 1.

SOCL 1283 Globalization and Social Change (4 SH)
Focuses on the economic, sociocultural, and political dimensions of globalization, emphasizing trends unfolding during the post–World War II era. Emphasizes the shifting organization of economic activity, the changing role of the nation-state, the emergence and spread of new cultural forms, and the linkage between global forces and urban and regional patterns of development. Additional topics include patterns and forms of social inequality, the relation between gender and globalization, the rise of transnational social movements, and the growth of global awareness.
• NU Core: Social science level 1.

SOCL 1285 Deviant Behavior and Social Control (4 SH)
Explores the conditions under which people categorize others as deviant; processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images; development of deviant careers and their relation to deviant subcultures; and situations in which people transform deviant identity.

SOCL 1287 Sociology of Religion (4 SH)
Offers a comparative and analytic treatment of religion as a social institution, focusing on the relations between religious organizations and other social institutions, with particular emphasis on the American experience. Analyzes religion as an agent of social change and stability.
SOCL 1290 Juvenile Delinquency (4 SH)
Examines the sociological and psychological approaches to juvenile delinquency and their implications for a typology of delinquency. Discusses problems of prevention, treatment, and rehabilitation.

SOCL 1295 Drugs and Society (4 SH)
Offers an introduction to the sociology of drugs. First examines social definitions of drugs, conditions of their use, and socialization into drug use. Then considers deviant drug use and effects of social control on definitions and use. Considers a range of licit and illicit drugs, but major emphasis is on alcohol, marijuana, and heroin.

SOCL 1297 Sociology of Popular Culture (4 SH)
Presents a sociological analysis of popular culture, focusing on the relationship between popular culture and social institutions such as religion, law, education, economy, and family; the organizations and artistic communities that produce popular culture such as the music industry, advertising, media, and television; and personal and political issues raised by popular culture.

SOCL 1298 Sociology of Hip-Hop: Politics, Identity, and Youth Culture in the Late Twentieth Century (4 SH)
Examines the global development of hip-hop and its manifestations in the realm of music, visual art, fashion, and language. Analyzes the antecedents of hip-hop and the development and emergence of this African-American expressive culture. Explores the social and political implications of hip-hop culture and the emergence of hip-hop in New York City in the 1970s through its evolution into a billion-dollar industry with wide global influence in marketing, film, music, and politics. Studies the dynamics of race, gender, youth, and class.

SOCL 2205 Law and Social Justice (4 SH)
Analyzes the impact of the legal system on the creation and perpetuation of criminality in contemporary American society. Devotes particular attention to the study of the creation of criminal law, the judicial process, and the role of law in the gap between crime and social justice. Suitable for students in prelaw, criminal justice, political science, and allied fields.
• Equivalent: SOCL 1205.

SOCL 2268 Social Movements (4 SH)
Introduces the social, cultural, and political dynamics that surround social movements, both historically and in the contemporary world. Emphasizes theory and research on national and transnational social movements, including studies of revolutions and political upheavals, demands for civil and human rights, movements for gender equality, and other instances of movements for social and political change. Emphasizes how structural factors shape social movement emergence and development and how social movements in turn shape the structure of societies.
• Equivalent: SOCL 1268.

SOCL 2270 Race and Ethnic Relations (4 SH)
Focuses on racial and religious groups, particularly with reference to the United States. Places special emphasis on historical development, specific problems of adjustment and assimilation, and present-day problems and trends.
• NU Core: Comparative study of cultures.
• Equivalent: SOCL 1270.

SOCL 2300 Social Theory (4 SH)
Reviews the dominant theoretical traditions in classical and contemporary sociology, showing the links between the social thought of the eighteenth and nineteenth centuries and current social thought.
• Prerequisite: (a) SOCL 1101 and (b) two sociology courses numbered 1000 or above (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

SOCL 2320 Statistical Analysis in Sociology (4 SH)
Offers students an opportunity to obtain knowledge and skills essential for understanding the theory and practice of social statistics commonly used in social research. Topics covered include the operationalization of abstract concepts; descriptive statistics; correlation; bivariate regression; central limit theorem; confidence intervals; hypothesis testing; and key concepts such as association, causation, and spurious relationships. Statistical software is used to complete assignments.
• NU Core: Mathematical/analytical thinking level 2.
• NUpath: Analyzing and using data.
• Equivalent: CRIM 3700, INSH 2104, and POLS 2400.
SOCL 2321 Research Methods in Sociology (4 SH)
Introduces students to the range of research methods used by sociologists. Covers experimental research, field research, survey research, and historical-comparative research. Sampling, the rules of evidence in empirical research, research ethics, and the place of values are discussed. Required for sociology majors.
• Prerequisite: SOCL 1101.

SOCL 2323 Ethnographic Methods (4 SH)
Focuses on the practical, ethical, and theoretical issues underlying qualitative field research. Emphasizes firsthand experience with participation, observation, interviewing, note-taking, data analysis, and ethnographic writing. Open only to sociology and anthropology majors.
• Prerequisite: SOCL 1101.

SOCL 2324 Human Services Research and Evaluation (4 SH)
Covers basic issues in applied research and the evaluation of services including the purposes of evaluation, ethics, formulating questions and measuring answers, designing evaluations and planning oriented research, utilizing evaluation results, and the turbulent setting of action programs. Suitable for students majoring in human services, sociology, psychology, nursing, health education, and related fields.
• Prerequisite: SOCL 1101 or HUSV 1101.

SOCL 2358 Current Issues in Cities and Suburbs (4 SH)
Introduces students to pressing urban issues: urban sprawl, poverty, education, transportation, economic development, and housing, through an intensive analysis of the Boston metropolitan area. The course is cotaught by university faculty and practitioners in government, community, and nonprofit organizations throughout the metropolitan area. Offers students the opportunity to analyze Boston data, go on outings to see development in progress, talk with urban practitioners about what they do, and conduct research on an urban issue of their choice.
• Equivalent: POLS 2358 and URBS 2358.

SOCL 2359 Current Issues in Cities and Suburbs Abroad (4 SH)
Introduces students to pressing urban issues—urban sprawl, poverty, education, transportation, economic development, and housing—through an intensive analysis of the metropolitan area. Taught by university faculty and local practitioners in government, community, and nonprofit organizations. Offers students an opportunity to analyze urban data, to go on outings to see development in progress, and to talk with urban practitioners about what they do in urban contexts outside of the United States. To be taken as part of a Dialogue of Civilizations.
• Repeatability: May be repeated without limit.

SOCL 2450 Class, Power, and Social Change (4 SH)
Focuses on theories of social inequality as applied to the exercise of power and large-scale social change. Examines contemporary events in order to understand power structures.
• Equivalent: SOCL 1210 and SOCL 3450.

SOCL 2991 Research Practicum (2 to 4 SH)
Involves students in collaborative research under the supervision of a faculty member. Offers students an opportunity to learn basic research methods in the discipline.
• Prerequisite: Sophomore standing or above and permission of instructor.
• Repeatability: May be repeated once for up to 4 total semester hours.

SOCL 3100 Gender, Social Justice, and Transnational Activism (4 SH)
Introduces issues, themes, and debates in feminist transnational theory, practice, and activism in contemporary contexts and how it has changed under the processes of globalization. Examines differences among women relating to race, class, sexuality, national identity, and political economy in reckoning with possibilities for sustainable social justice. Students interrogate the relationship between the local and global; the production of knowledge in different regions; the pragmatics of political mobilization; the varying contours of “social justice”; and other issues. Offers students an opportunity to discuss the impact of globalization, neoliberalism, and intimate violence on gendered politics and relations and to contend with the politics of difference, to debate its challenges, and to imagine possible futures for transnational gender justice.
• Cross-list: POLS 3100 and WMNS 3100.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: POLS 3100 and WMNS 3100.

SOCL 3401 Social Policy and Intervention (4 SH)
Focuses on study of the formation of social policies in response to social problems. Analyzes policies and problems, supporters and opponents of policy change, conditions under which control agencies adopt new policies, and effects of policy change. Particular emphasis is on case studies of social action and legal change.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
SOCL 3402 Feminist Perspectives on Society (4 SH)
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women’s views of social life as well as recognizes the differences among women.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
- NU Core: Comparative study of cultures.
- Equivalent: WMNS 3402.

SOCL 3406 Class, Crime, and the Legal System (4 SH)
Presents major sociological theories of crime and of the functioning of the criminal justice system in the United States. Examines statistical data and research on crime and justice. Highlights influence of class, race, and gender in the production of crime and in outcomes of the justice system.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
- NU Core: Comparative study of cultures.

SOCL 3407 The Immigrant Experience: Ethnicity, Race, and Inequality in America (4 SH)
Explores the integration of today’s immigrants into the housing and labor markets and political system by their ethnicity and race. Focuses on how immigrant children and the children of immigrants are incorporating into American society. Addresses several key questions, including: (1) How do white and nonwhite immigrants compare to native-born whites and nonwhites with respect to their residential attainment? (2) Do white and nonwhite immigrants negatively affect native-born white and nonwhite workers? (3) How politically active are white and nonwhite immigrants relative to their native-born counterparts? Students research how immigrants are incorporating into the Boston metropolitan area.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3408 Sociology of Organizations (4 SH)
Examines sociological perspectives on the structures and processes of large-scale formal organizations in Western society and contemporary organizational theory and research, with illustrations from business, governmental, and other organizations.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3411 The Networked Society Abroad (4 SH)
Introduces students to basic concepts and principles of social network analysis. Taught while abroad as part of a Dialogue of Civilizations program, it combines studying the different roles that social networks play in different institutions and societal settings with appropriate readings that offer a conceptual, theoretical, and applicable context for understanding the networked society.
- Repeatability: May be repeated without limit.

SOCL 3414 The Sociology of Campus Life (4 SH)
Focuses on campus life through the lens of classic sociological concerns of race, class, and gender. Offers students an opportunity to address core contemporary issues in higher education; to develop an understanding of campus life from the perspective of learning that occurs both inside and outside the classroom; and to assess how that learning impacts their views of themselves and their larger context. Also offers students an opportunity to develop an understanding of student commitment to issues of social change and social justice.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3418 Greater Boston Urban Policy Seminar (4 SH)
Designed to introduce the advanced undergraduate sociology, political science, or economics student to the broad area of public policy related to the specific problems of large metropolitan areas. Throughout the seminar there will be a focus on greater Boston. Among the issues discussed are racial attitudes and residential segregation, the urban labor market, housing, urban sprawl and transportation, education, public health, and urban planning. Links between all of these issues are explored.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3437 Children and Youth in Contemporary Society (4 SH)
Presents a sociological discussion of children focusing on race, gender, class, and childhood age as factors that children respond to as they go through their daily lives. Issues such as peer-group relations and special problems unique to childhood and their policy implications are also explored. Topics may include foster care, juvenile justice, youth pregnancy, and child labor among other issues.
- Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
SOCL 3440 Sociology of Human Service Organizations (4 SH)
Introduces selected theoretical perspectives on human service organizations, emphasizing defining organizational goals and effectiveness. Gives students the opportunity to become familiar with the nature of human service organizations, to compare these organizations to business and industrial organizations, to outline specific problems that human service organizations face, and to propose potential solutions.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3441 Sociology of Health and Illness (4 SH)
Offers a substantial overview of the sociology of health and illness. Medical sociology is an important subfield of sociology with important links to public health, social psychology, psychology, and other medical fields. Emphasizes several critical areas: society and disease; theoretical understandings of health inequalities; medicalization and social control; healthcare professions and professionalization; and the American healthcare system. Offers students an opportunity to obtain analytical frameworks to explore other topics in medical sociology not covered in this course.
• NUpath: Understanding societies and institutions, writing intensive in the major.

SOCL 3451 Privilege (4 SH)
Examines contemporary social inequality in the United States. Focuses on “how the elite obtain and maintain privilege and why.” Examines privilege as a system of advantages based on specific social characteristics (class, race, gender, and sexuality) and studies how privilege works in a variety of social institutions (e.g., family, housing, health, and crime). Students are charged to critically analyze stratification from a perspective of privilege rather than disadvantage and to consider how privilege shapes institutions and inequalities in U.S. society and their own lives.
• Prerequisite: (a) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.

SOCL 3455 Seminar in Urban Sociology (4 SH)
Focuses on important topics in the study of urban areas within sociology. Themes include residential segregation, suburbanization, neighborhood development and change, the economic development of cities, fiscal crisis, gentrification, urban crime, and public and private urban policies.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• Equivalent: SOCL 4516.

SOCL 3460 Sociology of Latino Society (4 SH)
Designed to familiarize students with the Latino population in the United States. Reviews economic, political, and social factors that have contributed to the presence of Latinos in the United States. Sociological perspectives are used to understand the social, economic, and political characteristics of the various Latino groups and how these relate to larger social and economic processes in the U.S. society.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3465 Globalization and the Evolution of Human Societies (4 SH)
Examines current issues of globalization from a sociological viewpoint, emphasizing the forces that create ties between societies and the consequences of these ties. Analyzes the structures of human societies, the ways in which they change over long periods of time, and the consequences of changes for people’s actions and beliefs. Stresses the importance of social “environments” in understanding social change and of the process of social adaptation. Uses sociological concepts to analyze current issues of globalization, their origins, and ways of dealing with them.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 3470 Social Conflict and Community Service (4 SH)
Offers a community service course supported by a grant from a Northeastern alumnus. The primary objective is to assist students in learning about the causes, consequences, and possible solutions for social conflict in the Boston area. Attention is also given to helping students see beyond their customary social experiences. Students work in teams on projects that deal in some way with social conflict, broadly defined. Reflections occur through team interactions, journal summaries, and focused discussions in weekly seminars. Each student writes an analytic paper that ties in sociological issues; some teams produce sets of papers that combine to produce reports for their host organizations.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• NU Core: Experiential learning.
SOCL 3471 Social Conflict and Community Services Abroad (4 SH)
Designed to assist students in learning about the causes, consequences, and possible solutions for social conflict by studying conflict abroad. Uses readings from sociology, political science, gender studies, education, and history about the nature of conflict and conflict resolution. Also designed to help students see beyond their customary social experiences and academic disciplines. Offers students an opportunity to work alone or in teams on projects that deal with social conflict, broadly defined. Requires community service in a specific organization in the country of stay. Uses team interactions, journal summaries, and focused class discussions to offer in-depth reflection on students’ project work, team-based experiences, readings, and related social issues. Requires each student to write an analytic paper tying theoretical issues with their research experiences.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• Repeatability: May be repeated without limit.

SOCL 3480 Comparative Political Economy (4 SH)
Designed to introduce the undergraduate student to competing paradigms in economic thought and public policy. The first third of the course is devoted to a brief overview of the historical, philosophical, and psychological roots of political economic ideology and socioeconomic institutions. The last two-thirds is spent in an inquiry into conservative, liberal, and radical political economic perspectives. Focuses on the role of government in political and economic affairs. Throughout the entire course, special attention is paid to an analysis of current economic conditions and policy in light of the theoretical models explored in class.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• Repeatability: May be repeated without limit.

SOCL 3485 Environment, Technology, and Society (4 SH)
Focuses on the connections between the development of modern nation-states and the control of nature. Explores the role human societies play in such events as climate change, tsunamis, and droughts. Asks how industrialization and the process of science and technology development are related to our transforming environmental conditions, as well as how the social sciences, the sciences, and engineering are transforming to address these issues. Draws on social theory, environmental history, anthropology/sociology, art/design, and open-source technologies to investigate theoretically and methodologically the sources, experiences of, and solutions for environmental health questions.
• NUpath: Understanding societies and institutions.

SOCL 3487 Applied Sociology: Practice and Theory (4 SH)
Offers the academic component of the experiential education requirement for sociology majors; to be taken after students have completed the experiential component. Provides a seminar format in which students will reflect upon their approved experience (that is, co-op, internship, community service, and so on) and integrate it into a research project. Students who have completed study abroad or a service-learning course in the department may not have to take this course.
• Prerequisite: SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• NU Core: Experiential learning.

SOCL 3488 Doing Sociology in the City Abroad (4 SH)
Introduces students to the classic sociological method of urban ethnography by facilitating their independent ethnographic research while abroad. Designed to be taken as part of a Dialogue of Civilizations program. Students spend the term in a geographic location, or with a social group of their choosing, conducting participant observation and taking field notes in the Chicago School tradition. Supplements the experience of conducting fieldwork with readings and group reflection. Offers students an opportunity to engage with basic concepts of ethnography and the practices of conducting qualitative research, coding, interpretive analysis of data, and oral and written presentation of findings.
• Prerequisite: May be repeated without limit.

SOCL 4513 Political Sociology (4 SH)
Uses conceptual frames, theoretical perspectives, and case studies to explore the interplay between everyday life and macro-institutional dynamics of political power. Analyzes political contestation and negotiation via religious, spatial, gendered, national, and international aspects of power.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• NUpath: Understanding societies and institutions.

SOCL 4514 “The Wire” and the Study of Urban Inequalities (4 SH)
Offers a seminar examining a range of topics related to the issue of urban inequality. Uses the HBO series The Wire (which aired from 2002–2008) as a vehicle to explore how crime and social control, labor markets, housing policies, local politics, and other urban institutions both reflect and contribute to systemic inequality in U.S. cities. The material for this class consists of academic readings and seasons one through three of The Wire.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
SOCL 4515 Public Policy Seminar (4 SH)
Designed to introduce the advanced undergraduate sociology, political science, or economics student to the art and science of public policy development, analysis, and evaluation. The first half of the course is devoted to a consideration of the social, political, and economic roots of public policy. The second half includes an inquiry into a range of issues having to do with the “art and science” of policymaking. A number of case studies are reviewed to provide examples of policy in action.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 4518 Law and Social Issues (4 SH)
Explores the ways in which the legal system shapes and is, in turn, shaped by ideological and political movements. For example, the bitter controversy over whether runaway juries have created “jackpot justice” by awarding huge sums to plaintiffs is a reflection of deep cultural and political divides over individual rights and corporate power. Also examines new legal principles that are currently evolving to deal with such misdeeds as systematic corporate misconduct, cyber crimes, and harassment.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Employing ethical reasoning, writing intensive in the major.

SOCL 4519 Seminar in Social Psychology (4 SH)
Explores in depth the ways sociologists study the interaction between individuals and social context.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 4520 Race, Class, and Gender (4 SH)
Considers the intersection of race, class, and gender in social structure, institutions, and people’s lives. Utilizes an interdisciplinary approach to focus on the socially constructed nature of these concepts and how they shape and create meaning in individual lives. Difference with an emphasis on inequality and varying life chances is a central concept for understanding our society and is central to our work. Requires a significant amount of reading and the class is run like a seminar with students expected to participate, take responsibility, and write a paper.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: WMNS 4520.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: WMNS 4520.

SOCL 4521 Ethnic, Racial, and Religious Identity (4 SH)
Explores some of the sociological assumptions about identity, identity politics, and the processes of assimilation and acculturation. Investigates the theories and methods used in the study of Jewish identity politics as a way of understanding a postmodern critique of the identity literature. Ends with a feminist critique of multiculturalism as a way of bringing together the academic study of identity, be it racial, ethnic, or religious, and political decision making.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.
• NU Core: Comparative study of cultures.

SOCL 4522 Political Ecology and Environmental Justice (4 SH)
Engages advanced sociological research on topics relating to political ecology and environmental justice, with the goal of producing a publishable report(s) to be published and posted on the Northeastern Environmental Justice Research (NEJRC) website and circulated on various national environmental list-serves. Possible topics of investigation could include the power of the polluter-industrial complex in the American political system; the role of trade agreements in relation to the globalization and the export of environmental hazards; climate justice, with an analysis of the manner in which climate change is exacerbating social and environmental injustices, especially for the poorest and most politically powerless populations in the world system; or many other important issues.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
SOCL 4523 Sexualities (4 SH)
Offers a primarily sociological overview of the field of sexuality studies. Explores the ways in which sexual behaviors and identities are in fact shaped by social norms, values, and expectations; the meanings and statuses ascribed to sexual acts, behaviors, identities, and communities; and the interactive processes by which sexualities are achieved. Also brings an intersectional framework to discussions by emphasizing how our understandings of sexuality interact with categories of gender, race, nation, and class. Examines a variety of topics, such as transgenderism, power, extreme and illicit sex, sexualization, pornography, and politics.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: WMNS 4523.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: WMNS 4523.

SOCL 4525 American Demographics (4 SH)
Offers an applied research experience in which students have the opportunity to study the major areas of demography. Focuses on the resources of the United States Census Bureau and, in particular, the data products available from recent census surveys.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 4528 Computers and Society (4 SH)
Examines the impact of the computer revolution on the conditions of work and life in contemporary society including legal and theoretical issues. Discusses ethical and professional issues in computer use.
• Prerequisite: Sophomore standing or above.

SOCL 4530 Seminar in the Family (4 SH)
Explores issues facing contemporary families including combining work and family, single motherhood, fathers and children, family violence, and differences among families of different ethnicities, cultures, and classes.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103.

SOCL 4535 European Union: Social and Political (4 SH)
Designed to provide a sociological introduction to the history and development of the common market, institutions, and policies of the European Union (EU). The EU began in the 1950s as a series of agreements on economic issues among a small number of countries, and has evolved to take on a role in various social, economic, and cultural areas in its member states. Emphasizes current challenges, issues, and debates in the EU, for example, the introduction of the euro; common policy areas including gender and racial equality; social policies and labor markets; migration and enlargement; the EU as an emerging international actor; and transatlantic relations.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: WMNS 4523.

SOCL 4580 Special Topics in Sociology (4 SH)
Designed as a specialized themes course for students with experience in sociology and/or anthropology. Takes advantage of unique opportunities—visiting guests, special thematic interests—which are not part of the regular curriculum.
• Repeatability: May be repeated without limit.

SOCL 4600 Senior Seminar (4 SH)
Offers students an opportunity to integrate and apply knowledge of the discipline by building on completed course work and conducting original research on a topic of their choice. Requires students to produce a research paper due at the end of the semester. This seminar operates as an intellectual workshop in which students share the process, as well as the results, of their research with the group. The class comes together to inform, guide, critique, and support one another’s research efforts in a collaborative fashion. Students are expected to make constructive comments on the work of others and to freely exchange ideas.
• Prerequisite: Junior or senior standing; sociology majors and sociology combined majors only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

SOCL 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Prerequisite: Junior or senior standing; sociology majors and sociology combined majors only.
• Repeatability: May be repeated without limit.
SOCL 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: SOCL 4970 and junior or senior standing; sociology majors and sociology combined majors only.
• Repeatability: May be repeated without limit.

SOCL 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

SOCL 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

SOCL 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

SOCL 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

SOCL 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

SOCL 5976 Directed Study (1 to 4 SH)
Comprises reading and research directed by a faculty member.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SOCL 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SOCL 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SOCL 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

SOCL 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

SOCL 7000 Qualifying Exam (0 SH)
Provides eligible students with an opportunity to take the master’s qualifying exam.

SOCL 7100 Queer Theory: Sexualities, Genders, Politics (3 SH)
Introduces the core texts and key debates that have shaped queer theory and examines the intersections between queer theory and feminism and critical race theory. Seeks to provide an understanding of expansive and radical contemporary queer politics by analyzing foundational queer and feminist texts, pushing beyond narrow constructions of identity politics, anti-discrimination policy, and rights-based reforms. Engages queer theory by means of a rich philosophical and political interrogation of the meaning and content of “queer.”
• Cross-list: WMNS 7100.
• Equivalent: WMNS 7100.

SOCL 7200 Foundations of Social Theory 1 (3 SH)
Studies the classic theorists including Durkheim, Weber, Marx, and others.
• NU Core: Capstone, writing intensive in the major.

SOCL 7201 Foundations of Social Theory 2 (3 SH)
Reviews the dominant theoretical traditions in contemporary sociology, examining the key assumptions, terminology, weaknesses, and strengths of the pluralist, managerialist, neo-Marxist, feminist, and postmodern paradigms. Strives not only to expose students to the giants in the field but, more important, to give students the intellectual tools to situate entire theoretical traditions vis-à-vis one another. Introduces students to various schools of thought. Offers students the opportunity to learn “how to think” sociologically and theoretically—that is, to go beyond simplistic and descriptive accounts of social phenomena to offer more systematic and insightful explanations.
• Prerequisite: Sociology students only.
• NU Core: Capstone, writing intensive in the major.
SOCL 7202 Feminist Theory (3 SH)
Considers major developments in feminist theory since the rise of the contemporary women’s movement. First looks at early socialist feminist and radical feminist theory and critiques of them, psychoanalytical feminist theory, postmodern feminism and its critics, and theories about exclusion and difference among women, particularly by women of color. Gender, sexuality, and power are central categories of analysis.

SOCL 7203 Contemporary Sociological Theory (3 SH)
Analyzes major contemporary theories, focusing on such themes as the relationship of criticism to theory, the dynamics of exchange and production in postnational economies, the socialization of “rational choice,” the theoretical significance of postmodernity and difference, the relation of the historical to the social dimension of social organization, the interaction of power and discourse, the operations of gender within theory, and the significance of class, race, and gender to models of the global political economy.

SOCL 7204 Ethnographic Theory (3 SH)
Examines ethnography, an approach mostly utilized in a “field setting” outside the university and its library. Calls for researchers to become directly involved or immersed in the everyday lives of individuals and/or groups in order to examine and explain the ways they subjectively perceive, feel, and give meaning to their world. The course’s main objective is to teach you the practicalities, realities, joys, and limitations of ethnography through the examination of some writings on ethnographies and a couple of actual ethnographies.

SOCL 7205 Law, Conflict, and Violence (3 SH)
Contrasts several major schools of thought about the relationships between law, conflict, and violence. Examines the differing assumptions about the law in legal realism, social choice theory, law and economics, Marxism, critical legal studies, functionalism, conflict theory, and natural law in order to reveal their explanations of crime and violence and the policies that arise from their theoretical assumptions.

SOCL 7206 Theories of Political Economy (3 SH)
Explores the basic philosophical, psychological, political, and economic underpinnings of contemporary public policy, with an emphasis on the United States. Considers the core philosophical and political theories of conservative, liberal, and radical political economy and examines the economic structures consistent with these competing theories.
  * Equivalent: POLS 7320.

SOCL 7210 Statistical Methods of Sociology (3 SH)
Introduces statistical methods relevant to sociology. Topics include tabular analysis, nonparametric statistics, analysis of variance, regression analysis, path analysis, measures of association, estimation, and univariate and multivariate hypothesis testing. A knowledge of elementary statistical theory is presumed.

SOCL 7211 Research Methods (3 SH)
Surveys methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and use of available data. Examines the roots and consequences of violent behavior in society and the individual. Topics vary, but will include serial murder, massacres, hate crimes, workplace murder, group violence including cults, and mass media portrayals of violence.
  * Prerequisite: Sociology students only.

SOCL 7212 Feminist Methodologies (3 SH)
Examines how feminist scholarship has challenged and reworked basic assumptions about the social world and the research that describes it. That requires three basic approaches: rethinking, reflecting, and rewriting. Examines the ways of knowing common to the social sciences and the ways in which new paradigms have or have not been integrated into the canons. Students are expected to do a close reading of the texts assigned and come prepared with questions and notes for the class meetings. Also requires one class presentation and one paper.

SOCL 7213 Advanced Research Methods (3 SH)
Presents quantitative techniques of analysis. Students are expected to conduct individual research projects.
  * Prerequisite: SOCL 7211.

SOCL 7215 Advanced Quantitative Techniques (3 SH)
Covers multivariate statistical models and their applications to social science data. Covers the ordinary least squares (OLS) regression model and the assumptions underlying it in detail, as well as techniques for analyzing data when OLS assumptions do not apply, such as simultaneous equation models, time series models, and maximum likelihood techniques for limited and discrete dependent variables. This is a second-semester course in quantitative techniques for graduate students in the social sciences.
  * Prerequisite: SOCL 7210 or POLS 7202.
  * Equivalent: POLS 7215.
SOCL 7219 Sociology of Mental Health and Illness (3 SH)
Provides an introduction to mental health and mental illness. Presents a number of perspectives on mental health and illness, including biological, genetic, and psychological approaches; however, the course focuses on the role of social factors in mental health and mental healthcare by examining the role of social factors in the etiology, course, and treatment of mental illness. Students have an opportunity to learn about the social consequences of mental illness, such as stigma, and explore ways to prevent these consequences. In addition, prevention, rehabilitation, and recovery are discussed. The social and political contexts within which mental health and mental illness occur are discussed as well as the role of professionals. This course is taught with attention to an interdisciplinary perspective.

SOCL 7220 Seminar in Qualitative Analysis (3 SH)
Studies qualitative techniques of analysis. Examines social-structure process and meaning in interacting groups. Students study a face-to-face group by means of participant observation using symbolic interaction concepts.

SOCL 7221 Globalization, Development, and Social Justice (3 SH)
Explores the rise of neoliberal globalization and its impact on local and national communities around the world. Examines complex patterns of resistance, including place-based struggles and transnational social movements. Combines theoretical analysis of global capitalism, development, the politics of resistance, and reformist/radical alternatives with the study of concrete struggles in defense of land, labor and human rights, indigenous cultures and identities, and ecological sustainability.

SOCL 7222 Gender and Globalization (3 SH)
Explores current issues and debates relating to the gendered effects of globalization and neoliberal reforms and the entanglement of their economic, social, and cultural effects. Gender research on globalization has expanded notions of work and migration to include the politics of location as well as the feminization of labor in transnational production. This seminar focuses on new forms of subjectivities, ideologies, sovereignty, and notions of citizenship in postindustrial and postcolonial settings. Topics may include, but are not limited to, poststructuralist feminist critiques, financial markets, migration, care and factory work, as well as the privatization of urban space.

SOCL 7225 Gender and Social Movements (3 SH)
Offers an in-depth examination of the sociological literature on the gender dynamics of social movements, both nationally based and transnational. Covers key questions, conceptual tools, and methodological frameworks in the study of social movements; the interplay of gender, the state, and social movements, including feminist and women’s movements; how social institutions and social norms may affect the course and outcomes of movements; and globalization, transnational social movements, and gender. Geared toward students who plan to do research on social movements or global social movements but also designed to be useful to those with interests in related fields.

SOCL 7227 Race and Ethnic Relations (3 SH)
Offers a graduate-level seminar in the sociology of race and ethnic relations. Explores the key social, economic, political, and ideological forces shaping race and ethnic relations in the United States, past and present, and the main theoretical, methodological, and substantive debates in the “race and ethnicity” subfield of sociology. Course topics include, but are not limited to, the conceptual and intellectual foundations of the study of race and ethnic relations; the sources and consequences of ethnic and racial identities; urban poverty and dynamics of racial residential segregation; the role of wealth in creating and perpetuating racial inequality; the “new black middle class”; and contemporary debates regarding racial prejudice, discrimination, and redistributive public policies in the United States.

SOCL 7230 Political Ecology of Global Capitalism (3 SH)
Analyzes the political economy of international capitalism, really existing state socialism, and the global environment. Includes philosophies of nature; laws of capital accumulation and ecological degradation; technology and the division of labor; combined and uneven development, imperialism, and ecological crises in the Third World; the relationship between economic and ecological crises; environmental policy, democracy, and the state; ecological racism, sexism, and classism; and the crisis of social movements in the United States.

SOCL 7231 Sociology of Prejudice and Violence (3 SH)
Examines the roots and consequences of violent behavior in society and the individual. Topics vary from semester to semester, but will include serial murder, massacres, hate crimes, workplace murder, group violence including cults, and mass media portrayals of violence.
SOCL 7232 Political Economy of Global Capitalism (3 SH)
Constitutes the required core course in the political economy concentration and serves as a theoretical introduction to neo-Marxian political economy. Includes historical materialism; the labor theory of value and elementary laws of capital accumulation; class, gender, race, and the division of labor; imperialism and underdevelopment; the state; political, economic, and social crisis theory; and debates concerning the restructuring of global capitalism.

SOCL 7233 American Demographics (3 SH)
Overviews major areas of demography including migration, fertility, population growth, and household transitions. Studies these processes in the context of social and economic changes, with an emphasis on societal consequences and social and economic policy.

SOCL 7234 Issues in Social Psychology (3 SH)
Examines human behavior from a sociological and psychological perspective. Gives special consideration to such topics as gossip and rumor, presentation of self, prejudice, and mass communication.

SOCL 7235 Urban Sociology (3 SH)
Discusses theories of the development of urban life. Compares preindustrial and industrialized urban areas. Presents methods for the study of urban social structure and change, and evaluates contemporary metropolitan action programs.

SOCL 7236 The Family (3 SH)
Analyzes social structure and social functions of the family as a social institution. Includes comparative and historical examination of relations between the family, gender, and other institutions in society.

SOCL 7237 Women, Men, and Social Change (3 SH)
Looks at how the Industrial Revolution and the corresponding changes in the labor force and patterns of domestic life have altered the sexual division of labor. In postindustrial society, new institutional forms are recasting personal relations. Examines these forces of social change and their impact on gender roles.

SOCL 7238 Sociology of Education (3 SH)
Analyzes the structure and function of educational institutions, and presents student, faculty, and administrative perspectives. Emphasizes the role of education in the process of socialization, social mobility, social change, and social control.

SOCL 7239 Sociology of Occupations and Professions (3 SH)
Studies the relations between the occupations and professions and society. Topics may include occupational stratification, professional group behavior, recruitment and socialization of occupations and professions, and political activism.

SOCL 7240 Sociology of Deviant Behavior (3 SH)
Analyzes theories of deviance (anomie, differential association, control, conflict, and labeling). Examines their basic assumptions, focus, key concepts, general propositions, empirical support, strengths and weaknesses, and implications for social policy.

SOCL 7241 Sociology of Law (3 SH)
Discusses the relationship among law, ethics, and social policy, with emphasis on such issues as family violence, the management of AIDS, state regulation of public morality, and health maintenance and the provision of medical care. The course has an applied focus and emphasizes student participation and initiatives.

SOCL 7242 Family Violence (3 SH)
Discusses physical abuse and sexual abuse of children, spousal violence and elder abuse, with emphasis on social policy and legal intervention.

SOCL 7243 Sociology of Health and Illness (3 SH)
Studies social aspects of illness and medicine, historically and cross-culturally. Focuses on illness and the medical profession in modern society and their structural settings: the community, the hospital, the medical school. Critically examines research studies in the field and specifies problems for future research.

SOCL 7244 Processes of Aging (3 SH)
Considers socioeconomic and social psychological consequences of aging from the perspective of healthcare providers. A major part of the course focuses directly on the biological changes entailed in aging and the appropriate medical management of geriatric patients. Open to students expected to provide healthcare services to geriatric patients.

SOCL 7245 Formal Organizations: Administration and Structure (3 SH)
Introduces and critically examines different theoretical approaches in an attempt to understand and explain how organizations work. Also examines the implications of organizational goals, structure, and control on society as a whole and organizational members in particular.

SOCL 7246 Sociology of Poverty (3 SH)
Analyzes sociological perspectives on causes of poverty, public views on poverty, and institutional responses to poverty. Emphasizes a concern with policy issues and implementation of policies. For advanced students in the social sciences and in the various human services schools in the University.
SOCL 7247 Economic Sociology (3 SH)
Reviews recent writings in economic sociology. Economic sociologists see social activity as embedded in social networks, institutional structures, history, and culture, while classical economics tends to view economic actors as behaving rationally in relative social isolation. This scholarship traces its intellectual roots to Marx, Weber, Durkheim, Simmel, Schumpeter, and Polanyi, while mainstream economists employ the lessons of Adam Smith, Ricardo, Mill, Marshall, Keynes, and Samuelson.

SOCL 7248 Race, Gender, Class: Feminist View (3 SH)
Analyzes the intersection of race, class, and gender in women’s lives and their meaning for equality and feminism. Includes work by and about men. An interdisciplinary approach focuses on the socially constructed nature of these concepts, how they shape social life, and create meaning. Difference has become a central category for understanding our multicultural social life, underscoring inequality, stratification, and divergent life chances and experiences in the United States. Examines struggles to analyze gender, race, ethnicity, and class simultaneously and to grapple with issues including theory, autobiography, sociological data and analysis, and popular culture.

SOCL 7249 Seminar in Cultural Studies (3 SH)
Focuses on issues having to do with the problematic connection between the social practices of representation (the relation of writing to idea) and practices of appropriation (the relation of knowing to reading). Discusses these two practices, at the heart of theoretical debates about the subject matter of cultural studies, in the context of recent critical formulations of praxis, power, social formation, and self-reflection. The overall project of the seminar is to investigate the historiographical and sociological aspects of interdisciplinary convergences among the humanities and social sciences.

SOCL 7250 Seminar in Urban Social Policies (3 SH)
Offers an overview of the contemporary urban policy issues in the United States. Examines the relationship between economic and political forces and how these forces determine which urban social issues get priority over the others. Uses case studies of specific urban social policies that were implemented in different cities, and discusses the possibilities for their nationwide implementation.

SOCL 7251 Community Analysis (3 SH)
Explores various approaches to the study of community, with emphasis on the politics of development and on neighborhoods. Also examines the importance of race, class, and ethnicity on emergence of new local social movements. Students are expected to do their own research project on specific community issues.

SOCL 7252 Class Structure and Social Inequality (3 SH)
Places theories of inequality between groups in historical perspective, from classical to modern industrial times. Discusses and evaluates sociological research in social stratification with regard to different social and cultural groups. Emphasis is on American society.

SOCL 7253 Assets and Social Policy (3 SH)
Examines how asset building has emerged as a community development strategy and policy innovation. Explores the shift from consumption-oriented social assistant to asset-based policy in the United States. Overall, asset accounts are the most rapidly growing form of domestic policy. This policy development occurs in the context of increasing income and wealth inequality. Asset-based policies have the potential to exacerbate inequality further, and are doing so because the poor are not included. Examines the significance of assets and how at the present time public policy is part of the structure of asset inequality. Explores asset building policy innovations.

SOCL 7254 Social Movements (3 SH)
Examines how groups mobilize collectively to achieve sociopolitical, economic, and cultural change, with a particular focus on the United States. Introduces various social movements and the sociological theories that have attempted to explain them. Draws examples from labor, civil rights, women’s, gay/lesbian liberation, student, antiwar, environmental, antiracist, urban, and global justice movements.

SOCL 7256 Contemporary Issues in Sociology (3 SH)
Discuss contemporary issues in sociology. Include supervised readings and written reports on special problems.
• Prerequisite: Sociology/anthropology and sociology students only.
• Repeatability: May be repeated without limit.

SOCL 7257 Contemporary Issues in Sociology (3 SH)
Discuss contemporary issues in sociology. Include supervised readings and written reports on special problems.
• Repeatability: May be repeated without limit.

SOCL 7258 Contemporary Issues in Sociology (3 SH)
Discuss contemporary issues in sociology. Include supervised readings and written reports on special problems.
• Repeatability: May be repeated without limit.

SOCL 7259 Contemporary Issues in Sociology (3 SH)
Discuss contemporary issues in sociology. Include supervised readings and written reports on special problems.
• Repeatability: May be repeated without limit.
SOCL 7260 Sociology of Science, Knowledge, and Technology (3 SH)
Offers an interdisciplinary seminar on the sociology of scientific knowledge and its consequences. Topics include the social construction of scientific knowledge and its use in controlling behavior and legitimating social inequality; the political economy of technology development and its cultural effects; and the processes by which society assesses (or fails to assess) and regulates (or does not regulate) the social and environmental consequences of science and technology.

SOCL 7261 Computers and Society (3 SH)
Offers a graduate seminar on the social impact of the computer “revolution” on the contemporary world. Topics include conditions of work, education, recreation, privacy, the computer science profession, paradigms of human thought, politics, and social change in the world economy.

SOCL 7262 Children in America: Sociological and Policy Perspective (3 SH)
Presents an introduction to the study of children, their problems, and various policy options to resolve these problems. While based on a sociological foundation, this course moves toward an interdisciplinary perspective in exploring such issues as education, family violence, healthcare, and juvenile justice, among others. The course is guided by the principles of social action advocacy in the children’s public policy arena.

SOCL 7263 Social Psychology of Stratification (3 SH)
Explores the social psychological dimensions of structured social inequality. Overviews the “social psychologies” embedded in the classical social theorists, then explores the literature on sociological social psychology (as opposed to its psychological cousin), identifying key theoretical frameworks and focusing on “social structure and personality” (or “social structure and attitudes”) research. Explores relevant literatures on various “subjective” responses to stratification including the self-concept, stratum (that is, race, class, or gender) identification and consciousness, the process of legitimation, stratification beliefs (or stratification ideology), racial attitudes, and links between these phenomena and various policy attitudes and preferences (support for affirmative action, wealth redistribution, and so on). Also explores the ways in which such responses may contribute to the maintenance and reproduction of the status quo (social reproduction), and social change.

SOCL 7264 Urban Poverty and Social Policy (3 SH)
Explores the causes and consequences of poverty and how it is experienced in America’s inner cities. Each week students are required to read a selected text that focuses on a sociological theory or concept related to urban poverty. Topics include employment, family structure, crime and social control, education, culture, and neighborhoods. One of the key objectives is to examine the advantages and disadvantages of various policies designed to address the persistence of poverty and/or its attendant problems and consider the effectiveness of these strategies for poverty reduction at the individual or community level.

SOCL 7265 Sociology of Gender (3 SH)
Examines the origins of feminist sociology, its contributions to gender studies and to sociology, and directions of research. Covers feminist critiques of mainstream sociology, i.e., Parsonian structural functionalism, as well as of critical or Marxist sociology. Theoretical debates include critique of “sex role” theory and its replacement by multilayered notions of gender. That is, we conceptualize gender as macro-institutional and ideological, as an interactional accomplishment, and an aspect of identity. Includes intersectional theories and research, global/transnational concerns, studies of masculinities, and the place of the body and sexuality studies. This is a graduate seminar.

• Prerequisite: Restricted to the following majors: criminal justice; health science/public health; history; journalism; law and public policy; nursing; political science; public administration; sociology; urban and regional policy; and women’s, gender, and sexuality studies.

SOCL 7267 Environment, Health, and Society (3 SH)
Studies contested illnesses, which are diseases or conditions in which there is dispute over environmental causation. For many diseases and conditions attributed to environmental and occupational exposure, the disease or condition and/or its causes are discovered by laypeople in workplaces and communities, with considerable attention to chemical exposures. This seminar synthesizes a diverse set of fields, encompassing environmental sociology, medical sociology, medical anthropology, science studies, history of medicine, history of science, environmental health, community-based participatory research, environmental justice, and environmental public health. Emphasizes both political economic and ideological factors as determinants of contestation. Also examines issues of interdisciplinary collaboration between social scientists and environmental health scientists.
SOCL 7288 Globalization and the City (3 SH)
Considers the conditions of cities and their residents in the era of globalization. Cities have always been located at the center of regional and global networks of trade, capital, and culture. Even so, urban sociology has tended to treat cities as closed systems, defined more by internal logics than by broader social and economic forces. Since the early 1990s, however, shifts under way in the global economy, information and communications technologies, political movements, and cultural processes have altered the way that scholars (and policy makers, planners, architects, urban residents, etc.) look at cities. Increasingly, the world’s cities are regarded as nodes in global networks; and correspondingly, urban social and spatial processes are being viewed through global lenses.

SOCL 7270 Sociology of Work and Employment (3 SH)
Examines the ways in which work organizations powerfully shape individual and social life. Traces such influences with particular emphasis on how organizations differentially affect the distribution of job rewards across class, gender and racial/ethnic lines. Topics include the historical evolution of the management/worker relationship, job segregation by both race and gender, the impact of new technologies on social inequality, the relation between gender and professional careers, governmental efforts to ensure equal opportunity, and the impact of workplace transformation on racial and gender inequalities at work.
• Prerequisite: Not open to students in the College of Computer and Information Science or the College of Engineering.

SOCL 7272 Globalization: Social and Political Theoretical Debates (3 SH)
Overviews contemporary theoretical debates over the social, political, and cultural dimensions of globalization and transnationalism. Examines challenges and effects of globalization on the core concerns of political sociology; and the future of democracy, the nation-state, the welfare state, and civil society including such transnational social movements as global feminism.

SOCL 7273 Gender and Social Policy (3 SH)
Provides an introduction to gender and social policy, with emphasis on intersections of inequalities based on class, race, and sexuality. The focus is on equality policies in employment including family-friendly measures and antidiscrimination policies. Includes those focused on child care, poverty, reproduction, and sexuality. Examines the intersections of family, economy, sexuality, and state from a variety of perspectives including cross-national and comparative analysis.

SOCL 7274 Cultural Studies (3 SH)
Introduces cultural studies as an interdisciplinary investigation of how modes and formations of difference among cultural practices are represented sociologically and historically in the social sciences and humanities. Is intended to elucidate debates among the various critical disciplines of the “human sciences” in regard to recent changes in the meaning and use of the term “culture” in history, sociology, literature, cinema studies, and politics. The form of this inquiry is critical. By this is meant that theory and method are conceived of qualitatively and as moments of conceptualization and self-reflection, and that the course draws on various literatures that now operate critically and self-critically at the intersection of the various academic fields including dialectics, structuralism and its critical variants, feminist theory, and writings on postcolonialism.

SOCL 7287 Social Movements in Health (3 SH)
Offers a graduate seminar centering on health social movements. Also explores general social movement theory and research. Uses concepts from science and technology studies and covers some core medical sociology concerns such as health inequalities; personal experience of illness; and lay-professional disputes over disease identification, causation, prevention, and treatment. Among the movements covered are disability rights, breast cancer activism, medical activism, black health movements, environmental justice, community health centers, patients’ rights, and health access movements.

SOCL 7290 Intergroup Relations (3 SH)
Examines the relations between various racial, national, cultural, and religious groups, with emphasis on historical development. Emphasis is on American society with its specific problems of adjustment and assimilation.

SOCL 7291 American Society (3 SH)
Provides an introduction to mental health and mental illness. Presents a number of perspectives on mental health and illness, including biological, genetic, and psychological approaches; however, the course focuses on the role of social factors in mental health and mental healthcare by examining the role of social factors in the etiology, course, and treatment of mental illness. Students have an opportunity to learn about the social consequences of mental illness, such as stigma, and explore ways to prevent these consequences. In addition, prevention, rehabilitation, and recovery are discussed. The social and political contexts within which mental health and mental illness occur are discussed as well as the role of professionals. This course is taught with attention to an interdisciplinary perspective.
SOCL 7292 Graduate Seminar on Growth with Equity (3 SH)
Designed to introduce the graduate political science, sociology, policy, or economics student to the broad area of economic growth and income distribution. Brings together data on historical trends in growth and distribution, reviews alternative theories used to explain economic growth in income inequality, and focuses on various policies to enhance both growth and equity.

SOCL 7293 Public Policy Seminar (3 SH)
Concentrates on the scope of the study of public policy, disciplinary contributions to policy analysis and the study of public policy, methods of policy analysis, and models of policy processes.
* Equivalent: POLS 7204.

SOCL 7294 Urban Policy (3 SH)
Designed to introduce the graduate political science, sociology, policy, or economics student to the broad area of public policy devoted to the specific problems of large metropolitan areas. Throughout the seminar series, there is a focus on Greater Boston. Discusses issues of racial attitudes and residential segregation, the urban labor market, housing, urban sprawl and transportation, education, public health, and urban planning. Explores links between all of these.

SOCL 7701 Tutorial in Teaching (3 SH)
Discusses issues and problems in teaching. This is a required course for all doctoral candidates and should be taken during a semester when the student has major responsibility for designing and executing a course in either sociology or anthropology. Open to doctoral candidates only.
* Prerequisite: Master's degree required.

SOCL 7976 Directed Study (1 to 4 SH)
Comprises reading and research directed by a faculty member.
* Repeatability: May be repeated without limit.

SOCL 7978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
* Repeatability: May be repeated without limit.

SOCL 7990 Thesis (1 to 4 SH)
Offers thesis supervision by members of the department.
* Repeatability: May be repeated without limit.

SOCL 7996 Thesis Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.

SOCL 8400 Planning Module in Urban and Regional Policy (1 SH)
Relates a professional activity to urban and regional planning.
* Repeatability: May be repeated up to 3 times.

SOCL 8673 Master's Paper in Sociology (3 SH)
Comprises empirical or library research meeting the criteria for publication in a professional journal. Supervised by members of the department.

SOCL 8960 Exam Preparation—Doctoral (0 SH)
Offers the student the opportunity to prepare for the PhD qualifying exam under faculty supervision.

SOCL 8966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
* Repeatability: May be repeated without limit.

SOCL 8982 Readings (1 to 4 SH)
Offers selected readings under the supervision of a faculty member.
* Repeatability: May be repeated without limit.

SOCL 8984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
* Repeatability: May be repeated without limit.

SOCL 8996 Research (0 SH)
Offers the student the opportunity to conduct full-time research.
* Repeatability: May be repeated without limit.

SOCL 9000 PhD Candidacy Achieved (0 SH)
Indicates successful completion of the doctoral comprehensive exam.

SOCL 9984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
* Repeatability: May be repeated without limit.

SOCL 9996 Research (0 SH)
Offers the student the opportunity to conduct full-time research.
* Repeatability: May be repeated without limit.

SOCL 9990 Dissertation (0 SH)
Offers theoretical and experimental work conducted under the supervision of a departmental faculty.
* Repeatability: May be repeated once.

SOCL 9996 Dissertation Continuation (0 SH)
Offers continued thesis work conducted under the supervision of a departmental faculty.
* Repeatability: May be repeated without limit.
SPANISH (SPNS)

SPNS 1101 Elementary Spanish 1 (4 SH)
Designed for students with little or no knowledge of Spanish. Presents essentials of correct Spanish usage through acquisition of basic skills in reading, speaking, writing, and aural comprehension.

SPNS 1102 Elementary Spanish 2 (4 SH)
Continues SPNS 1101. Includes completion of basic grammatical usage, reading of contemporary Hispanic material, and increased stress on oral and aural skills.
• Prerequisite: SPNS 1101, SPNS 1301, or placement test.

SPNS 1301 Elementary Spanish Immersion 1 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SPNS 1302 Elementary Spanish Immersion 2 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SPNS 1402 Elementary Spanish 2 for Healthcare Professionals (4 SH)
Reviews the present tense of regular, irregular, yo form irregular, and stem-changing verbs for students who have completed one level of Spanish. Offers students an opportunity to practice different medical scenarios consisting of brief conversations in the consulting room/hospital with the pediatrician, gynecologist, and with the dietician. Explores all the parts of the body and how to conduct a physical exam with a patient in Spanish as well as converse with patients at an elementary level.
• Prerequisite: SPNS 1101, SPNS 1301, placement test, or permission of instructor; Bouvé students only.

SPNS 2101 Intermediate Spanish 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Spanish materials.
• Prerequisite: SPNS 1102, SPNS 1302, or placement test.

SPNS 2102 Intermediate Spanish 2 (4 SH)
Builds on SPNS 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary Spanish materials.
• Prerequisite: (a) SPNS 2101, SPNS 2301, or placement test and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.

SPNS 2151 Intermediate Spanish for Business Purposes (4 SH)
Emphasizes communicating in a business environment, tailoring grammar and sentence pattern coverage, vocabulary, and cultural topics to a business setting. Combines contemporary business topics and intermediate business Spanish. Offers students an opportunity to be prepared to communicate in speaking and writing in a business setting in Spain and parts of Latin America and with a better understanding of the current business culture in Spain and Latin America.
• Prerequisite: SPNS 2101, SPNS 2201, SPNS 2301, or permission of instructor.

SPNS 2201 Intermediate Spanish 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Offers advanced grammar topics and continued stress on aural/oral acquisition. Provides some reading of literary texts as well as of popular media.
• Prerequisite: SPNS 1202, SPNS 1302, or placement test; international business majors only.

SPNS 2202 Intermediate Spanish 2—BSIB (4 SH)
Continues SPNS 2201. Designed to meet the special needs of international business students. Continues acquisition of all major skills in Spanish language. Provides increased reading of literary and popular culture texts. Also includes student projects.
• Prerequisite: SPNS 2201, SPNS 2301, or placement test; international business majors only.

SPNS 2301 Intermediate Spanish Immersion 1 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SPNS 2302 Intermediate Spanish Immersion 2 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.
SPNS 2401 Intermediate Spanish 1 for Healthcare Professionals (4 SH)
Reviews the present tense of regular, irregular, y formas irregular, and stem-changing verbs. Explores the preterite and imperfect tenses and the command forms formal (usted and ustedes). Topics also include por vs. para. Offers students an opportunity to practice a number of different medical scenarios in the emergency room, medical center, hospital, laboratory, and the X-ray room. Reviews the parts of the body and conducting a physical exam with a patient. Students practice taking a medical history and doing an extensive physical exam in Spanish.

• Prerequisite: SPNS 1102, SPNS 1302, SPNS 1402, placement test, or permission of instructor; Bouvé students only.

SPNS 2402 Intermediate Spanish 2 for Healthcare Professionals (4 SH)
Reviews all the preterite and imperfect tenses and introduces the present subjunctive. Offers students an opportunity to practice the command forms formal (ud./uds.) and different medical scenarios as well as to learn a variety of medical procedures and treatments for different illnesses. The course is designed to prepare students to converse with their patients at an intermediate level and discuss a variety of treatments for different medical conditions.

• Prerequisite: SPNS 2101, SPNS 2301, SPNS 2401, placement test, or permission of instructor; Bouvé students only.

SPNS 2900 Specialized Instruction in Spanish (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.

• Repeatability: May be repeated without limit.

SPNS 3101 Advanced Spanish 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

• Prerequisite: SPNS 2102, SPNS 2302, or placement test.

SPNS 3102 Advanced Spanish 2 (4 SH)
Builds on SPNS 3101 and continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

• Prerequisite: SPNS 3101 or SPNS 3301.

SPNS 3201 Advanced Spanish 1—BSIB (4 SH)
Designed to meet the special needs of international business students. Offers advanced grammar review and expanded student participation. Offers a major project in the language with the possibility of community work in the language.

• Prerequisite: SPNS 2202, SPNS 2302, or placement test; international business majors only.

SPNS 3202 Advanced Spanish 2—BSIB (4 SH)
Continues SPNS 3201. Offers advanced conversation and composition work for international business students. Is the final language course before students go abroad. Enhances and reinforces those practical language and communication skills students will encounter when they are abroad.

• Prerequisite: SPNS 3201 or SPNS 3301; international business majors only.

SPNS 3301 Advanced Spanish Immersion 1 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

SPNS 3302 Advanced Spanish Immersion 2 (4 SH)
Designed for students who are in a Spanish-speaking country, this is an off-campus immersion course. Focuses on standard Spanish as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

SPNS 3401 Advanced Spanish 1 for Healthcare Professionals (4 SH)
Reviews the command forms formal (ud./uds.), present subjunctive, and the imperfect subjunctive. Other topics include different medical conditions such as skin disorders and cardiovascular, pulmonary, gastrointestinal, genitourinary diseases, etc. Offers students an opportunity to practice having discussions with their Spanish-speaking patients regarding the different conditions that affect them and discuss a variety of treatment options. Focuses on preventative medicine—talking about the importance of a healthy diet, exercising, etc. The class is conducted totally in Spanish.

• Prerequisite: SPNS 2102, SPNS 2302, SPNS 2402, placement test, or permission of instructor; Bouvé students only.

SPNS 3501 Advanced Spanish Conversation: Global Communication (4 SH)
Designed for nonnative and native speakers whose language skills are at the advanced level and who seek specialized conversational language instruction. Focuses on current global issues, with particular attention paid to events in the Spanish-speaking world and Latinos in the United States. Offers students an opportunity to enrich vocabulary and enhance oral and written communication.

• Prerequisite: SPNS 3101, SPNS 3201, SPNS 3301, or permission of instructor.
SPNS 3800 Special Topics in Spanish (1 to 4 SH)
Focuses on a unique aspect of the Spanish language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).

- Prerequisite: At least an intermediate level of skill in the language.
- Repeatability: May be repeated up to 3 times.

SPNS 3900 Specialized Instruction in Spanish (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.

- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

SPNS 4201 Advanced Proficiency Spanish 1—BSIB (4 SH)
Designed for international business students to enhance their ability to communicate effectively in Spanish. Seeks to reinforce grammatical concepts and aims to enrich students’ vocabulary, with emphasis on business vocabulary. Focuses on drills, paired and group activities, dictations, role-playing, reading, translations, and listening to audio materials in order to achieve a living language experience. By engaging students in such activities, the course offers students an opportunity to further develop their cultural understanding and their use of Spanish for business purposes.

- Prerequisite: SPNS 3202 or SPNS 3302; international business majors only.

SPNS 4202 Advanced Proficiency Spanish 2—BSIB (4 SH)
Designed for international business students. Offers students an opportunity to continue to develop their ability to communicate effectively in Spanish. Seeks to reinforce grammatical concepts and aims to enrich students’ vocabulary, with emphasis on business vocabulary. Focuses on drills, paired and group activities, dictations, role-playing, reading, translations, and listening to audio materials in order to achieve a living language experience. By engaging students in such activities, the course offers students an opportunity to further develop their cultural understanding and their use of Spanish for business purposes.

- Prerequisite: SPNS 4201; international business majors only.

SPNS 4800 Special Topics in Spanish (1 to 4 SH)
Focuses on a unique aspect of the Spanish language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).

- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

SPNS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.

- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated without limit.

SPNS 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.

- Repeatability: May be repeated without limit.

SPNS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

- Repeatability: May be repeated without limit.

SPNS 5120 Spanish for Healthcare Professionals (3 SH)
Designed for students in healthcare programs who have little or no conversational fluency in Spanish. The goal of this course is primarily to develop speaking and listening skills with a particular focus on medical terminology and to give healthcare students the opportunity to learn the Spanish vocabulary for anatomy and physiology. Provides students with the opportunity to develop basic interviewing skills and the conversational skills necessary to conduct a basic physical exam and take a basic medical case history.

SPNS 5130 Spanish for Healthcare Professionals (3 SH)
Assumes that students have an elementary working knowledge of and skills in Spanish. Aims to impart specialized medical terminology in Spanish that can be used in a range of healthcare settings. Offers students an opportunity to expand their Spanish oral skills (speaking and listening) and their Spanish literacy skills (reading and writing).

- Prerequisite: Junior, senior, or graduate standing.

SPNS 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.
SPNS 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SPNS 6320 Medical Spanish for Healthcare Professionals (3 SH)
Seeks to train students who have completed at least one year of elementary Spanish and have a working knowledge of the language to acquire specialized medical terminology in Spanish that can be used in a range of healthcare settings. Provides students with the opportunity to expand their Spanish speaking and listening skills and their reading and writing skills. Through a variety of simulations, students also have an opportunity to develop and enhance interview and conversational skills appropriate to a variety of medical settings.
• Prerequisite: One year of elementary Spanish or permission of department.

SLPA 1000 College: An Introduction (1 SH)
Provides an introduction to the University, college, and health professions to enhance students’ understanding of self and the decisions they make academically and socially as members of the University’s diverse, multicultural community. Group activities and individual assignments along with active participation in a learning community help students adjust to life on an urban campus, develop a better understanding of the learning process, acquire essential academic skills, and make connections with the faculty and students in the college.

SLPA 1101 Introduction to Communication Disorders (4 SH)
Offers an overview of disorders of speech and hearing and their treatment, and a review of normal speech and hearing development. Requires clinical observations of persons with speech, language, and hearing disorders.
• NUpath: Engaging with the natural and designed world.
• Equivalent: SLPA 0100.

SLPA 1102 Language Development (3 to 4 SH)
Provides an overview of the development of the language system from birth to adolescence. Students compare different theories of language acquisition and understand their implications for intervention approaches; become familiar with broad developmental stages in infancy and childhood in the domains of motor skills, cognition, social skills, and speech and language, and the connections among these domains; understand the social dynamics between parents and children from which early gestures and prespeech vocalizations emerge; utilize some informal measures of language development covering form, content, and use; and understand broad differences in development in multicultural populations including Asian, Hispanic, and African-American children.
• Prerequisite: Bouvé students only.
• Equivalent: SLPA 0200.

SLPA 1103 Anatomy and Physiology of Speech and Hearing Mechanism (3 to 4 SH)
Offers an in-depth study of the static structure, musculature, and physiology of the speech and hearing mechanism. Emphasizes current research in speech and hearing physiology.
• Prerequisite: Bouvé students only.
• Equivalent: SLPA 0300.

SLPA 1200 Phonetics (3 to 4 SH)
Introduces students to articulatory, perceptual, and linguistic aspects of speech sounds, and phonetic transcription of normal and disordered speech using the International Phonetic Alphabet. Utilizes lectures, discussions, laboratory exercises, demonstrations, readings, audiotape exercises, problem sets, quizzes, and examinations.
• Equivalent: SLPA 0400.

SLPA 1202 Neurological Bases of Communication (4 SH)
Provides students with the opportunity to acquire a basic understanding of human neuroanatomy and neurophysiology as related to normal aspects of speech, hearing, and language. Central and peripheral nervous system anatomy and physiology are reviewed developmentally from the embryologic through the life-span perspectives.

SLPA 1203 Introduction to Audiology (3 to 4 SH)
Offers the opportunity to gain knowledge of the physics of sound and the anatomy/physiology of the human hearing mechanism, and how these two areas are interrelated. Familiarizes students with some of the diagnostic tests performed by the audiologist in order to assess the integrity of the hearing mechanism. Concludes with a brief overview of amplification and the rehabilitation process for hearing-impaired individuals.
• Prerequisite: SLPA 1205; Bouvé students only.
• Equivalent: SLPA 0600.
SLPA 1205 Speech and Hearing Science (3 to 4 SH)
Introduces facts and theories related to the physical bases of sound as relevant to speech acoustics; anatomy of the hearing mechanisms; psychoacoustics; and speech perception. While primarily concerned with normal communication, the course also includes discussion of communication disorders. Lab demonstrations and problem sets augment lectures and discussions.
• Equivalent: SLPA 0700.

SLPA 1555 Communication Disorders in Movies (4 SH)
Seeks to increase student understanding of communication disorders through film. By watching Oscar-awarded, Oscar-nominated, and other Hollywood movies, students are offered an opportunity to develop a heightened sensitivity for how society views specific communication disorders. Through related lectures, discussion, structured activities, and assignments, studies the etiology and diagnosis of a variety of communication disorders and how individuals with these disorders may be helped.
• NU Core: Social science level 1.
• NUpath: Engaging with the natural and designed world.
• Equivalent: SLPA 2555.

SLPA 2000 Introduction to Co-op (1 SH)
Prepares students for all aspects of the cooperative education component of their curriculum by comparing the goals and expectations of co-op employer, co-op faculty, and students themselves. Through professional goal exploration, students gain an understanding of the policies and procedures of the Department of Cooperative Education. The spectrum of clinical settings for speech, language, and hearing professionals is examined as well as current trends in the job market. Effective job search strategies through developing résumés, preparing for interviews, and making informed choices are targeted. Also examines on-the-job scenarios involving problem solving, ethical issues, and confidentiality, and discusses appropriate ways to handle difficult workplace situations.
• Prerequisite: Bouvé students only.

SLPA 4501 Language Disorders in Children (4 SH)
Covers a variety of common speech and language disorders in children with both biological and environmental foundations. Covers models of speech and language processing, definitions of disorders in relation to those models, and a range of intervention methodologies. Considers issues of bilingualism and bidialectalism and how they impact speech and language learning and academic success. Also considers the implications of these disorders for academic achievement, particularly reading and writing. The course is taught using a case-based approach. A portion of the credit for the course is earned through Web-based learning.
• Prerequisite: SLPA 1102 and SLPA 1200.
• Equivalent: SLPA 6306.

SLPA 4650 Seminar in SLP and Audiology (4 SH)
Offers students a transition into clinical practice. Students develop hands-on skills in either assessment or treatment, understand the ethics of clinical practice, and develop professional communication skills in a clinical setting.
• Prerequisite: SLPA 5107 and junior or senior standing.
• NU Core: Capstone, writing intensive in the major.

SLPA 4651 Speech Disorders across the Life Span (4 SH)
Offers students an opportunity to obtain the foundation needed to work with adults and children who demonstrate delays and disorders of speech production across the life span. Discusses articulation and phonological development and disorders, phonological differences, disorders of fluency of speech, and disorders of resonance and voice. Presents formal and informal diagnostic and therapeutic intervention for each disorder/difference and discusses the impact of these communication problems in relation to the individual and family.
• Prerequisite: SLPA 1103 and SLPA 1200 and senior standing;
speech-language pathology and audiology students only.

SLPA 4652 Seminar in SLP and Audiology Abroad: Achieving Cultural Competency (4 SH)
Offers students opportunities to improve their cultural awareness; to develop their knowledge of different cultures; to increase their appreciation of—and sensitivity to—cultural differences; and to experience rehabilitation-related, culturally diverse experiences while abroad. Rehabilitation services are provided in a variety of educational, medical, and community settings. Effectiveness of rehabilitation across these settings is impacted by many factors, including the interaction between cultural influences of the clinician and the clients/patients with whom he or she is working.
• Repeatability: May be repeated without limit.

SLPA 4700 Directed Observation Workshop (1 SH)
Offers students an opportunity to learn about assessment and intervention of individuals with communication disorders across the life span through guided observation of speech and language sessions. Discusses integrating principles of evidence-based practice into intervention. Reviews recent journal articles regarding treatment options applicable to clients. As part of the course, students have an opportunity to accrue a minimum of four hours of videotaped observations toward the twenty-five observation hours required by the American Speech-Language Hearing Association (ASHA) to meet clinical requirements as part of ASHA standards.
• Prerequisite: Bouvé students only.
SLPA 4701 Clinical Research Directed Study (1 SH)
Allows undergraduate students the opportunity to pursue a research interest beyond the confines of a specific course. Under the direction of a faculty adviser, students jointly develop a plan of study. Gives students a first exposure to all or some of the steps of the research process relative to their interest areas, beginning with the formulation of the problem and ending with the dissemination of the findings.

• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• NU Core: Writing intensive in the major.
• Repeatability: May be repeated without limit.

SLPA 4702 Clinical Research Directed Study (2 SH)
Allows undergraduate students the opportunity to pursue a research interest beyond the confines of a specific course. Under the direction of a faculty adviser, students jointly develop a plan of study. Gives students a first exposure to all or some of the steps of the research process relative to their interest areas, beginning with the formulation of the problem and ending with the dissemination of the findings.

• Repeatability: May be repeated without limit.

SLPA 4703 Clinical Research Directed Study (3 SH)
Allows undergraduate students the opportunity to pursue a research interest beyond the confines of a specific course. Under the direction of a faculty adviser, students jointly develop a plan of study. Gives students a first exposure to all or some of the steps of the research process relative to their interest areas, beginning with the formulation of the problem and ending with the dissemination of the findings.

• Repeatability: May be repeated without limit.

SLPA 4704 Clinical Research Directed Study (4 SH)
Allows undergraduate students the opportunity to pursue a research interest beyond the confines of a specific course. Under the direction of a faculty adviser, students jointly develop a plan of study. Gives students a first exposure to all or some of the steps of the research process relative to their interest areas, beginning with the formulation of the problem and ending with the dissemination of the findings.

• Repeatability: May be repeated without limit.

SLPA 4891 Research Abroad (4 SH)
Offers an opportunity to conduct research under faculty supervision as part of an international study experience.

• NU Path: Analyzing and using data, integrating knowledge and skills through experience.

SLPA 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.

• Repeatability: May be repeated without limit.

SLPA 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.

• Prerequisite: SLPA 4970.
• Repeatability: May be repeated without limit.

SLPA 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.

• NU Path: Integrating knowledge and skills through experience.

SLPA 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

• Repeatability: May be repeated without limit.

SLPA 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.

• Repeatability: May be repeated without limit.

SLPA 4994 Internship (4 SH)
Offers students an opportunity for internship work.

• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

SLPA 4995 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.

• Repeatability: May be repeated without limit.

SLPA 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.

• NU Core: Experiential learning.
• NU Path: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

SLPA 5100 Diagnostic Audiometry (3 SH)
Presents an in-depth examination of the various uses of pure tone, speech, and impedance measures as they relate to the standard audiological assessment. Covers case history and case reporting.

• Prerequisite: Junior, senior, or graduate standing.
SLPA 5101 Electrophysiology (1 SH)
Focuses on the interaction of measuring equipment and specific body responses to auditory stimulation. Explores in detail the acoustic and nonacoustic reflex, the otoacoustic emission, and the evoked auditory potential.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5102 Anatomy and Physiology of the Ear (2 SH)
Details anatomy, physiology, and neurology of the outer, middle, and inner ear, as well as structure and function of the eighth cranial nerve.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5103 Language Disorders in Children for Non–Speech-Language Pathology and Audiology Majors (3 SH)
Emphasizes current theories of language behavior and their practical application to the assessment and remediation of language disturbances in children. Uses lectures, discussions, and case presentations to focus on what constitutes a language problem, what assessment tools and therapeutic techniques are currently available, and what underlying principles are involved in selecting and organizing the content of a remediation program.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5104 Differential Diagnosis in Audiology (3 SH)
Examines in detail the site of lesion test battery approach to differential diagnosis in audiology. Includes consideration of Bekesy, ENG, SISI, tone decay tests, ABLB, acoustic reflex, and auditory evoked potentials (ABR).
• Prerequisite: SLPA 5100 and junior, senior, or graduate standing; Bouvé students only.

SLPA 5105 Auditory Pathologies (3 SH)
Provides an overview of temporal bone and eighth nerve anatomy. Discusses physiology of the auditory system. Covers the more frequently encountered pathologies affecting the auditory system as well as medical/surgical treatment of those disorders.
• Prerequisite: SLPA 5100 and junior, senior, or graduate standing; Bouvé students only.

SLPA 5106 Amplification (4 SH)
Explores physical characteristics of hearing aids and their performance. Offers theoretical approaches to selection and fitting of hearing aids, and analysis of hearing aid dispensing systems.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5107 Clinical Procedures (3 to 4 SH)
Reviews principles and procedures of the functional analysis of behavior and focuses on the application of behavioral theory and research to speech, language, and hearing training. Emphasizes clinical investigation in the experimental analysis of the behavior of communication disorders and experiences in the application of experimental procedures in assessment and treatment programs.
• Prerequisite: Junior, senior, or graduate standing; Bouvé students only.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

SLPA 5108 Rehabilitation Audiology (3 SH)
Provides information about the effects of hearing loss on communication, the role of the audiologist in the rehabilitation process, approaches to counseling, uses of amplification, and issues in industrial and educational hearing conservation.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5109 Neurology of Communication (3 SH)
Provides students with the opportunity to acquire a basic understanding of human neuroanatomy and neurophysiology as related to normal aspects of speech, hearing, and language. Reviews central and peripheral nervous system anatomy and physiology developmentally from embryologic through the life span perspectives. Neurology of common speech-language pathologies are similarly addressed.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5110 Language Disorders across the Life Span (3 to 4 SH)
Offers students an opportunity to obtain the foundation needed to work with children and adults with frequently referred language disorders that are typical consequences of congenital and acquired central and peripheral nervous-system impairments. Emphasizes the anatomy/etiology/neurology/physiology of common disorders, characteristics of these disorders, and intervention approaches (diagnostic and therapeutic). Addresses prevention, outcome, efficacy, and service-delivery considerations.
• Prerequisite: (a) SLPA 1102 and junior or senior standing or (b) graduate standing; speech-language pathology and audiology students only.
• Equivalent: SLPA 4500.

SLPA 5111 Anatomy and Physiology of the Auditory System (3 SH)
Details the anatomy, physiology, and neurology of the outer, middle, and inner ear, as well as providing basic coverage of the higher peripheral and central auditory mechanisms.
• Prerequisite: Junior, senior, or graduate standing.
SLPA 5150 Early Intervention: Assessment and Intervention (3 SH)
Offers an opportunity to learn the assessment models and multidomain tests used in early intervention. Familiarizes students with formal and informal tests. Offers an opportunity to learn a variety of intervention models, methods, and strategies.
• Prerequisite: Junior, senior, or graduate standing.

SLPA 5201 Diagnostic Testing in Speech-Language Pathology (1 SH)
Offers students an opportunity to review diagnostic tests and test manuals in the field of speech-language pathology and to practice their administration. Discusses information about test content, reliability, and validity. Principles of standardized testing, norm referencing, and test scoring are reviewed and practiced.
• Prerequisite: Senior standing or graduate standing; speech-language pathology and audiology majors only.

SLPA 5976 Directed Study (1 to 4 SH)
Allows students to pursue topics of individual interest beyond the scope of formal course work under the direction of faculty.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SLPA 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SLPA 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SLPA 6208 Pediatric Audiology (2 SH)
Familiarizes students with embryological development of the auditory system, structural lesions of the auditory system, categories of genetic and metabolic deafness, syndromes associated with deafness, contemporary neonatal screening, audiological assessment of the pediatric patient, test interpretation, and audiological counseling.

SLPA 6209 Psychoacoustics (2 SH)
Explores the relationship between acoustic stimuli and psychological responses to sounds. Stresses the similarities and differences between the perception of normal hearing and among different types of impaired hearing. Topics include a general review of the physics of sound, detection, discrimination, masking, binaural hearing, and speech perception.
• Prerequisite: Bouvé students only.

SLPA 6210 Psychosocial Aspects of Communication Disorders (2 SH)
Covers the psychological, educational, and social aspects of communication disorders, particularly auditory impairment.
• Prerequisite: Bouvé students only.

SLPA 6211 Research and Evidence-Based Practice (3 SH)
Uses principles of evidence-based practice to prepare students primarily as consumers of clinically relevant research in the field of communication disorders. While consumers utilize research information in some shape or form in their daily practice, producers engage in the conduct of original or replicated research. Consumers and producers of research information should be concerned with internal and external validity of research. As consumers, for example, clinicians may consult research studies to determine suitable treatments for their clients. As producers, clinicians may document a treatment via the case study method or single-subject experimental research. Emphasizes the role of using research to guide practice, even though the role of clinicians as research producer is addressed as well.
• Prerequisite: Junior, senior, or graduate standing; speech-language pathology and audiology students only.

SLPA 6212 Seminar in Hearing Science (2 SH)
Offers individual research and/or critical review of the literature in the area of bone conduction of auditory signals, evoked response audiometry, impedance, and audiometry, cortical processing of auditory input, and other related topics. Requires students to be responsible for class presentations of researched material.
• Repeatability: May be repeated without limit.

SLPA 6213 Pediatric Aural Rehabilitation (2 SH)
Focuses on various approaches to rehabilitation for deafness in children. Intervention philosophy, style, and practice are analyzed in an effort to understand the rationale of a particular approach to rehabilitation. Among the various approaches are cochlear implant, American Sign Language, and total communication.

SLPA 6214 Noise and Hearing (2 SH)
Covers such topics as different types of potentially hazardous sounds (that is, sound-level measurement and sources including personal stereos, recreational noises, industrial noises, and so on), how noise alters hearing, national regulations and reporting of noise levels, how to prevent noise-induced hearing loss, and how to educate and motivate people of different ages to prevent noise-induced hearing loss.
SLPA 6215 Pediatric Audiology (3 SH)
Covers the embryological development of the auditory system, structural lesions of the auditory system, categories of genetic and metabolic deafness, and syndromes associated with deafness. Discusses contemporary neonatal screening methods and audiolgic assessment of the pediatric patient. Reviews test interpretation, audiolgic counseling, and amplification intervention options and verification procedures.
*Prerequisite: AuD students only.

SLPA 6216 Physiological Acoustics (2 SH)
Emphasizes the biophysics of the hearing mechanism, especially in terms of actual clinical utility. Stresses comparative anatomy and physiological analysis.

SLPA 6217 Noise and Hearing (3 SH)
Covers topics related to the effects of noise on the auditory system and strategies for educating people about noise hazards. Primarily examines recent research in the field and then considers strategies for disseminating information regarding noise hazards to the public. Each student is asked to write educational pieces intended to inform the public about the effects of noise on the performance of the auditory system, to regularly read research articles related to course topics, and to participate in discussions of those articles.
*Prerequisite: AuD students only.

SLPA 6219 Aural Rehabilitation (3 to 4 SH)
Provides a detailed examination of various approaches to speech reading and auditory training as they apply to children and adults. Offers an integrated approach to management of hearing-impaired individuals.

SLPA 6220 Hearing Science (2 SH)
Provides a concentrated study of the physical sciences related to the practice of audiology, including waves, sound-unit conventions, sound propagation, filters, and sound technologies.

SLPA 6221 Hearing Science (3 SH)
Provides a concentrated study of the physical sciences related to the practice of audiology, including waves, sound-unit conventions, sound propagation, filters, and sound technologies. Seeks to provide the student with an in-depth understanding of hearing science through lectures, hands-on experiences, as well as assignments.

SLPA 6224 Psychoacoustics and Electroacoustics (3 SH)
Effect Spring 2017
Offers an in-depth, high-level look at signal processing, electronics, and physical principles associated with the sound perception, propagation of sound, electroacoustical devices, and technologies common to the practice of audiology and hearing science.
*Prerequisite: AuD students only.

SLPA 6301 Speech Science (3 SH)
Focuses on normative aspects of speech acoustics, speech production, and speech perception, but will also include exploration of disordered speech and remediation of speech disorders. Laboratory exercises and class projects are used to augment class lectures and discussions.
*Prerequisite: Junior, senior, or graduate standing; speech-language pathology and audiology students only.

SLPA 6303 Stuttering (3 SH)
Provides students with the information base needed to work with individuals of all ages who present with any type of fluency disorder. Focuses on theoretical background and assessment/treatment techniques for dysfluent individuals. Emphasizes outcome and efficacy considerations.
*Prerequisite: Senior or graduate standing; Bouvé students only.

SLPA 6304 Augmentative and Alternative Communication (3 SH)
Provides an overview of augmentative and alternative communication (AAC) approaches for individuals with severe communication impairments. Helps students gain the foundation knowledge and skills for further independent study, continuing education, further course work, and practicum experience. For student who seek additional study or experience in AAC, the course should provide an enabling foundation for providing direct services in AAC or to serve as a consultant to meet the needs of individuals with severe communication impairments. For those who will not seek additional study in AAC, the course should provide the basic knowledge for appropriate referral and collaboration.
*Prerequisite: Senior or graduate standing; Bouvé students only.

SLPA 6305 Articulation and Phonology (3 SH)
Familiarizes students with theoretical, empirical, and practical views of the etiology, assessment, and treatment of disorders of the speech sound system. Focuses on disorders that are developmental in nature (as opposed to emerging after normal speech sound development has occurred). Includes a review of articulatory phonetics, discussion of relevant linguistic principles, and study of theory and data relevant to the course of normal speech sound system development.
*Prerequisite: Senior or graduate standing; speech-language pathology and audiology students only.
SLPA 6306 Speech-Language Disorders in Children (3 SH)
Covers a variety of common speech and language disorders in children with both biological and environmental foundations. Studies models of speech and language processing, definitions of disorders in relation to those models, and a range of intervention methodologies. Students consider issues of bilingualism and bidialectism and how they impact speech and language learning and academic success. Finally, students consider the implications of these disorders for academic achievement, particularly reading and writing. Is taught using a case-based approach. A portion of the credit for the course is earned through Web-based learning.
* Equivalent: SLPA 4501.

SLPA 6307 Voice Disorders (3 SH)
Examines voice disorders, which are prevalent across the life span in both professional and lay voice users. Evaluation and treatment of organic and/or functional vocal pathologies are key focuses of speech-language pathologists across clinical settings (educational and medical). Provides students with the information base needed to work with these interesting and rewarding populations. Emphasis is on anatomy and physiology of normal and impaired voice production, instrumental and noninstrumental assessment, and treatment techniques for remediation. Emphasizes prevention, outcome, and efficacy considerations.
* Prerequisite: SLPA 6301 with a grade of B and senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6308 Dysphagia (3 SH)
Evaluating and treating swallowing disorders are key focuses of the speech-language pathologies in most clinical work settings (educational and medical), with individuals of all ages. Provides students with the information base needed to work with these challenging and rewarding populations. Focuses on theoretical background and assessment/treatment techniques for dysphagia individuals. Emphasizes outcome and efficacy considerations.
* Prerequisite: Speech-language pathology and audiology students only.

SLPA 6309 Speech-Language Disorders in Adults (3 SH)
Examines speech, language, and cognitive-linguistic disorders, which are typical consequences of acquired central and peripheral nervous system adult impairments. Provides students with the foundation needed to work with frequently referred adult-impaired populations across clinical settings. Emphasis is on the anatomy/etiology/neurology/physiology of commonly acquired adult communication disorders (including aphasia, apraxia, dementia, dysarthria, and traumatic brain injury), characteristics of these communication disorders, and intervention approaches (diagnostic and therapeutic). Addresses prevention, outcome, efficacy, and service-delivery considerations.
* Prerequisite: SLPA 5109 with a grade of B and junior, senior, or graduate standing; speech-language pathology and audiology students only.

SLPA 6311 Counseling in SLP (3 SH)
Provides students with a theoretical framework from which specific counseling strategies may be implemented for individuals and their families with various communication disorders. Stresses conversational interactive strategies.

SLPA 6312 Audiology for Speech-Language Pathology (3 SH)
Provides speech-language pathology majors a review of standard procedures and an update of contemporary issues in audiology. Focuses on pathological disruption of the auditory system and on assessment. Covers case history and case reporting.

SLPA 6314 Professional Practice (2 SH)
Provides contemporary information relative to the practice of audiology and speech-language pathology. Includes such topics as planning a business practice, establishing a successful business operation, securing third-party reimbursement, and providing services within state licensing and ASHA ethical guidelines.
* Repeatability: May be repeated without limit.

SLPA 6315 Professional Practice (3 SH)
Provides contemporary information relative to the practice of audiology and speech-language pathology. Includes such topics as planning a business practice, establishing a successful business operation, securing third-party reimbursement, and providing services within state licensing and ASHA ethical guidelines.
* Repeatability: May be repeated without limit.

SLPA 6316 Assistive Technology (2 SH)
Provides students with an understanding of the use of technology to improve the lives of people with communication disabilities in this three-credit elective course. Students develop an understanding of the principles underlying human activity assistance technology from the perspective of both users and professionals. Includes demonstrations of technology and hands-on training in the use of computer software. Introduces both traditional and computer-based technology.

SLPA 6317 Sociolinguistics (3 SH)
Consists of basic sociolinguistic concepts including dialectal variations and other forms of language variation; attitudes toward language use and the speech community; language needs of multicultural children in educational settings, considering cultural attitudes of teachers and types of learning situations available; and social and cultural diversity and its effects on the individual’s communicative competence. Includes methods of sociolinguistic research; bilingual language development; language in the classroom; and sociolinguistic effects on reading, writing, oral language, and role relationships.
SLPA 6318 Speech-Language Pathology in the Schools (3 SH)
Prepares students for a potential career as a speech-language pathologist (SLP) in the public schools. The regular education classroom has been recognized as the least restrictive environment (LRE) for most children. Many schools now provide a variety of special education services within the classroom using specialized learning techniques infused with curricular content. This has challenged the manner in which SLPs plan and deliver services to children with communication impairments. Many experienced SLPs have long acknowledged frustrations inherent in traditional speech-language intervention, exemplified by goals and services only marginally related to classroom demands and fragmented objects in the individualized education plan. Helps students to avoid becoming a “broom-closet therapist” (Simon, 1987) and develop into a classroom-based communication specialist; a role supported by recent laws and legislation.

SLPA 6319 Speech-Language Pathology in the Medical Settings (3 SH)
Prepares students for a potential career as a speech-language pathologist (SLP) in a medical setting working with patients across the life span. Topics include scope of practice, the team approach, third-party coverage/reimbursement, ethics, healthcare reform, assessment of outcomes, documentation, care for the caregiver, and service delivery across the continuum of care. Addresses service delivery issues and concerns relevant to the following types of medical settings: acute care, acute rehabilitation, early intervention, chronic care, and home care.

SLPA 6321 Motor Speech Disorders (3 SH)
Focuses on the neurology, SLP evaluation, and SLP treatment of individuals presenting with any type/types of anarthria/dysarthria and apraxia/dyspraxia of speech. Many of the neurologically impaired children and adults that speech-language pathologists work with present with motor speech disorders. Diagnostically, studies how to complete oral motor examinations (including an assessment of those cranial nerves involved in respiration, phonation, resonance, and articulation) and intelligibility testing. Therapeutically, studies a variety of therapy approaches for the range of motor speech disorders based on severity of impairment and prognosis for recovery/improvement including verbal, nonverbal, prosthetic, and pharmacologic.

• Prerequisite: SLPA 6301 with a grade of B and senior or graduate standing.

SLPA 6322 Language Literacy (3 SH)
Focuses on the development of language and literacy skills through storybook reading, the use of predictable and repetitive text, logical sequencing, and the provision of multiple opportunities to gain oral control over the language in texts. Discusses how to give children the opportunity to generalize use of storybook language in meaningful communication. Also explores techniques to expand and develop a child’s language.

• Prerequisite: Senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6323 Dialects, Bilingualism, and Accent Modification (3 SH)
Introduces students to current research into interlanguage phonology, considering both perception and production. With the increase in globalization and immigration trends in this country, there is a need for clinicians and researchers to be aware of the interactions between dialected speech and disordered speech. Focuses on the major language groups of the world. Discusses a variety of approaches to accent modification, including the use of computer-assisted and Web-based approaches. Offers a practice-oriented approach and introduces students to major issues of intelligibility and naturalness in minority populations. This elective course is offered every two years.

SLPA 6324 Workshop in Speech Pathology and Audiology (3 SH)
Offers workshops in a specific field of interest from time to time. These may include topical issues or new information in either theory or practice.

SLPA 6326 Genetic Communication Disorders (3 SH)
Introduces the basics of both clinical and molecular genetics. No single scientific discipline has had more impact on the understanding of diseases and disorders in humans than genetics. Describes the basics of heredity, how genes work and are expressed in people, how to gather information that might reveal a genetic basis for a communicative impairment, and the importance of understanding that basis. Also discusses syndromes that have a communication component, the diagnostic process, and syndromic implications for treatment.

SLPA 6327 Topics in Professional Practice (2 SH)
Identifies current issues in the fields of speech-language pathology and audiology relative to ethics, service delivery systems, acceptable standards of clinical practice, and emerging trends in diagnostics and treatment. Critical thinking and problem-solving abilities are utilized to analyze clinical and professional dilemmas.

• Repeatability: May be repeated without limit.

SLPA 6328 Seminar in Audiology (2 SH)
Offers advanced study of the development of principles and theories associated with modern procedures and methods used in audiology.
SLPA 6330 Language Literacy 1 (0.5 SH)
Designed to teach students in the field of communication disorders about early childhood literacy skill acquisition, use, and challenges. Offers students an opportunity to learn how to deliver language-based early literacy services to young children in a manner consistent with the American Speech-Language-Hearing Association (ASHA) position that speech-language pathologists can and should play a critical and direct role in literacy development/use for people with communication disorders across the life span.
* Prerequisite: Senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6331 Seminar in Communication Disorders (1 SH)
Explores in-depth issues in communication disorders relating to current aspects of clinical management. May include a variety of specific topics.
* Repeatability: May be repeated without limit.

SLPA 6332 Seminar in Communication Disorders (2 SH)
Allows for the advanced study of current diagnostic and intervention strategies, applications of theoretical and applied research, and exploration of current topics in speech-language pathology. Topics may range from the treatment of undeserved populations to the analysis of complex clinical cases requiring interdisciplinary management.
* Repeatability: May be repeated without limit.

SLPA 6333 Seminar in Communication Disorders (3 SH)
Allows for the advanced study of current diagnostic and intervention strategies, applications of theoretical and applied research, and exploration of current topics in speech-language pathology. Topics may range from the treatment of undeserved populations to the analysis of complex clinical cases requiring interdisciplinary management.
* Repeatability: May be repeated without limit.

SLPA 6334 Seminar in Communication Disorders (4 SH)
Allows for the advanced study of current diagnostic and intervention strategies, applications of theoretical and applied research, and exploration of current topics in speech-language pathology. Topics may range from the treatment of undeserved populations to the analysis of complex clinical cases requiring interdisciplinary management.
* Repeatability: May be repeated without limit.

SLPA 6335 Early Intervention: Assessment and Intervention (3 SH)
Covers assessment models and the multidomain tests used in early intervention. Students become familiar with informal and formal instruments used in different areas including cognition speech and language, motor, and social/emotional domains. Explains the process and responsibilities for the writing of individualized service plans (ISPs), as well as variety of intervention models, methods, and strategies to be implemented in natural environments. Is taught by professors drawn from special education, speech-language pathology, counseling psychology, nursing, and physical therapy. Students participate in Northeastern’s Global Early Intervention Network.
* Prerequisite: Junior, senior, or graduate standing; Bouvé students only.

SLPA 6336 Instrumentation and Electronics for Audiologists (3 SH)
Details methods, instruments, and standards used for measurement and calibration of audiometric signals, including basic circuit interpretation, design, and construction.

SLPA 6337 Language Literacy Experiential Program (0.5 SH)
Offers students in the field of communication disorders an opportunity to obtain supervised off-campus clinical experience delivering language-based early literacy services to young children in a manner consistent with the American Speech-Language-Hearing Association (ASHA) position that speech-language pathologists can and should play a critical and direct role in literacy development/use.
* Prerequisite: Senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6338 Language Literacy 2 (2 SH)
Designed to teach students in the field of communication disorders about literacy skill use and evaluation and treatment of literacy impairments beyond early childhood. Reinforces the knowledge and skills covered in SLPA 6330. Offers students an opportunity to learn how to deliver language based-services to middle-school-age children and adults in a manner consistent with the American Speech-Language-Hearing Association (ASHA) position that speech-language pathologists can and should play a critical and direct role in literacy development/use for people with communication disorders across the life span.
* Prerequisite: SLPA 6330 and senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6409 Audiology Clinic Seminar (1 SH)
Offers advanced study of the development of principles and theories associated with modern procedures and methods used in audiology.
* Repeatability: May be repeated without limit.
SLPA 6410 Audiology Clinic 1 (3 SH)
Offers a supervised clinical experience in audiology designed for beginning graduate students. Includes practicum sites at the Northeastern University Hearing Language and Speech Center, satellite clinics, and/or educational settings. Requires student to be available a minimum of twenty hours per week during the academic year. Requires attendance at on-campus seminar meetings held weekly.
• Prerequisite: SLPA 6414 (may be taken concurrently).
• Repeatability: May be repeated without limit.

SLPA 6411 Audiology Clinic 2 (3 SH)
Continues SLPA 6410. Offers a supervised clinical experience in speech-language pathology and audiology for advanced graduate students. Uses practical experience to emphasize problem-solving techniques relevant to case management. Requires student to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6410.
• Repeatability: May be repeated without limit.

SLPA 6412 Audiology Clinic 3 (3 SH)
Continues SLPA 6411. Offers a supervised clinical experience in speech-language pathology and audiology for advanced graduate students. Uses practical experience to emphasize problem-solving techniques relevant to case management. Requires student to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6411.
• Repeatability: May be repeated without limit.

SLPA 6413 Audiology Clinic 4 (3 SH)
Continues SLPA 6412. Offers a supervised clinical experience in speech-language pathology and audiology for advanced graduate students. Uses practical experience to emphasize problem-solving techniques relevant to case management. Requires student to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6412.
• Repeatability: May be repeated without limit.

SLPA 6414 Speech-Language Pathology Clinic Seminar (1 SH)
Provides feedback and reflection on the clinical experience as students begin their entry into clinical practice on an individual and small-group basis.
• Prerequisite: Bouvé students only.

SLPA 6415 Speech-Language Pathology Advanced Clinical Practicum 1 (3 SH)
Offers supervised clinical experience in speech pathology for beginning graduate students. Includes practicum sites at the Northeastern University on-campus clinical site, satellite clinics, and/or educational settings. Requires student to be available a minimum of twenty hours per week during the academic year. Requires attendance at on-campus seminar meetings held weekly.
• Prerequisite: Junior, senior, or graduate students; speech-language pathology and audiology students only.
• Repeatability: May be repeated without limit.

SLPA 6416 Speech-Language Pathology Advanced Clinical Practicum 2 (2 SH)
Offers supervised clinical experience in speech pathology at the Northeastern University Hearing, Language, and Speech Center, medical settings, educational settings, and rehabilitation centers. Uses practical experience to emphasize advanced diagnostic and management techniques, stressing the application of theory to practice. Requires student to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6415 with a grade of B; Bouvé students only.
• Repeatability: May be repeated without limit.

SLPA 6417 Speech-Language Pathology Advanced Clinical Practicum 3 (2 SH)
Offers supervised clinical experience in speech-language pathology for advanced graduate students, placing them in settings such as the Northeastern University Speech, Language, and Hearing Center, medical settings, educational settings, and rehabilitation centers. Uses practical experience to emphasize problem-solving techniques relevant to case management and continues to integrate theory and practice. Requires students to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6301 with a grade of B; Bouvé students only.
• Repeatability: May be repeated without limit.

SLPA 6418 Speech-Language Pathology Advanced Clinical Practicum 4 (2 SH)
Offers supervised clinical experience in speech-language management pathology for advanced graduate students, placing them in settings such as the Northeastern University Speech, Language, and Hearing Center, medical settings, educational settings, and rehabilitation centers. Uses practical experience to emphasize problem-solving techniques relevant to case management and continues to integrate theory and practice. Requires students to be available a minimum of twenty hours per week during the academic year.
• Prerequisite: SLPA 6417 with a grade of B; Bouvé students only.
• Repeatability: May be repeated without limit.
SLPA 6419 Audiology Clinic for Speech-Language Pathologists (1 SH)
Provides the SLP students with hands-on experience as well as general theoretical background to basic hearing testing, hearing aid fitting, and management.
• Repeatability: May be repeated without limit.

SLPA 6420 Practical Statistics for Speech-Language Pathology and Audiology (3 SH)
Introduces basic concepts in data collection, organization, and analysis using statistical methods with an overall focus on profession-specific application and interpretation.
• Prerequisite: Senior or graduate standing; speech-language pathology and audiology students only.

SLPA 6706 Instrumentation (3 SH)
Describes and illustrates the basics of signal generation and control. Covers decibel notation and SPL, HTL, peSPL, and nHL. Describes in detail types of signals used in auditory measures as well as the methods used to calibrate those signals. Also describes and illustrates signal delivery transducers, including circumaural and insert phones, bone conductors, and loudspeakers with their driver amplifiers.

SLPA 6708 Speech/Language Clinic for Audiology Students (1 SH)
Offers audiology students a supervised clinical experience in speech-language screenings at the Northeastern University Speech-Language and Hearing Center, satellite clinics, and educational settings. Offers students the opportunity to gain experience screening adults and children. Requires students be available for seminar meetings on campus.

SLPA 6711 Scope of Practice in Audiology (2 SH)
Using ASHA documents entitled “Scope of Practice in Audiology,” describes and defines the ASHA Code of Ethics, segments of FDA policy regarding audiological activities, and relevant legislation such as Massachusetts General Law and Chapter 93: 71. Examines the limits of regulated practice and identifies examples of practice deemed to have exceeded the limits imposed by defining authorities.

SLPA 6715 Amplification 1 (3 SH)
Explores physical characteristics of hearing aids and their performance. Offers theoretical approaches to selection and fitting of hearing aids and analysis of hearing aid dispensing systems. Introduces digital technology and contemporary software fitting systems as well as verification methods.

SLPA 6716 Amplification 2 (3 SH)
Expands on SLPA 6715 and examines state-of-the-art digital technology and contemporary software fitting systems. Explores the use of computers to fit and validate hearing aids as well as computer approaches to document hearing aid benefit. Examines the limits of personally worn amplification and presents difficult-to-fit cases.
• Prerequisite: Bouvé students only.

SLPA 6722 Evaluation and Treatment of Central Pathologies (3 SH)
Examines behavioral and electrophysiological assessment of central auditory dysfunction. Emphasizes audiological evaluation as well as neuropsychological and speech-language evaluations. Describes the importance of parent and teacher observation of child behavior. Discusses pharmacological treatment where appropriate. Discusses and demonstrates audiological intervention including formal and informal auditory training programs and the use of FM signal processors to facilitate auditory processing. Illustrates the role of the audiologist as a CORE team specialist and parental advocate. Offers hands-on experience during class time as well as through completion of assignments.
• Prerequisite: Admission to AuD program or permission of instructor.

SLPA 6726 Assessment and Treatment of Balance Disorders (2 SH)
Requires students to become skilled in various assessment techniques associated with differential diagnosis of balance disorders. Illustrates the importance of case history and facilitates student skill acquisition in use of video electronystagmography (VENG) for optokinetic, positional, and caloric assessment. Affords students opportunities to learn the importance of rotational chair and acquire skill in its clinical application. Discusses the variety of medical/surgical treatments for control of balance disorders and demonstrates manipulation approaches appropriate for audiological care.

SLPA 6727 Assessment and Treatment of Balance Disorders (3 SH)
Requires students to become skilled in various assessment techniques associated with differential diagnosis of balance disorders. Illustrates the importance of case history and seeks to facilitate student skill acquisition in use of video electronystagmography (VENG) for optokinetic, positional, and caloric assessment. Students also have opportunities to learn the importance of rotational chair and acquire skill in its clinical application. Discusses the variety of medical/surgical treatment for control of balance disorders and demonstrates manipulation approaches appropriate for audiological care. Offers hands-on experience during class time and through completion of assignments.
SLPA 6728 Assessment of Vestibular Disorders (3 SH)
Offers a detailed review of how to evaluate the dizzy patient in a clinical setting. Topics include neuroanatomy and physiology of the balance and vestibular system, the importance of case history and physical examination, standard laboratory testing such as videonystagmography (VNG), rotational chair, and computerized dynamic posturography (CDP). Includes contemporary assessment procedures such as vestibular evoked myogenic potential (VEMP), subjective visual vertical (SVV), and video head impulse test (vHIT). Offers hands-on experience during the course.
- Prerequisite: AuD students only.

SLPA 6729 Management of Vestibular Disorders (3 SH)
Focuses on clinical management of a variety of balance and vestibular disorders, from initial diagnosis to treatment and rehabilitation. Topics may include, but are not limited to, Meniere’s disease, benign paroxysmal positional vertigo, vestibular migraine, and vestibular schwannoma, etc. Expects students to learn how to integrate the knowledge of laboratory vestibular testing, covered in SLPA 6728, into clinical care of individual patients with specific vestibular complaints. Offers students an opportunity to become efficient in clinical decision making. Uses case studies during the course.
- Prerequisite: SLPA 6728; AuD students only.

SLPA 6736 Advanced Evoked Potential Measures (2 SH)
Examines the latest applications of evoked potential measures, including ASSR and Stacked ABR. Covers the P300, MMN, the late cortical potentials, and brain mapping. Discusses applications of these measures to clinical practice.

SLPA 6737 Advanced Evoked Potential Measures (3 SH)
Examines the latest applications of evoked potential measures, including auditory brainstem response (ABR), auditory steady-state response (ASSR), and stacked auditory brainstem response. Also covers the auditory P300 response, auditory middle latency response (AMLR), and the auditory late response (ALR). Discusses applications of these measures to clinical practice. Offers an opportunity to obtain hands-on experience during class time and through completion of assignments.

SLPA 6741 Pharmacology for Audiologists (2 SH)
Covers introductory information on pharmacological agents, their actions, and adverse reactions. Discusses the use of drugs to treat auditory disease, and analyzes the specific process of ototoxic reaction. Examines the use of drugs to treat tinnitus.

SLPA 6746 Implantable Hearing Devices (2 SH)
Examines implantable hearing devices, specifically cochlear implants (CI), middle-ear implants, and bone-anchored hearing aids (BAHA). Discusses cochlear implant candidacy, surgery, follow-up, and long-term training and education issues relevant to children. Covers in detail the performance, cost, and efficiency of middle-ear implants and BAHA.

SLPA 6747 Implantable Hearing Devices (3 SH)
Examines implantable hearing devices, specifically cochlear implants (CI), middle-ear implants, and bone-anchored hearing aids (BAHA). Discusses cochlear implant candidacy, surgery, follow-up, and long-term training and education issues relevant to children. Covers the performance, cost, and efficiency of middle-ear implants and BAHA in detail. Provides hands-on experience with programming of devices during class time and through completion of assignments.

SLPA 6751 Advanced Audiology Clinic 1 (2 SH)
Introduces students to clinical process and provides an opportunity for self-reflection and evaluation. Offers students the chance to learn how to observe client behavior, how to write clinical reports, and how to recommend specific audiological treatment. This course offers a supervised clinical experience in audiology designed for beginning graduate students. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students to be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars.

SLPA 6752 Advanced Audiology Clinic 2 (2 SH)
Offers students the opportunity to expand on clinical skills as well as self-evaluation skills that were introduced in . Focuses on obtaining a basic case history, test procedures and skills, as well as providing results and recommendations to patients. This course offers a supervised clinical experience in audiology designed for beginning graduate students. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Requires students to be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars.

SLPA 6753 Advanced Audiology Clinic 3 (2 SH)
Expands on knowledge and skills covered in and and seeks to further develop student self-assessment skills. Uses practical experiences to emphasize problem-solving techniques relevant to case management. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Requires students to be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars. This is an intermediate level of clinical training.
- Prerequisite: SLPA 6752.
SLPA 6754 Advanced Audiology Clinic 4 (2 SH)
Provides practical experiences to emphasize problem-solving techniques relevant to case management and to continue to integrate theory and practice. Fosters greater independence in case management and follow-up. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Requires students be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars.
• Prerequisite: SLPA 6753.

SLPA 6755 Advanced Audiology Clinic 5 (2 SH)
Provides practical experiences to assist students in acquiring clinical skills and knowledge necessary to prepare them for the clinic internship. Focuses on student self-assessment skills as well as independent thinking and problem solving. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Requires students be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars. This is an advanced level of clinical training.
• Prerequisite: SLPA 6754.

SLPA 6756 Advanced Audiology Clinic 6 (2 SH)
Provides practical experiences to assist students in acquiring clinical skills and knowledge necessary to prepare them for the clinic internship. Focuses on assisting students in assigning priorities to clinical goals and objectives as well as independent thinking and problem solving. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Formative assessment of emergent skills are performed as well as summative assessment of the complete clinician. Requires students be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars. This is an advanced level of clinical training.
• Prerequisite: SLPA 6755.

SLPA 6757 Advanced Audiology Clinic 7 (3 SH)
Offers practical experiences that seek to assist students in acquiring clinical skills and the knowledge necessary to prepare them for the clinic internship. Focuses on assigning priorities to clinical goals and objectives as well as independent thinking and problem solving. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Formative assessment of emergent skills is performed as well as summative assessment of the complete clinician. Requires students be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars. This is an advanced level of clinical training.
• Prerequisite: SLPA 6756; audiology students only.

SLPA 6758 Advanced Audiology Clinic 8 (3 SH)
Offers practical experiences that seek to assist students in acquiring clinical skills and the knowledge necessary to prepare them for the clinic internship. Focuses on assigning priorities to clinical goals and objectives as well as independent thinking and problem solving. Practicum sites include the Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and educational settings. Formative assessment of emergent skills is performed as well as summative assessment of the complete clinician. Requires students be available a minimum of 20 hours per week during the academic year for clinical practicum and scheduled seminars. This is an advanced level of clinical training.
• Prerequisite: SLPA 6757; audiology students only.

SLPA 6761 Advanced Audiology Clinic 1 (1.5 SH)
Introduces students to the clinical process. Affords students opportunities to learn how to observe client behavior, how to write clinical reports, and how to recommend specific audiological treatment. Offers a supervised clinical experience in audiology designed for beginning graduate students. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students be available a minimum of one to two days per week during the academic year.

SLPA 6762 Advanced Audiology Clinic 2 (1.5 SH)
Affords students the opportunity to expand on clinical skills that were introduced in SLPA 6761. Focuses on obtaining a basic case history, test procedures and skills, as well as providing results and recommendations to patients. Offers a supervised clinical experience in audiology designed for beginning graduate students. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students be available a minimum of one to two days per week during the academic year.

SLPA 6763 Advanced Audiology Clinic 3 (1.5 SH)
Expands on knowledge and skills acquired in SLPA 6761 and SLPA 6763 and helps students further develop self-assessment skills. Uses practical experiences to emphasize problem-solving techniques relevant to case management. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students be available a minimum of one to two days per week during the academic year.
SLPA 6764 Advanced Audiology Clinic 4 (1.5 SH)
Provides practical experiences to emphasize problem-solving techniques relevant to case management and to continue to integrate theory and practice. Fosters greater independence in case management and follow-up. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students be available a minimum of one to two days per week during the academic year.

SLPA 6765 Advanced Audiology Clinic 5 (1.5 SH)
Provides practical experiences to assist students in acquiring clinical skills and knowledge necessary to prepare them for the clinic internship. Focuses on student self-assessment skills as well as independent thinking and problem solving. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Requires students be available a minimum of one to two days per week during the academic year.

SLPA 6766 Advanced Audiology Clinic 6 (1.5 SH)
Provides practical experiences to assist students in acquiring clinical skills and knowledge necessary to prepare them for the clinic internship. Focuses on assisting students in assigning priorities to clinical goals and objectives as well as independent thinking and problem solving. Includes practicum sites at Northeastern University Speech-Language and Hearing Center, area clinics or hospitals, and/or educational settings. Formative assessment of emergent skills are performed as well as summative assessment of the complete clinician. Requires students be available a minimum of one to two days per week during the academic year.

SLPA 6773 Topics Seminar (3 SH)
Provides a forum for students to examine contemporary issues in audiology as they relate to patient services and audiologist expertise. Requires students to extract from contemporary audiological literature a multitude of topics that reflect the current state of audiology. The instructor functions as a moderator/facilitator.

SLPA 6791 AuD Clinic Internship 1 (3 SH)
Provides students with the first of three segments of a full-time clinical experience in a variety of off-campus settings, including hospitals, clinics, private audioligic practices, rehabilitation centers, and educational settings. Direct supervision is provided by off-campus licensed audiologists who are in contact with University faculty.

SLPA 6792 AuD Clinic Internship 2 (3 SH)
Provides students with the second of three segments of a full-time clinical experience in a variety of off-campus settings, including hospitals, clinics, private audioligic practices, rehabilitation centers, and educational settings. Direct supervision is provided by off-campus licensed audiologists who are in contact with University faculty.

SLPA 6793 AuD Clinic Internship 3 (3 SH)
Provides students with the final segment of full-time clinical experience in a variety of off-campus settings, including hospitals, clinics, private audioligic practices, rehabilitation centers, and educational settings. Direct supervision is provided by off-campus licensed audiologists who are in contact with University faculty.

SLPA 6812 Newborn Hearing Screening Diagnostic Follow-Up (3 SH)
Focuses on the various components of the newborn and infant audioligic diagnostic test battery. Through course lectures, case studies, and hands-on experience, offers students an opportunity to develop the skills and gain the confidence necessary to perform hearing testing on this particular demographic in a clinical setting.
• Prerequisite: SLPA 6737; AuD students only.

SLPA 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.
• Repeatability: May be repeated without limit.

SLPA 6966 Practicum (1 to 4 SH)
Provides eligible students with an opportunity for practical experience.
• Repeatability: May be repeated without limit.

SLPA 6978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

SLPA 6984 Research (1 to 4 SH)
Affords students the opportunity to develop practical research skills through involvement in a research project. Requires students to submit their finished project to a state or national organization for possible acceptance as a poster presentation. Emphasizes research methods, including data collection and analysis, as well as writing skills.
• Repeatability: May be repeated without limit.

SLPA 6985 AuD Research Project 1 (1 SH)
Offers a research course designed to provide the student with experience in conducting a literature review and in developing an experimental design. Seeks to give students an appreciation for the initial steps in the research process.
• Prerequisite: SLPA 6211 (may be taken concurrently); AuD students only.
SLPA 6986 AuD Research Project 2 (1 SH)  
Offers a research course designed to provide the student with experience in recruiting subjects and participating in data collection. Offers students an opportunity to develop a database or other data-logging system to organize study findings.  
- Prerequisite: SLPA 6985; AuD students only.

SLPA 6987 AuD Research Project 3 (1 SH)  
Offers a research course designed to provide the student with experience in interpretation of research findings. Offers students an opportunity to formally present a summary of their research findings, including a proposal for follow-up research.  
- Prerequisite: SLPA 6986; AuD students only.

SLPA 6990 Thesis (3 SH)  
Offers a research activity that is the first of a two-course thesis sequence with the recommendation of the adviser.  
- Repeatability: May be repeated without limit.

STRATEGY (STRT)

STRT 4501 Strategy in Action (4 SH)  
Provides for the integration and application of administrative theory, knowledge, skills, and experiences for effective strategic performance in an organization. Enables students to acquire a better understanding of the relevance and limitations of business and management concepts and techniques when making and implementing strategic decisions.  
- Prerequisite: Business majors and combined majors only with senior standing.  
- NU Core: Capstone, writing intensive in the major.  
- NUpath: Understanding societies and institutions, writing intensive in the major, demonstrating thought and action in a capstone.  
- Equivalent: INTB 4202, INTB 4501, STRT 4514, and STRT 4516.

STRT 4514 Internal Case Competition Challenge (4 SH)  
Covers integration and application of theory, knowledge, skills, and experiences for effective strategic performance in an organization. Offers students an opportunity to develop strong analytical, critical-thinking, team-building, and presentation skills to prepare them for addressing business problems strategically and to present their analysis and solutions effectively, both orally and in writing. A key element of this course is participation in internal case competitions.  
- Prerequisite: Junior or senior standing; business majors only.  
- NU Core: Capstone, writing intensive in the major.  
- Equivalent: INTB 4202, INTB 4501, STRT 4501, and STRT 4514.

STRT 4516 External Case Competition Challenge (4 SH)  
Covers integration and application of theory, knowledge, skills, and experiences for effective strategic performance in an organization. Offers students an opportunity to develop strong analytical, critical-thinking, team-building, and presentation skills to prepare them for addressing business problems strategically and to present their analysis and solutions effectively, both orally and in writing. A key element of this course is participation in external case competitions.  
- Prerequisite: Junior or senior standing; business majors only.  
- NU Core: Capstone, writing intensive in the major.  
- Equivalent: INTB 4202, INTB 4501, STRT 4501, and STRT 4514.

STRT 6200 Strategic Decision Making in a Changing Environment (3 SH)  
Focuses on strategy development and implementation for a line of business and for the corporation as a whole by adopting a top management perspective. Beginning with developing a mission statement and goals for the firm, focuses on environmental scanning, incorporating economic, technological, sociopolitical, and legal trends in conducting industry analysis, thus assessing opportunities and threats and the firm’s capabilities before formulating strategy that represents a fit between the environment and the firm. Discusses how to develop competitive advantage and assess competitive positioning, and studies how organizational structure and systems contribute to implementing strategy. Stresses the role of leadership and motivation before moving on to feedback mechanisms to assess success in strategy implementation, leading to revision of strategic plans as needed.  
- Prerequisite: (a) FINA 6208 or FINA 6200 and (b) HRMG 6208 or HRMG 6200 and (c) MECN 6208 or MECN 6200 and (d) MKTG 6208 or MKTG 6200  
- Equivalent: MGMT 6200, MGMT 6208, and STRT 6208.

STRT 6208 Strategic Decisions for Growth (3 SH)  
Focuses on developing and implementing long-term strategy for businesses. Examines how businesses grow in the context of the external environment. Environmental, macroeconomic, and competitive analysis; industry structure analysis; and an evaluation of current and future resources available to a firm together help determine strategy choices in a world characterized by alliances, outsourcing, and mergers and acquisitions. Leadership, organizational structure, business processes, the quality of human capital, corporate social responsibility, and reward systems all affect strategy implementation. Measurement and control systems help determine strategic plan achievement and create a feedback loop for revising strategic plans for future periods.  
- Prerequisite: 25 semester hours of MBA core curriculum; business administration and finance/business administration students only.  
- Equivalent: MGMT 6200, MGMT 6208, and STRT 6200.
NORTHEASTERN UNIVERSITY

STRT 6210 Workforce Metrics and Analytics (3 SH)
Introduces how to measure and manage a workforce strategically, including (1) identifying the strategic work that is truly necessary to execute firm strategy; (2) investing in differentiated management systems that support that work; and (3) designing and implementing targeted measurement systems, such as human resources function and workforce scorecards, designed to help to hold line managers accountable for strategic talent. Emphasizes helping students move from a focus on levels associated with a particular workforce attribute (e.g., what is our cost per hire?) to understanding the impact of the workforce on business-level outcomes (e.g., how might an increase in the quality of our project managers affect new product cycle time?).
• Prerequisite: Restricted to students in selected MBA and MSF programs.

STRT 6220 Strategic Management for Healthcare Organizations (3 SH)
Offers students an opportunity to understand general business strategy concepts as they relate to the healthcare industry. Explores how to analyze market opportunities and challenges as they apply to various healthcare organizations, such as hospitals, physician organizations, and nursing homes. Presents and discusses analytical frameworks for making strategic decisions, drawing on different disciplines, including economics, management, and psychology. Strategic issues include mergers and acquisitions, vertical integration, joint ventures and alliances, performance-control systems, and organizational design.
• Prerequisite: Open to MBA, MPA, and MPH students; to MS students in urban and regional policy and in law, policy, and society; and to business certificate students.
• Equivalent: INTB 6220.

STRT 6291 Changing the Strategic Viewpoint for Competitive Advantage (2 SH)
Studies different business strategy perspectives, examining how businesses create competitive advantage with strategy and how businesses can choose perspectives most relevant to their particular situation. Offers students an opportunity to develop the foundation to evolve new ways of thinking about strategy so they may view problems in ways their competitors haven’t yet discovered. Strategy perspectives include industry structure (focused on competitive forces such as customers, suppliers, and competitors); resource-based (focused on identifying what the firm excels at and finding opportunities to leverage it); and learning (focused on learning as a strategic asset where the company’s ability to learn and adapt quickly provides a competitive edge). Applies this range of strategy perspectives to generate useful strategic insights.
• Prerequisite: Executive MBA students only.
• Equivalent: MGMT 6291.

STRT 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Repeatability: May be repeated once.

SUPPLY CHAIN MANAGEMENT (SCHM)

SCHM 2201 Supply Chain Management (2 SH)
Analyzes the role and activities of those involved in supply chain management decision making. Emphasizes the importance of transportation planning, inventory control, warehouse management, development of customer service standards, and procurement in the design and operation of supply and distribution systems. Attention is given to the importance of information systems and the Internet in supporting such activities. Special attention is also given to the need to develop close working relationships with managers in other functional areas including manufacturing, information systems, marketing, and international operations. This integrative approach to management is critical in supporting supply chain cost and service improvements.
• Prerequisite: Business majors and combined majors only.
• Corequisite: MGSC 2201.

SCHM 2301 Supply Chain and Operations Management (4 SH)
Focuses on the integrative management of business activities intrinsic to the smooth flow of goods or services, information, and financial transactions across firms from raw materials to the end customer. This collaborative approach creates competitive advantages for all members of a supply chain. Emphasizes the responsibilities of managers regarding decisions concerning the design, operation, and control of supply chains and operations. Considers customers, globalization, corporate strategy, resources, sustainability, ethics, and diversity. Topics covered include customer-centric management; supply chain and operations strategies; process structure and control; and supply, inventory, and quality management. Emphasizes the key role of information technology, logistics network design, supply chain relationships, and process evolution.
• Prerequisite: ACCT 1201, ACCT 1202, or ACCT 1209 (any of which may be taken concurrently); business majors and combined majors only.
• NU Core: Mathematical/analytical thinking level 2.
SCHM 3301 Global Supply Chain Strategy (4 SH)
Focuses on the managerial activities of those involved in supply chain management operations and planning for companies doing international commerce. Analyzes contemporary issues that affect the design of international supply chain systems, including sourcing, logistics, transactions, risk, sustainability, and ethical considerations. Examines the current status and future prospects of the modes of international transportation as well as international trade and development issues, not only from the corporate perspective but also in terms of government policy.

- Prerequisite: ECON 2350, IS 3500, MATH 2280, MATH 3081, MGSC 2301, POLS 2400, or SCHM 2301; business majors and combined majors only.

SCHM 3305 Purchasing (4 SH)
Addresses the strategic and operational role of purchasing and its impact on the supply chain as it relates to the entire organization. Focuses on a variety of aspects of supply management—organization of the function, procedures, supplier selection, negotiations, buyer-supplier relationships, quantity, quality, and cost/price considerations for the purchase of goods and services. Offers students an opportunity to develop an understanding of the linkages between the purchasing function and other functions within the organization including supply chain management, manufacturing, marketing, and finance.

- Prerequisite: (a) ECON 2350, MATH 2280, MATH 3081, MGSC 1201, MGSC 2301, POLS 2400, SCHM 2201, or SCHM 2301 and (b) sophomore standing or above; business majors and combined majors only.

- Equivalent: SCHM 4405.

SCHM 3308 Supply Chain Information Systems and Technology (4 SH)
Explores the use of information systems and information technology to support logistics and broader supply chain management processes. Emphasizes the value of information related to cross-enterprise integration and the use of advanced planning systems (APS) to support decision making. A considerable component of the class is dedicated to the application of commercial-grade strategic network design software.

- Prerequisite: (a) MISM 2301, IS 3500, or CS 2510 (the latter with a grade of C–) and (b) SCHM 2201 or SCHM 2301; business majors and combined majors only.

SCHM 3310 Logistics and Transportation Management (4 SH)
Examines the logistics and transportation operations, including the structure, challenges, and potential of the major modes of domestic transportation. Focuses on the interaction between logistics providers and shippers in the marketplace. Explores the major dynamics of the logistics marketplace and their impact on supply chain management. Seeks to provide students with a managerial perspective on controlling what is typically the most expensive component of supply chain management, transportation expenditures.

- Prerequisite: SCHM 2301; business majors and combined majors only.

SCHM 3320 Demand Planning and Forecasting (4 SH)
Offers a practical introduction to demand (sales) planning and forecasting for business students. Focuses on the organizational processes in managing demand as well as generating a forecast, regression analysis, exponential smoothing, time-series analysis, judgmental forecasting methods, and evaluation of forecast quality. Uses real-life data and various software packages to illustrate basic concepts.

- Prerequisite: (a) SCHM 3301, SCHM 3305, or SCHM 3310 (b) business majors and combined majors only.

SCHM 3330 Sustainability and Supply Chain Management (4 SH)
Focuses on how to create sustainable supply chains that profitably yield high-quality, safe products without supply interruption while creating a net benefit for the employees, community, and the environment. Studies how companies measure environmental performance and use the data to motivate associates, suppliers, customers, policymakers, and the public. Also addresses the impacts of global sustainability frameworks and measures.

- Prerequisite: SCHM 3301, SCHM 3305, or SCHM 3310; business majors and combined majors only.

SCHM 4401 Advanced Problems in Supply Chain Management (4 SH)
Identifies and examines important issues that are of strategic importance to executives involved in supply chain management. Emphasizes the decision-making processes and tools employed by those executives in the context of corporate strategic management. While case studies are extensively employed, there is an important independent research component to the course, and research findings are discussed with the class and shared through presentations. Also involves companies and executives from supply chain service providers.

- Prerequisite: (a) SCHM 3301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (c) junior or senior standing; business majors and combined majors only.

- NU Core: Writing intensive in the major.

- NUpath: Writing intensive in the major.
SCHM 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8 credit honors project.
• Repeatability: May be repeated without limit.

SCHM 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: SCHM 4970.
• Repeatability: May be repeated without limit.

SCHM 4993 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Repeatability: May be repeated without limit.

SCHM 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SCHM 5978 Independent Study (1 to 4 SH)
Allows students who have received approval to undertake independent study in lieu of any course required in the various concentrations. Students present proposals to an Independent Studies Committee for evaluation and approval. Every proposal requires a detailed outline of the objectives and plan of study and must be accompanied by a supporting statement from the supervising faculty member under whose direction the study takes place. A copy of the final report prepared by the student is presented to the appropriate Independent Studies Committee. Further information about the Independent Studies Program can be obtained from concentration coordinators.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

SCHM 6200 Supply Chain and Operations Management (4 SH)
Focuses on integrative management of the flow of goods, services, and related information from product development, sourcing and procurement, production operations and control, logistics management, and attendant management of relationships between firms through delivery to end consumer. Offers students an opportunity to gain foundational knowledge on supply chain and operations management concepts and techniques.
• Prerequisite: Full-time MBA students only.

SCHM 6208 Managing the Supply Chain (2 SH)
Examines the decision-making process in supply chain management. Emphasizes an integrative management approach that not only links traditional logistics management to other corporate functions, such as manufacturing, marketing, and international operations, but also synchronizes these activities with the company’s vendors and customers. Attention is also given to the importance of information systems and the Internet in supporting these linkages. This integrative approach to management is critical in supporting supply chain cost and service improvements.
• Equivalent: SCHM 6210.

SCHM 6210 Supply Chain Management (3 SH)
Analyzes the role and activities of those involved in supply chain management decision making. Emphasizes the importance of transportation planning, inventory control, warehouse management, development of customer service standards, and procurement in the design and operation of supply and distribution systems. Emphasis is on the importance of information systems and the Internet in supporting such activities. Special attention is also given to the close working relationships with managers in other functional areas including manufacturing, information systems, marketing, and international operations. This integrative approach to management is critical in supporting supply chain cost and service improvements.
• Prerequisite: Business students only.
• Equivalent: SCHM 6208.

SCHM 6211 Logistics and Transportation Management (3 SH)
Examines the logistics and transportation operations, including the structure, challenges, and potential of the major modes of domestic transportation. Focuses on the interaction between logistics providers and shippers in the marketplace. Explores the major dynamics of the logistics marketplace and their impact on supply chain management. Offers students a managerial perspective on controlling what is typically the most expensive component of supply chain management, transportation expenditures.
SCHM 6212 Executive Roundtable in Supply Chain Management (3 SH)
Structured around the participation of upper-level corporate executives in the classroom. Topics covered and executives participating are based on the most important contemporary issues in supply chain management. Operates on a seminar basis with extensive interaction between students and executives. Also comprises a strong individual research focus with students completing a major research paper during the term.

Prerequisite: (a) SCHM 6208 or SCHM 6210 and (b) SCHM 6213.

SCHM 6213 Global Supply Chain Strategy (3 SH)
Focuses on the managerial activities of those involved in supply chain management operations and planning for companies involved in international commerce. Analyzes contemporary issues that affect the design of international supply chain systems and strategies, including sourcing, logistics, transactions, risk, and ethical considerations. Examines the current status and future prospects of the modes of international logistics operations as well as international trade and development issues, not only from the corporate perspective but also in terms of government policy.

Prerequisite: Business students only.

SCHM 6214 Sourcing and Procurement (3 SH)
Addresses the strategic and operational role of sourcing and procurement and its impact on the supply chain as it relates to the entire organization. The selection, contracting, development, and monitoring/managing of the right supplier in the right location is more often a source of competitive advantage and a major contributor to a company’s bottom line. Focuses on a variety of aspects of this function—strategy development, organization, procedures, supplier selection, negotiations, buyer-supplier relationship management, quantity, quality, timeliness, and cost/price considerations for the purchase of goods and services. Emphasizes the perspective of the sourcing and procurement manager. The key questions addressed in this course are: What does the manager need to know to be effective? How do they apply key concepts?

SCHM 6215 Supply Chain Analytics (3 SH)
Designed to develop strategic decision-making skills using the latest analytics capabilities and enabler. Examines the state of the art in analytics capabilities and how these drive supply chains, from marketing to sourcing. Also examines how organizations use analytics to meet their strategic objectives, provide value to the business, and make decisions. Focuses on industry best practices, including studying some of the leading companies.

SCHM 6216 Market-Driven Supply Chains (3 SH)
Introduces students to concepts of how companies may develop capabilities for managing rapid reconfiguration of supply chains, strategic outsourcing, capacity and information sharing, collaboration, contracts, and risk management. Exposes students to what suppliers need to develop to ensure responsiveness and efficiency in this changing environment. This may entail shared processes across multiple enterprises with high visibility and speed in an uncertain environment.

SCHM 6218 Offshore Outsourcing (3 SH)
Reviews models for offshoring activities. Explores the factors that help in deciding to offshore different business areas. Also reviews the pitfalls and the management actions needed to embark on successful offshoring. Examines the strategic and management issues generated by the outsourcing phenomenon. Supplements theoretical material with case studies of firms that have engaged in offshoring technology and product development, as well as other functions such as financial analysis, human resources, and legal services.

SCHM 6220 Growing and Protecting Business Value through the Supply Chain (3 SH)
Designed to provide insights into how supply chain innovators are elevating their strategic value within organizations. Focuses on a number of emerging leadership models by examining strategic, value-added opportunities for building supply chain management (SCM) innovation as a core competency; connecting SCM to boardroom goals; building an understanding of high-performance SCM systems; assessing and configuring innovative SCM strategies; and managing change in a dynamic global SCM environment. Offers students an opportunity to learn and practice the tools and frameworks and build their skills as well as diagnostically evaluate current operating models.

Prerequisite: Online MBA only.

SCHM 6221 Sustainability and Supply Chain Management (3 SH)
Focuses on how to create sustainable supply chains that profitably yield high-quality, safe products without supply interruption while creating a net benefit for the employees, community, and the environment. Studies how companies measure environmental performance and use the data to motivate associates, suppliers, customers, policy makers, and the public. Also addresses the impacts of global sustainability frameworks and measures.
SCHM 6222 Managing Emerging Issues in Supply Chain Management (3 SH)
Focuses on developing competency in management of new and emerging issues in the supply chain across industries. Emphasizes strategic and tactical response to changes in the business environment that have major impacts on a company’s supply chain operations and competitiveness. Topics covered vary but may include supply chain changes due to mergers and acquisitions, security breach, product recalls, natural disasters, geopolitical events, sustainability, business-to-business relationship dynamics, etc.

SCHM 6223 Managing Healthcare Supply Chain Operations (3 SH)
Examines concepts and topics related to the design and management of supply chain operations in the healthcare sector. Focuses on activities and functions such as inventory control, order fulfillment, logistics, procurement, managing processes, relationship management, and information technology systems. Introduces various tools and techniques that enhance effective supply chain operations in healthcare organizations.

- Prerequisite: Business administration students only.

SCHM 6224 Demand Planning and Forecasting (3 SH)
Offers a practical introduction to demand (sales) forecasting for business students. Focuses on the organizational processes in generating a forecast, regression analysis, exponential smoothing, time-series analysis, judgmental forecasting methods, and evaluation of forecast quality. Uses real-life data and various software packages to illustrate basic concepts.

- Prerequisite: Business administration and supply chain management students only.

SCHM 6280 Strategic Management of Supply Chains (3 SH)
Analyzes the role and activities of those involved in supply chain management decision making. Emphasizes the importance of transportation planning, inventory control, warehouse management, development of customer service standards, and procurement in the design and operation of supply and distribution systems. Emphasis is on the importance of information systems and the Internet in supporting such activities. Special attention is also given to the close working relationships with managers in other functional areas including manufacturing, information systems, marketing, and international operations. This integrative approach to management is critical in supporting supply chain cost and service improvements in high-technology industries.

- Prerequisite: High technology and business administration students only.

SCHM 6290 Sourcing, Making, and Delivering Goods in a Dynamic, Global Business Environment (2 SH)
Offers students an opportunity to understand the key trends and challenges associated with supply chain management (SCM), the importance of collaboration and information quality, the impact of SCM on financial performance, and emerging best practices in SCM. Specific topics in SCM, which encompasses all of the business processes involved in sourcing, making, and delivering goods, include analyzing models of SCM; strategies for synchronizing supply and demand; identifying the challenges and opportunities when supply chains are global; understanding the impact of logistics trends on the distribution-related processes of SCM; and exploring the impact of emerging trends such as sustainability, risk management, mobile and social media technologies, and regulations on the future of SCM.

- Prerequisite: High technology and business administration students only.

SCHM 6960 Exam Preparation—Master’s (0 SH)
Offers the student the opportunity to prepare for the master’s qualifying exam under faculty supervision.

SCHM 6964 Co-op Work Experience (0 SH)
Provides eligible students with an opportunity for work experience.

- Repeatability: May be repeated without limit.

SCHM 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.

- Repeatability: May be repeated without limit.

SUSTAINABLE BUILDING SYSTEMS (SBSY)

SBSY 5100 Sustainable Design and Technologies in Construction (4 SH)
Covers theory of sustainability and green building procedures; sustainable design and construction practices; use of appropriate materials and systems with low environmental impact for creating energy-efficient buildings; green construction practices, including reducing pollution, emissions, and construction waste; and U.S. Green Building Council’s LEED rating system. May be helpful to students preparing for the LEED Green Associate examination.

- Prerequisite: Junior, senior, or graduate standing; engineering students only.
SBSY 5200 Sustainable Engineering Systems for Buildings (4 SH)
Focuses on basic design and construction of mechanical/electrical/plumbing (MEP) systems in buildings. Covers MEP documentation, plumbing water supply, HVAC systems, electrical power supply and distribution, lighting systems, low-voltage electrical systems, and estimating and planning for these specialty areas. Also addresses sustainable design and construction practices for MEP, including minimization of energy consumption and carbon footprint.
• Prerequisite: Junior, senior, or graduate standing; engineering students only.

SBSY 5300 Information Systems for Integrated Project Delivery (4 SH)
Focuses on new software systems for increasing efficiency of project delivery and facilitating design and construction integration through the use of BIM (Building Information Modeling) and related technologies. Exposes students to various software systems, including hands-on cases of BIM use, 4D (construction drawings linked to schedule) modeling, and 5D models (4D + cost). Covers the impact of new technology on project delivery, including owner’s perspective, advantages, and disadvantages. Also covers use and background of common industry systems to apply BIM concepts to construction projects.
• Prerequisite: Junior, senior, or graduate standing; engineering students only.

SBSY 5400 Sustainable Building Systems Seminar (0 SH)
Features prominent speakers from the sustainable building design and construction industry to showcase new building technologies, tools, and projects and to discuss national and international trends in the industry. Offers students an opportunity to meet innovators and key players advancing the field of sustainable building systems.
• Prerequisite: Junior, senior, or graduate standing.

SUEN 6110 Graduate Studio 1: Sustainable Urban Sites (6 SH)
Offers a studio-based graduate-level introduction to design and management of sustainable urban sites. Core topics include fundamental site analysis, formal organization, spatial definition, and site operations. Emphasizes the contextual, programmatic, performative, aesthetic, and experiential aspects of waterfront and brownfield revitalization, with a focus on urban and landscape ecology best management practices (BMPs). Key tools and media are introduced and practiced in increasingly complex applications, including basic drawing, modeling, and design software.

SUEN 6120 Graduate Studio 2: Sustainable Urban Systems (6 SH)
Offers a graduate-level studio following SUEN 6110 and introducing fundamental landscape planning, design, and strategic management of environmental infrastructures at the urban and regional scale. Core topics include the spatial and operational role in the built landscape of living systems—such as constructed wetlands, urban forests, urban wilds, and managed habitats—and their dynamic relationship to recreation, transit, food, housing, and industrial networks. Emphasizes the integration of constructed ecologies into the cultural landscape around issues of environmental justice. Continues the introduction of key tools and media from SUEN 6110, including advanced digital drawing, modeling, and design communication.
• Prerequisite: SUEN 6110.

SUEN 6210 Implementation and Visualization for Urban Environments 1 (4 SH)
Offers an intensive introduction to site analysis and manipulation of earthworks, water, and vegetation, with a focus on disturbance regimes within waterfront and brownfield zones. Core topics emphasize the ecological services promoted by the urban environment, including urban soil structure; contouring the urban surface; regional plant communities; and storm water, surge, and tidal flux management. Supports development of implementation skills by training in vector, raster, and 3D modeling software. Constitutes the first half of a two-part sequence and provides the foundation for SUEN 6220.

SUEN 6220 Implementation and Visualization for Urban Environments 2 (4 SH)
Constitutes the second half of a two-part sequence and builds upon material in SUEN 6210. Core topics include an introduction to regional landscape ecology in urbanized watersheds. Focuses on landscape-scale systems and soft infrastructure. Introduces GIS and geo-design software as a lens to learn about and visualize change in regional environments. Offers students an opportunity to advance landscape analysis and visualization skills through further training in vector, raster, and 3D modeling software.
• Prerequisite: SUEN 6210.

SUEN 6310 Cities, Nature, and Design in Contemporary History and Theory (4 SH)
Offers a lecture course presenting a historical overview of evolving cultural, environmental, and technological influences on societal attitudes toward the relationship of cities, nature, and design. Core topics include the emergence of critical theories, aesthetic philosophies, and design typologies in the modern era of industrialization and the subsequent impact of information, participation, and globalization trends on twenty-first-century-designed urban environments.
SUEN 6340 Topics in Urban Environmental Design (4 SH)
Offers a lecture- and discussion-based course focusing on research themes relevant to the MDes-SUEN graduate program curriculum. Topics are developed based upon instructor’s research relative to particular urban, ecological, sociological, landscape architectural, or technical subjects. Exposes students to cutting-edge methods of research and practice in designed urban environments.
• Repeatability: May be repeated up to 2 times.

SUEN 6964 Co-op Work Experience (0 SH)
Offers eligible students an opportunity for work experience.
• Prerequisite: Restricted to students in sustainable urban environments.
• Repeatability: May be repeated up to 2 times.

SUEN 6966 Practicum (1 to 4 SH)
Offers eligible students an opportunity for practical experience.
• Prerequisite: Restricted to students in sustainable urban environments.
• Repeatability: May be repeated up to 7 times for up to 8 total semester hours.

SUEN 7130 Master’s Research Studio: Design and the Resilient City (6 SH)
Offers an advanced graduate studio focusing on contemporary landscape and urbanism research strategies. Themes include ecological, economic, and social resiliency in urban environments. Offers students an opportunity to formulate original approaches to design research. Uses integrated analysis, visualization, and conceptualization skills to progress through group and individual exercises with a focus on design thinking for climate change, water rise, public health and security, and other issues of global relevance. Requires the formulation of a design thesis for resilient urban environments, presented and defended in written, oral, and digital formats, which provides the basis for development of individual design proposals in SUEN 7140.
• Prerequisite: Permission of the Urban Landscape program required for students without a BARCH, BLA, MARCH, MCP, MLA, MRP, MUD, or equivalent.
• Repeatability: May be repeated once.

SUEN 7140 Master’s Research Studio: Master’s Project (6 SH)
Constitutes the second half of the Master’s Research Studio sequence. Using the design thesis established in SUEN 7130, offers students an opportunity to formulate proposals for intervention into a specific urbanized environment. Individual projects progress with instructor guidance from schematic phasing through design development, with a focus on change management and vitalization of the ecologic, economic, social, and aesthetic facets of contemporary cities and regions. Requires individual presentation and defense of master’s projects in written, oral, and digital formats.
• Prerequisite: SUEN 7130.
• Repeatability: May be repeated once.

SUEN 7230 Urban Ecologies and Technologies 1 (4 SH)
Offers a workshop-based course as the first in a two-part sequence. Lectures, in-class exercises, and site-based investigation use case-study methods to document ecotechnologies operating in the built environment, with a focus on design and implementation metrics, material life cycle management, funding models, and aesthetic and cultural aspects. Potential topics include green roofs, green walls, bioswales, pervious pavements, constructed wetlands, “complete streets” elements, geosensor networks, alternative waste management, water detention and energy generation methods, and living infrastructure for coastal environments.

SUEN 7240 Urban Ecologies and Technologies 2 (4 SH)
Offers a community outreach course as the second in a two-part sequence and builds upon SUEN 7230. The core theme is development of innovative, market-based ecotechnology prototypes for the urban landscape that contribute to the environmental and cultural life of the city. With instructor guidance, offers students an opportunity to identify a potential ecotechnology project to design through engagement with community members, public, or institutional clients. The course outcome includes site documentation; a schematic design proposal produced by students working in groups; and, if appropriate in terms of time, budget, and scale, implementation.
• Prerequisite: SUEN 7230.

SUEN 7320 Pro-Seminar: Issues in Designed Urban Environments (4 SH)
Offers an advanced graduate seminar examining the forces shaping designed urban environments in contemporary global culture. A diverse range of material from published design criticism to open source social media engagement provides basis for discussion and written and oral presentations. Course themes determined by the instructor parallel the studio sequence SUEN 7130 and SUEN 7140, although discussion topics are broadly presented to engage graduate students from any background.
• Repeatability: May be repeated up to 3 times.

SUEN 7978 Independent Study (1 to 6 SH)
Offers independent work under the direction of members of the department and/or interdisciplinary faculty. Course content is defined and approved by instructor.
• Repeatability: May be repeated up to 11 times for up to 12 total semester hours.
SWAHILI (SWHL)

SWHL 1101 Elementary Swahili 1 (4 SH)
Designed for students with very little or no prior knowledge of Swahili. Focuses on developing the student’s competency in listening, speaking, reading, and writing Swahili. An important component in Swahili language is its unique cultural application, which aspects will be highlighted as necessary to help enhance learning. Swahili is the most widely spoken language in eastern Africa and parts of countries such as Somalia, Angola, the DRC-Congo, Burundi, and Rwanda. It is also spoken by a large number of people around the world in the diaspora. This course is designed to build the learner’s ability to communicate in Swahili in different social and professional settings.

SWHL 1102 Elementary Swahili 2 (4 SH)
Continues to provide students with the opportunity to develop competency in listening, speaking, reading, and writing Swahili. Offers progressively more intense practice in spoken and written communication. An important component in Swahili language is its unique cultural application, which aspects will be highlighted as necessary to help enhance learning.

• Prerequisite: SWHL 1101 or SWHL 1301.

SWHL 1301 Elementary Swahili Immersion 1 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili. Offers students an opportunity to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SWHL 1302 Elementary Swahili Immersion 2 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SWHL 2101 Intermediate Swahili 1 (4 SH)
Emphasizes further vocabulary building. Offers students an opportunity to continue to master the fine points of grammar through written composition, prepared oral reports, and reading and discussion from contemporary Swahili materials.

• Prerequisite: SWHL 1102 or SWHL 1302.

SWHL 2102 Intermediate Swahili 2 (4 SH)
Builds on SWHL 2101 and focuses on further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through written composition, prepared oral reports, and reading and discussion from contemporary Swahili materials.

• Prerequisite: (a) SWHL 2101 or SWHL 2301 and (b) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.

• NU Core: Writing intensive in the major.

• NUpath: Writing intensive in the major.

SWHL 2301 Intermediate Swahili Immersion 1 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SWHL 2302 Intermediate Swahili Immersion 2 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili. Offers students an opportunity to continue to develop grammatical and conversational competence. Focuses on oral and aural skills that are enhanced by the immersion environment.

SWHL 2900 Specialized Instruction in Swahili (1 to 4 SH)
Designed for individuals whose language skills are at the intermediate level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language. Students must have at least an elementary level of competence in the language.

• Repeatability: May be repeated without limit.

SWHL 3101 Advanced Swahili 1 (4 SH)
Continues further development of vocabulary. Offers students an opportunity to continue to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

• Prerequisite: SWHL 2102 or SWHL 2302.

SWHL 3102 Advanced Swahili 2 (4 SH)
Builds on SWHL 3101 and continues further development of vocabulary. Offers students an opportunity to master grammar and conversation through advanced reading, composition, grammar review, and listening skills. Whenever possible, offers students an opportunity to engage in local community activities to enhance communication skills and cultural knowledge.

• Prerequisite: SWHL 3101 or SWHL 3301.
Course Descriptions

SWHL 3301 Advanced Swahili Immersion 1 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

SWHL 3302 Advanced Swahili Immersion 2 (4 SH)
Designed for students who are in a Swahili-speaking country, this is an off-campus immersion course. Focuses on standard Swahili as well as the local dialect. Offers students an opportunity to continue to develop grammatical and conversational competence.

SWHL 3800 Special Topics in Swahili (1 to 4 SH)
Focuses on a unique aspect of the Swahili language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an intermediate level of skill in the language.
- Repeatability: May be repeated up to 3 times.

SWHL 3900 Specialized Instruction in Swahili (1 to 4 SH)
Designed for individuals whose language skills are at an advanced level and who seek specially focused language instruction. Such instruction might be the use of the language in specific settings, or it might be focused on specific conversational nuances of the language.
- Prerequisite: At least an advanced level of competence in the language.
- Repeatability: May be repeated without limit.

SWHL 4800 Special Topics in Swahili (1 to 4 SH)
Focuses on a unique aspect of the Swahili language. The specific topics are chosen to reflect current developments in the language and expressed student interests. Focuses on the use of the language for specific purposes or its use in specialized settings (e.g., media, business, health).
- Prerequisite: At least an advanced level of skill in the language.
- Repeatability: May be repeated up to 4 times.

SWHL 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
- NUpath: Integrating knowledge and skills through experience.

SWHL 4992 Directed Study (1 to 4 SH)
Offers students a way of going beyond work given in the regular curriculum; may also enable students to complete major or minor requirements in certain situations. Priority is given to language majors and to juniors and seniors.
- Repeatability: May be repeated without limit.

SWHL 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Repeatability: May be repeated up to 3 times.

SWHL 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

SWHL 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
- Prerequisite: Junior, senior, or graduate standing.
- Repeatability: May be repeated without limit.

TELECOMMUNICATION SYSTEMS (TELE)

TELE 5310 Fundamentals of Communication Systems (4 SH)
Explores the underlying physical layer technologies used in the telecommunications industry. Introduces communications basics such as the concept of a channel, noise, SNR, sampling, Shannon’s law, Nyquist limit, crosstalk, echo, multiplexing, as well as the transition from analog to digital, including line coding, synchronization, BER, and framing. Covers signal types, spectral analysis, and source coding. Discusses digital and carrier modulation technologies; spread-spectrum modulation; and multiuser radio communications, including radio link analysis, propagation, multipath fading, antennas, and spectrum issues. Introduces error correction and detection coding. Provides an overview of fiber optic communication systems, including sources, amplifiers, and multichannel systems.
- Prerequisite: Junior, senior, or graduate standing; restricted to students in the College of Engineering and in the College of Computer and Information Science.
- Equivalent: TSMG 5310.
TELE 5320 Telecommunications Architecture and Systems (4 SH)
Seeks to provide an understanding of the telecommunications network today and how it is evolving. Focuses primarily on the Public Switched Telephone Network—architecture, network systems, and call control—and on cellular wireless systems. Topics include coding of audio and video sources, including PCM, compression techniques, standards; digital transmission, SONET/SDH, network synchronization, digital switching; and the optical core. Addresses network survivability, traffic engineering, routing, and numbering. Explores issues in call control, signaling, and telephony services including DTMF, SS7/CCS architectures and protocols, call models. Discusses cellular networks including review of radio communications, cellular concept, wireless access technologies, handoff, second- and third-generation standards, mobility management, voice and data architectures. Introduces evolution of the network to packet: media and signaling protocols, QoS issues, PSTN interworking.

- **Prerequisite:** (a) TELE 5310 (which may be taken concurrently) and (b) junior, senior, or graduate standing; engineering students only.
- **Equivalent:** TSMG 5320.

TELE 5330 Data Networking (4 SH)
Provides the basics of data networking protocols and architectures in a relatively nonquantitative manner. Topics include layered architectures, the Internet, and OSI model; local and wide area networks and network topologies; transport protocols including TCP, UDP, and RTP; data link protocols, encoding, framing, PPP, and error control; statistical multiplexing; queuing; Little’s law; medium access protocols including Ethernet, token ring, FDDI, and 802.11; packet switching and datagrams, virtual circuits, bridges, and ATM switching; internetworking, interdomain and intradomain routing algorithms, naming and addressing, and IPv6; application protocols such as ftp and http; congestion and flow control in the Internet and ATM networks; quality of service issues; network security, cryptography protocols, protocols for security services, and firewalls; and network management protocols.

- **Prerequisite:** Junior, senior, or graduate standing; engineering students only.
- **Corequisite:** TELE 5331.
- **Equivalent:** TSMG 5330.

TELE 5331 Lab for TELE 5330 (0 SH)
Addresses a range of networking components, including routers, switches, and Linux servers, and how they are configured to create a virtual environment. Covers the installation and configuration of networking concepts such as DNS, DHCP, and firewalls and the creation of virtual environments. Requires students, working in teams, to configure one or more components; the teams then must interconnect the components to form a small network. In the process of configuration and integration, students are exposed to troubleshooting at various protocol layers and have an opportunity to become familiarized with different operating systems and networking tools.

- **Prerequisite:** Junior, senior, or graduate standing.
- **Corequisite:** TELE 5330.

TELE 5340 Telecommunications Public Policy and Business Management (4 SH)
Introduces students to business management issues, such as basic accounting, finance, marketing, and operations in the telecommunications field, and also topics such as the time value of money and decision making. Also includes issues of human relations, organizational behavior, and business strategy. Provides an understanding of the regulatory environment of the telecommunications industry. Topics include universal service, service quality tariffs, the Modified Final Judgment and Telecom Act of 1996, market restrictions and segmentation, the current competitive environment in the United States and internationally, interconnection including unbundling, collocation, economic issues, and global trends in market reform.

- **Prerequisite:** Junior, senior, or graduate standing.
- **Equivalent:** TSMG 5340.

TELE 5600 Linux/UNIX Systems Management for Network Engineers (4 SH)
Introduces UNIX/Linux in a networking/Internet environment. Covers operating system concepts, tools, and utilities; networking and security issues; and data and text processing using scripts and filters. Addresses basic administrative tasks such as managing users, file systems, security, and software. Covers networking topics such as network configuration, daemon processes, SSH, DNS, DHCP, diagnostic tools, and the use of scripts and automation to manage applications and systems, as well as security topics such as name and authentication services, access control lists, file modification protections, and firewalls.

- **Prerequisite:** (a) TELE 5330 or TSMG 5330 and (b) junior, senior, or graduate standing; restricted to students in the College of Engineering and the College of Computer and Information Science.
TELE 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: TSMG 5976.

TELE 5978 Independent Study (1 to 4 SH)
Offers work performed under individual faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.
• Equivalent: TSMG 5978.

TELE 6100 Telecommunications Convergence (4 SH)
Discusses enabling communication and networking technologies that facilitate different flavors of convergence, as well as converged network architectures, i.e., IP-based architectures that support mobility management, multimedia QoS, session management, and network security for all applications. “Convergence,” which generally refers to the coming together of the communications, information, and entertainment industries, is the telecom industry’s latest mantra. Includes underlying communications technologies for broadband wireless access (OFDM, OFDMA, MIMO antennas); standards for broadband wireless access (WiMAX, LTE); mobile/fixed integration (femtocells); and converged architectures (the IP Multimedia Subsystem). Emphasizes technologies, architectures, and standards that are of major current interest to industry.
• Prerequisite: (a) TELE 5310 with a grade of B or TSMG 5310 with a grade of B and (b) TELE 5330 with a grade of B or TSMG 5330 with a grade of B; telecommunication systems management and electrical engineering students only; registration limited and by application only; it is expected that all students have prior knowledge of digital communications, radio propagation, cellular networks, and second generation wireless standards (GSM and CDMA).
• Equivalent: TSMN 6100.

TELE 6200 Advanced Data Networking (4 SH)
Addresses data networking topics not covered in TSMG 5330 and issues of topical importance in both the Internet and the enterprise. Takes a big-picture approach, looking at the network as a whole. Identifies and studies common architectural components, protocol mechanisms, and design/implementation principles and trade-offs based on scaling, performance, and security considerations. Focuses throughout on technologies being deployed in the network core (i.e., not access) to support the enterprise, content delivery, and virtualization. Typical technologies include VLANs, large flat Layer-2 network design, media streaming, multimedia protocols, P2P architectures and protocols, structured and unstructured overlays, content distribution, caching and replication, CDN architectures, data center networks, virtual routing, and load balancing. Uses case studies throughout.
• Prerequisite: TELE 5330 with a grade of B or TSMG 5330 with a grade of B; restricted to students in the College of Engineering and in the College of Computer and Information Science.
• Equivalent: TSMN 6200.

TELE 6350 IP Telephony (4 SH)
Provides a comprehensive overview of IP telephony architectures and protocols, with emphasis on SIP, the Session Initiation Protocol. Topics include a review of classical circuit-switched telephony, especially signaling; a review of IP networking, especially routing and addressing; peer and master-slave protocols for IP telephony (SIP, H.323, MGCP); speech coding; the transport of real-time traffic over IP (RTP and RTCP); bandwidth control; and issues in network quality of service, such as traffic modeling, dimensioning, and QoS mechanisms. Emphasis on SIP includes call flows, network components, security, routing, and advanced services.
• Prerequisite: (a) TELE 5320 (which may be taken concurrently) or TSMG 5320 and (b) TELE 5330 or TSMG 5330; engineering students only.
• Equivalent: TSMN 6350.
**TELE 6360 Operation Support Systems in Telecommunications (4 SH)**

Introduces Operation Support Systems (OSS) in telecommunications: their purpose, components, processes, and architectures. Covers OSS that support service and network provisioning, customer care, ordering, billing, network management among other support functions, and the telecommunications management network (TMN) architecture and network management protocols. Addresses the role of vendors in providing OSS and the range of services offered, including wireline voice and data; DSL; FTTP; wireless and mobile services; and video, cable, and integrated services. Seeks to provide understanding of how the Internet is changing OSS interconnections models and how the regulatory environment impacts OSS interconnections and architecture. Other topics include the impact of new services on OSS; new software technologies such as Web services, service-oriented architecture (SOA), work flow; and trends in next-generation OSS and OSS architectures.

- **Prerequisite:** TELE 5330 or TSMG 5330.
- **Equivalent:** TSMS 6360.

**TELE 6370 Perspectives in Telecommunications Policy (4 SH)**

Examines the interrelationship of technological change, business objectives, and governmental policy goals on outcomes in telecommunications markets. Analyzes perspectives and cases from various nations to give students an opportunity to become familiar with public and private institutions, as well as other interest groups, that shape the agenda and outcomes of telecommunications policy in various countries. Emphasizes changing regulatory approaches, such as the increased reliance on network unbundling and the impact of technological changes on market forces and policy decisions. Examines how national policy objectives are formulated and issues associated with broadband deployment. Also evaluates policies designed to introduce competition into monopoly markets, the impact of Internet and wireless technologies on policy and markets, and emerging policy issues associated with network neutrality and Internet governance.

- **Prerequisite:** TELE 5340 or TSMG 5340.
- **Equivalent:** TSMB 6370.

**TELE 6380 Consulting Project in Telecommunications (4 SH)**

Provides an opportunity to work on a consulting project with management from telecommunications companies and other companies with project needs relating to telecommunications. Projects may include assessing market, regulatory, and technology challenges involved in the implementation of broadband services; evaluating the impact of technology changes on specific market segments; researching needs for new functionality in telecommunications billing and operation support systems; valuing intellectual property in telecommunications companies and related industries; researching technological and business trends in the global telecommunications market. Gives students an opportunity to work in teams and be guided by a faculty advisor resulting in a presentation and report for the client company. Students also have an opportunity to develop teamwork, project management, and communications skills.

- **Prerequisite:** TELE 5340 or TSMG 5340; engineering students only.
- **Equivalent:** TSMB 6380.

**TELE 6600 Special Topics—Telecommunication Policy (1 to 4 SH)**

Covers state-of-the-art material of current interest.

- **Prerequisite:** Engineering students only.
- **Repeatability:** May be repeated up to 8 times.
- **Equivalent:** TSMG 6600.

**TELE 6601 Special Topics—Systems (1 to 4 SH)**

Description to come.

- **Repeatability:** May be repeated up to 8 times.
- **Equivalent:** TSMS 6600.

**TELE 6602 Special Topics—Business (1 to 4 SH)**

Description to come.

- **Repeatability:** May be repeated up to 8 times.
- **Equivalent:** TSMB 6600.

**TELE 6603 Special Topics—Networking (1 to 4 SH)**

Description to come.

- **Repeatability:** May be repeated up to 8 times.
- **Equivalent:** TSMN 6600.

**TELE 6945 Master's Project (4 SH)**

Offers theoretical or experimental work under individual faculty supervision.

- **Prerequisite:** Telecommunication systems students only.
- **Equivalent:** TSMG 6945.

**TELE 6964 Co-op Work Experience (0 SH)**

Provides eligible students with an opportunity for work experience.

- **Prerequisite:** ENCP 6000.
- **Repeatability:** May be repeated without limit.
- **Equivalent:** TSMG 6964.
THEATRE (THTR)

THTR 1000 Theatre at Northeastern (1 SH)
Intended for freshmen in the College of Arts and Sciences. Introduces freshmen to the liberal arts in general; familiarizes them with their major; helps them develop the academic skills necessary to succeed (analytical ability and critical thinking); provides grounding in the culture and values of the University community; and helps them develop interpersonal skills—in short, familiarizes students with all skills needed to become a successful university student.

• Prerequisite: Freshman standing; theatre majors and cinema studies/theatre combined majors only.

THTR 1100 Production Experience 1 (1 SH)
Offers lab practice in technical production; may be repeated for credit (maximum two credits).

• Repeatability: May be repeated once.
• Equivalent: THTR 4804.

THTR 1101 Introduction to Theatre (4 SH)
Reveals the dynamic world of theatre by exploring the artistry, ideas, and techniques of actors, designers, directors, and playwrights. Goes behind the scenes in the study of theory and literature with both in-depth discussions and in-class performances. Includes a survey of significant movements in theatre history and analysis of diverse plays from contemporary drama. No theatre experience required.

• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

THTR 1120 Acting 1 (4 SH)
Focuses on the development of fundamental performance techniques and various significant acting methodologies needed by an actor to develop stage presence, strengthen the imagination, and increase freedom of expression. Studies, analyzes, and interprets contemporary texts through the performance of monologues and scenes.

• Prerequisite: Theatre majors and combined majors only.
• NUpath: Exploring creative expression and innovation.

THTR 1125 Improvisation for Entrepreneurs (4 SH)
Introduces students to theatre improvisation principles, games, and exercises. Offers a playful and demanding environment for students to recognize and develop their “soft skills” and to learn to read and react to unexpected situations with confidence and agility. This is an experiential studio course—sessions are comprised of a series of cumulative group and individual exercises to explore and practice spatial awareness, physical presence, mental agility, creativity, adaptability, risk taking, intuition, and teamwork. Using the required reading as a starting point, a final self-reflection paper gives students an opportunity to articulate their discoveries, their challenges, and their strategies.

• Prerequisite: Not open to theater majors.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

THTR 1127 Improvisation for Entrepreneurs—Abroad (4 SH)
Introduces students to theatre improvisation principles, games, and exercises. Offers a playful and demanding environment for students to recognize and develop their “soft skills” and to learn to read and react to unexpected situations with confidence and agility. This is an experiential studio course—sessions are comprised of a series of cumulative group and individual exercises to explore and practice spatial awareness, physical presence, mental agility, creativity, adaptability, risk taking, intuition, and teamwork. Using the required reading as a starting point, a final self-reflection paper gives students an opportunity to articulate their discoveries, their challenges, and their strategies. Taught abroad.

• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.
• Repeatability: May be repeated without limit.

THTR 1130 Introduction to Acting (4 SH)
Introduces techniques that awaken the creative mind, body, and spirit of the actor. Through theatre games and voice/movement exercises, offers students an opportunity to explore and develop skills used by actors in preparation for a role. Students rehearse and perform scenes from contemporary plays. Designed for nontheatre majors; previous stage experience welcome but not required.

• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation, interpreting culture.
THTR 1150 Dance History: Modern to Hip Hop (4 SH)
Surveys the technical and stagecraft skills that are essential knowledge for all theatre professionals. Offers students an opportunity to develop a hands-on understanding of the areas of scenery and costume construction, production management, stage management, sound engineering, and lighting. Covers the practical skills needed to participate in the creation, evaluation and revision of a theatrical production in this laboratory-based course through participation in crew work for department productions. No previous theatre experience is required.
• NUpath: Exploring creative expression and innovation.

THTR 1135 Introduction to Acting Abroad (4 SH)
Introduces techniques designed to awaken the creative mind, body, and spirit of the actor. Through theatre games and voice/movement exercises, offers students an opportunity to explore and develop skills used by actors in preparation for a role. Students rehearse and perform scenes from contemporary plays. Designed for nontheatre majors; previous stage experience welcome but not required. Taught abroad.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation, interpreting culture.
• Repeatability: May be repeated without limit.

THTR 1150 Dance History: Modern to Hip Hop (4 SH)
Explores the historical development of dances performed in the 20th century as both performance and history, including modern dance, jazz, American ballet, tap, African-American dance, and hip-hop. Examines the ways in which dance embodies ideas about culture, race, and gender. Offers students an opportunity to rehearse and perform dance techniques of diverse styles and by significant choreographers. Involves readings, research, and writing assignments, as well as attending professional dance performances.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 1160 The Professional Voice (4 SH)
Designed to help students across disciplines enhance the quality of their spoken voice and the clarity and urgency with which they express themselves. Offers students practical tools to improve their voice and speech in interpersonal interactions, based on the book Freeing the Natural Voice by Kristin Linklater and elements of the Alexander Technique. Offers students an opportunity to learn how to free the habitual tensions, holding patterns, and inefficient uses that block the clear communication of thoughts and feelings. Focuses on the development of physical and vocal exercises and the direct application of these skills to various forms of texts. Students are expected to practice the exercises and to do a fair amount of preparation work outside the studio.
• Prerequisite: Nontheatre majors only.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.

THTR 1165 The Professional Voice Abroad (4 SH)
Designed to help students across disciplines enhance the quality of their spoken voice and the clarity and urgency with which they express themselves. Includes practical tools to improve voice and speech in interpersonal interactions, based on the book Freeing the Natural Voice by Kristin Linklater and elements of the Alexander Technique. Offers students an opportunity to learn how to free the habitual tensions, holding patterns, and inefficient uses that block the clear communication of thoughts and feelings. Expect students to practice the exercises and to do a fair amount of preparation work outside the studio. Taught abroad.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation.
• Repeatability: May be repeated without limit.

THTR 1170 The Eloquent Presenter (1 SH)
Designed to help students to enhance the effectiveness with which they present themselves in front of an audience. Uses the application of theatre training exercises and practical tools to offer students an opportunity to improve the quality of their spoken voice, the clarity with which they articulate their ideas, and their ability to command the attention of audiences in diverse interpersonal and professional interactions.
• Prerequisite: Restricted to students in the College of Computer and Information Science.

THTR 1210 Theatre and Society (4 SH)
Covers several great practitioners of theatre. Focuses on how social behavior influenced the thought and craft of playwrights, actors, directors, designers, and theorists as well as how society was influenced by drama and theatre. Emphasizes how the play’s ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements to the course.
• NU Core: Arts level 1.
• NUpath: Interpreting culture, understanding societies and institutions.
• Equivalent: THTR 2340.
THTR 1220 African-American Theatre (4 SH)
Surveys the history of African-American theatre artists in America from the time of Ira Aldridge to the present day. Also examines the works of African-American playwrights from the Harlem Renaissance to the present, with an emphasis on the period beginning with Baraka’s *Dutchman*.
• Equivalent: AFAM 1220.

THTR 1230 The Evolution of Fashion and Costume (4 SH)
Traces the evolution of fashion and costume from ancient Greece to the twenty-first century. Illustrated lectures focus on the history and meaning of clothing design and the development of style. Clothing has been used for centuries to protect, attract, and define one’s identity. Examines the shifting trends of fashion for men and women within its historical, cultural, and economic contexts.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

THTR 1233 Nineteenth- and Twentieth-Century Fashion in Europe (4 SH)
Traces the evolution of fashion and costume in Europe from the beginning of the nineteenth century to the twenty-first century. Illustrated lectures focus on the history and meaning of clothing design and the development of style. Examines trends in fashion for men and women within its historical, cultural, political, and economic contexts. By studying fashion history in cities such as London and Paris, students have access to primary sources of fashion history, including paintings, sculpture, and textiles and garments from the periods being studied. Emphasizes current trends in fashion, with in-depth studies of the work of designers such as Dior, Chanel, McQueen, Westwood, Dolce and Gabbana, Versace, McCartney, and more. Taught abroad.
• NU Core: Arts level 1.
• Repeatability: May be repeated without limit.

THTR 1235 Fashion and Costume Design in Film and Television (4 SH)
Examines the role of costume and fashion design in media, from the movies of the Golden Age of Hollywood to the latest high-tech motion pictures to the most recent cable miniseries. Studies the history and social contexts of clothing in media, as well as the critical role of fashion in relation to the narrative, i.e., how it enhances the mood and propels the dramatic action of the production. Uses illustrated lectures, critical thinking and writing, and a major experiential component to focus on how/why clothing is worn, how fashion design and costume design intersect, and how we can understand the economic and cultural realities of the twentieth and twenty-first centuries through the shifting trends of fashion.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.

THTR 1240 Fashion Industry and Trend Forecasting in Europe (4 SH)
Examines the world of global fashion forecasting with industry professionals in European cities such as London and Paris. Studies how and why global fashion trends are designed, developed, and produced and how economic and cultural realities are revealed through the shifting trends of fashion. Recent developments in business, politics, economics, and culture all have a tremendous impact on trends in fashion. Examines the fashion industry in terms of the five basic pillars of the complex fashion system: cultures of design, production, representation, consumption, and disposal. The course includes illustrated lectures, site visits to couture fashion houses/studios, an experiential component (the global fashion trend presentation), and the development of a class blog dedicated to trends seen by the students on the streets of Europe. Taught abroad.
• NU Core: Arts level 1.
• NUpath: Interpreting culture.
• Repeatability: May be repeated without limit.

THTR 1250 Voice and Movement 1 for Theatre (4 SH)
Focuses on vocal and physical exercises that enable the actor to connect with the voice through freeing the physical and emotional self. Vocal work emphasizes centering, physicalization, breath support, articulation, resonance, and projection. Physical work develops concentration, control, and stamina through exercise, relaxation, improvisation, manipulation of energy flow, rhythms, and imagination. Emphasizes using the body as an expressive instrument. Includes selected monologues and/or scenes for classroom analysis. The course uses the techniques of Linklater and Viewpoints.
• Prerequisite: THTR 1120; theatre majors and combined majors only.

THTR 1260 Movement for the Actor (4 SH)
Explores movement techniques that enhance the actor’s expressiveness, performance energy, and body awareness. Offers students an opportunity to experience diverse movement training theories such as Suzuki, Alexander, and Laban and synthesize them in the creation of an original ensemble-based performance. Focuses on physical exercises and processes that strengthen the body; enliven the imagination; enhance concentration; and improve flexibility, balance, relaxation, and posture. Seeks to empower actors to externalize the emotional and imaginative inner experience and maximize stage presence and power. No previous movement or acting experience required.
THTR 1270 Introduction to Theatrical Design (4 SH)
Introduces the principles of contemporary theatrical design and how to apply the creative process to scenery, costumes, and lighting. Offers students an opportunity to discover how design concepts are developed and relate to each other through research, script analysis, color theory, and visual composition. Seeks to develop the student’s capacity for collaboration and techniques for conceptualizing a play into a multidisciplinary work of art. No theatre experience required.
• NU Core: Arts level 1.
• NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 2000 Production Experience 2 (1 SH)
Offers lab practice in rehearsal and performance for production; may be repeated for credit (maximum of two credits).
• Repeatability: May be repeated once.
• Equivalent: THTR 4808.

THTR 2300 Theatre History: Greek Tragedy to Romanticism (4 SH)
Explores the history of classical theatre, its dramatic development, and its unique contributions to Western civilization. Offers students an opportunity to discover notable plays and theatre artists from ancient Greece to the 1800s, including Elizabethan England, the golden age of Spain, and the Italian Renaissance. Playwrights include Euripides, Shakespeare, Calderón, and Goldoni.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) sophomore standing or above.
• NU Core: Writing intensive in the major.
• NUpath: Interpreting culture, understanding societies and institutions, writing intensive in the major.

THTR 2310 History of Musical Theatre (4 SH)
Traces the creative evolution of the stage musical from its 19th-century origins to current Broadway hits; from popular entertainment to an important theatrical art. Offers students an opportunity to examine this unique and original art form from multiple perspectives—historical, cultural, political, and aesthetic—and to develop insights into the concepts and methods of such pioneering composers, lyricists, and theatre artists as Gilbert and Sullivan, Cole Porter, Rodgers and Hammerstein, Leonard Bernstein, and Stephen Sondheim.
• NUpath: Interpreting culture.

THTR 2315 Rebels of Modern Drama (4 SH)
Investigates groundbreaking classics by modern European playwrights (1890s–1950s) such as Henrik Ibsen, Anton Chekhov, August Strindberg, George Bernard Shaw, Bertolt Brecht, and Samuel Beckett. Reveals how these social and literary rebels broke with tradition and created new forms of theatre. Examines their significant works as literature, history, and performance, as well as their relevance today. Includes written and oral analyses of plays as performances and the creation of an original play or work of visual art.
• NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 2320 Pioneers of American Theatre (4 SH)
Explores significant American stage works from the 1920s to the 1980s. Investigates the pioneering playwrights who reflected and reshaped American identity, such as O’Neill, Miller, Williams, Hansberry, Albee, Shepard, and Wilson. Includes concurrent developments in theatre history and performance.

THTR 2325 From Script to Stage (4 SH)
Offers students an opportunity to develop the skills and techniques used by professional theatre artists to analyze a script and awaken the essence and meaning of a play in preparation for production. Examines structure and form, characters and action, symbols and metaphors, and the historical and social context in case studies of classic and contemporary plays.
• NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 2330 Playwriting (4 SH)
Offers a collaborative workshop environment for developing dialogue, scenes, and one-act plays. Analyzes the dramatic techniques of modern masters as well as acclaimed contemporary playwrights. Culminates in the development of original one-act plays and a presentation of workshop scripts by professional actors.
• NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 2335 Boston Theatre Experience (4 SH)
Offers a comprehensive experiential survey of professional theatre today. Students attend Boston-area productions that reflect a diverse range of styles and aesthetics, with special emphasis on the creation of new plays. Through preparatory readings and lectures, combined with postplay critical assessments (oral and in writing) and interactions with theatre artists (playwrights, actors, directors), offers students an opportunity to examine and discover how to interpret the art of contemporary theatre in the United States, from fringe companies to Broadway, as audience members and aspiring artists. Requires attendance at plays outside of class time.
• NUpath: Interpreting culture.
THTR 2340 Theatre and Society (4 SH)
Covers several great practitioners of theatre. Focuses on how social behavior influenced the thought and craft of playwrights, actors, directors, designers, and theorists as well as how society was influenced by drama and theatre. Emphasizes how the play’s ideas are translated into performance. Uses video, discussion, and live performance, when possible, as integral elements to the course.
• NuPath: Interpreting culture, understanding societies and institutions.
• Equivalent: THTR 1210.

THTR 2342 Acting 2 (4 SH)
Continues THTR 1120. Focuses on developing the actor’s sense of truth and emotional freedom. Emphasizes creating, developing, and sustaining character and developing ensemble. Includes monologues and scenes performed for classroom analysis.
• Prerequisite: THTR 1120; theatre majors and combined majors only.

THTR 2345 Acting for Cameras (4 SH)
Explores the craft and methods of actors working in front of the camera through monologues, scenes, and group projects that balance artistic development with technical demands. Offers students an opportunity to discover ways to identify and free their performance energy on camera with a foundation of relaxation and truth. This creative process is paired with complementary media skills, such as basic video editing, audition techniques, voice-over, motion capture (mocap), and 3D scanning. Previous acting experience suggested but not required.

THTR 2346 Viewpoints (4 SH)
Engages actors with an innovative technique that draws upon rigorous physical training exercises and practice in the nine areas of actors’ concentration known as Viewpoints. Creative improvisational sessions provide an intuitive and dynamic approach to acting. Culminates in the application of Viewpoints to new scripted works.
• Prerequisite: THTR 1120 or THTR 1130.

THTR 2347 Voice and Movement 2 for Theatre (4 SH)
Continues THTR 1250. Offers students an opportunity to further develop and strengthen the body and the voice in the pursuit of eloquent speaking and compelling presence onstage. Vocal practice emphasizes breath capacity, resonance, and clarification of speech sounds through the study of the International Phonetic Alphabet. Physical practice emphasizes improvisation, coordination, stamina, and spatial awareness. Includes direct application of all skills to diverse dramatic texts.
• Prerequisite: THTR 1250, THTR 2342, and sophomore standing or above; theatre majors and combined majors only.

THTR 2360 Stage Makeup (4 SH)
Focuses on the principles of, the reasons for, and the materials used in makeup for the theatre, television, and films. Includes the practical application of types and styles of makeup: straight, old-age, character, and corrective.

THTR 2365 Technical Theatre 2 (4 SH)
Continues THTR 1131. Covers the intermediate skills of technical theatre required for all theatre professionals. Students pursue more advanced technical skills in areas such as drafting, and the reading of technical drawings for both scenery and lights. A minimum of thirty hours of crew work is required per semester, along with attending both strikes for departmental shows. Assignments and hours are arranged with the area supervisor.
• Prerequisite: THTR 1131.

THTR 2370 Lighting Design for the Stage (4 SH)
Examines basic principles and practices of stage lighting including the qualities and functions of light, lighting instruments and controls, basic electricity, color in light, and analysis of the script in terms of light requirements. Expects students to develop light plots and schedules for various kinds of stage productions. Includes lab work on lighting crews for University productions.
• NuCore: Mathematical/analytical thinking level 2.
• NuPath: Exploring creative expression and innovation, conducting formal and quantitative reasoning.

THTR 2370 Costume Design (4 SH)
Presents the beginning designer with the opportunity to investigate costume design theory and to foster perceptual development. Through lectures and projects, gives students the opportunity to explore both the abstract and historical aspects of costume design as well as textual analysis and its conceptual implications. Does not require prior art or design education.
• Prerequisite: Sophomore standing or above.
• NuPath: Exploring creative expression and innovation.

THTR 2385 Fashion Construction and Pattern Making (4 SH)
Offers students an opportunity to develop the skills and techniques necessary for creating and using basic master patterns and dress forms to create skirts, dresses, trousers, and tops. Covers basic fashion construction, flat patterning, draping, and finishing techniques.
THTR 2400 Scenic Design (4 SH)
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of graphics tools—line, form, balance, color, rhythm, and so on—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships; visually expressing conceptual themes; and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging.
- Prerequisite: THTR 1270 and sophomore standing or above.
- NUpath: Exploring creative expression and innovation.
- Equivalent: THTR 3460.

THTR 2600 Voice and Speech for the Actor (4 SH)
Seeks to enhance the quality and power of the actor’s voice with a focus on the clarity, vitality, and eloquence with which they communicate themselves on stage. Following the pedagogy known as Freeing the Natural Voice, developed by Kristin Linklater, sessions provide a progression of physical and vocal exercises that free the habitual tensions and inefficiencies that block the clear communication of emotional and creative impulses. Offers students an opportunity to apply voice and speech training to diverse texts comprised of drama, poetry, and original writing. The goal is a free, healthy, confident voice that fully expresses the actor’s individuality and commands the attention of an audience.
- Prerequisite: THTR 1120 and THTR 2342.

THTR 3450 Acting 3—Playing Shakespeare (4 SH)
Explores ways to bring the texts of Shakespeare alive onstage. Using the First Folio, the course studies structure of the verse, rhetorical devices, figures of speech, in a variety of Shakespeare’s texts, including sonnets, scenes, and soliloquies. Sound and movement sequences revitalize the eloquent speaking of heightened texts and the personal connection to the characters.
- Prerequisite: THTR 2342 and junior or senior standing; theatre majors and combined majors only.

THTR 3460 Scenic Design (4 SH)
Introduces the theory and practice of theatrical design and the role of the designer in the production process. Through project work, examines the use of graphics tools—line, form, balance, color, rhythm, and so on—in the development of the design idea. Emphasizes understanding and utilizing spatial relationships; visually expressing conceptual themes; and understanding the various uses, problems, and practical considerations of proscenium, thrust, and arena staging.
- Prerequisite: THTR 1270 and sophomore standing or above.
- NUpath: Exploring creative expression and innovation.
- Equivalent: THTR 2400.

THTR 3450 Acting 3—Playing Shakespeare (4 SH)
Explores ways to bring the texts of Shakespeare alive onstage. Using the First Folio, the course studies structure of the verse, rhetorical devices, figures of speech, in a variety of Shakespeare’s texts, including sonnets, scenes, and soliloquies. Sound and movement sequences revitalize the eloquent speaking of heightened texts and the personal connection to the characters.
- Prerequisite: THTR 2342 and junior or senior standing; theatre majors and combined majors only.

THTR 3550 Directing for the Stage (4 SH)
Focuses on purposes and techniques of theatrical direction related to script analysis, production style, pictorial composition, rhythmic evolution, and empathic responses.
- Prerequisite: THTR 1120, THTR 1270, and junior or senior standing.

THTR 3570 Musical Theatre Technique (4 SH)
Applies acting technique to the performance of songs and scenes from the musical theatre canon that represent a variety of cultures. Studies, analyzes, and interprets Broadway musical classics and contemporary musical theatre forms and styles, from composers such as Cole Porter, Rodgers and Hammerstein, and Stephen Sondheim. Offers students an opportunity to explore acting, singing, and dancing through performance theories by analyzing character development and synthesizing movement and dance with music and lyrics. Culminates in student performances of solo, small ensemble, and large ensemble excerpts from musicals.
- Prerequisite: THTR 1120 or THTR 1130.
- NUpath: Exploring creative expression and innovation, interpreting culture.

THTR 3700 Rehearsal and Production: The Art of Collaboration (4 SH)
Offers students an opportunity to experience the process of making imaginative, innovative theatre by collaborating on a theatre department production. Based on auditions, experience, skills, and interest, students rehearse and perform an acting role or collaborate in areas of design, stage management, dramaturgy, or production under the direction of faculty, staff, and guest artists. Students chronicle the process in a stage journal and in a final paper, identifying creative discoveries, accomplishments, and experiences. May be repeated for credit up to three times; fulfills the experiential education requirement for theatre majors.
- NU Core: Experiential learning.
- NUpath: Integrating knowledge and skills through experience.
- Repeatability: May be repeated up to 3 times.
- Equivalent: THTR 4701.
THTR 4701 Rehearsal and Production: The Art of Collaboration (4 SH)
Offers students an opportunity to experience the process of making imaginative, innovative theatre by collaborating on a theatre department production. Based on auditions, experience, skills, and interest, students rehearse and perform an acting role or collaborate in areas of design, stage management, dramaturgy, or production under the direction of faculty, staff, and guest artists. Students chronicle the process in a stage journal and in a final paper, identifying creative discoveries, accomplishments, and experiences. May be repeated for credit up to three times; fulfills the experiential education requirement for theatre majors.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated up to 3 times.
• Equivalent: THTR 3700.

THTR 4702 Capstone Rehearsal and Performance (4 SH)
Requires students to research, prepare, and perform either a substantial acting role, a design assistantship, a dramaturgy, a stage-management position, or other position of responsibility for a departmental production. Also requires an intensive-writing component enabling the synthesis of the theoretical, analytical, and artistic aspects of theatre production.
• Prerequisite: Junior or senior standing.
• NU Core: Capstone, writing intensive in the major.
• NUpath: Writing intensive in the major, demonstrating thought and action in a capstone.

THTR 4804 Theatre Practicum (1 SH)
Offers lab practice in technical production; may be repeated for credit (maximum three credits).
• Repeatability: May be repeated up to 2 times.
• Equivalent: THTR 1100.

THTR 4880 Special Topics: Theatre History (1 to 4 SH)
Offers opportunity for in-depth examination of a subject of particular significance to the field.
• Repeatability: May be repeated up to 4 times.

THTR 4882 Special Topics: Theatre Performance (1 to 4 SH)
Offers opportunity for in-depth examination of a subject of particular significance to the field.
• Repeatability: May be repeated up to 4 times.

THTR 4888 Special Topics: Theatre Design (1 to 4 SH)
Offers opportunity for in-depth examination of a subject of particular significance to the field.
• Repeatability: May be repeated up to 4 times.

THTR 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.

THTR 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: THTR 4970.
• Repeatability: May be repeated without limit.

THTR 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

THTR 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

THTR 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

THTR 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

THTR 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using it to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

TOXICOLOGY (TOXC)

TOXC 4970 Junior/Senior Honors Project 1 (4 SH)
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project.
• Repeatability: May be repeated without limit.
TOXC 4971 Junior/Senior Honors Project 2 (4 SH)
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field.
• Prerequisite: TOXC 4970.
• Repeatability: May be repeated without limit.

TOXC 4991 Research (4 SH)
Offers students participation in faculty-directed projects in the toxicology laboratory.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

TOXC 5570 Clinical Toxicology (2 SH)
Examines the potential toxicity of drugs, commercial products, and environmental agents. Focuses on clinical manifestations, mechanisms of toxicity, principles of treatment, and prevention of acute and chronic poisonings.
• Prerequisite: PHSC 5100 and junior, senior, or graduate standing.

TOXC 5572 Environmental Toxicology (3 SH)
Discusses the distribution, interaction, and effects of toxic agents on the biosphere. Applies the results of toxicology investigation to understanding the environment’s chemical pollution.
• Prerequisite: (a) CHEM 2311, PHSC 2301, and junior or senior standing or (b) CHEM 2311, BIOL 1117, and junior or senior standing or (c) graduate standing.
• Equivalent: TOXC 6272.

TOXC 5574 Organ Systems Toxicology (3 SH)
Presents the principles of toxicology from an organ-systems perspective. Focuses on the concepts used to evaluate toxicity, the mode of injury at the organ and cellular level, and the basic subcellular mechanisms through which toxic agents produce damaging effects.
• Prerequisite: (a) PHSC 4501 and junior or senior standing or (b) graduate standing.
• Equivalent: TOXC 6274.

TOXC 5576 Experimental Toxicology (3 SH)
Emphasizes the interpretation of toxicological literature. Employs structure activity and biochemical methods of assessment to evaluate mechanisms of toxicity of major classes of chemical compounds. Develops the ability to analyze and interpret data in the literature.

TOXC 5578 Biochemical Toxicology Lab (4 SH)
Introduces investigative methods for assessing toxicity. Develops the ability to analyze and interpret data generated in the lab and in the literature, and sharpens technical report-writing skills.
• Prerequisite: Junior, senior, or graduate standing.
• Equivalent: TOXC 6278.

TOXC 5976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

TOXC 5978 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

TOXC 5984 Research (1 to 4 SH)
Offers an opportunity to conduct research under faculty supervision.
• Prerequisite: Junior, senior, or graduate standing.
• Repeatability: May be repeated without limit.

URBS 2357 Growth and Decline of Cities and Suburbs (4 SH)
Introduces students to the field of urban studies. Focuses on these central issues: how cities and suburbs evolve, what makes a city or suburb a good place to live, and how cities and suburbs are (or are not) planned. Students review the ways in which urban scholars and practitioners study cities and suburbs, their research methodologies, definition of issues, and division of labor among different disciplines. Students explore the roles of individuals, communities, the private sector, and government in planning and shaping the city.
• Prerequisite: Sophomore standing or above.
• Equivalent: POLS 2357 and SOCL 2357.

URBS 2358 Current Issues in Cities and Suburbs (4 SH)
Introduces students to pressing urban issues: urban sprawl, poverty, education, transportation, economic development, and housing, through an intensive analysis of the Boston metropolitan area. The course is co-taught by university faculty and practitioners in government, community, and nonprofit organizations throughout the metropolitan area. Offers students the opportunity to analyze Boston data, go on outings to see development in progress, talk with urban practitioners about what they do, and conduct research on an urban issue of their choice.
• Prerequisite: Sophomore standing or above.
• Equivalent: POLS 2358 and SOCL 2358.
WMNS 1101 Sex, Gender, and Popular Culture (4 SH)
Examines how femininities, masculinities, and different forms of sexual identity are produced and represented within popular culture. Using theories and concepts from both feminist/sexuality studies and popular culture studies, analyzes popular texts and media for their treatment of gender and sexuality and the intersection of those categories with racial and class identities. Explores the visual representation of women (and men) and analyzes how visual and textual media shape our attitudes and identities. Required reading and assignments include close readings of texts, film screenings, class discussions and activities, writing assignments, and creative projects.
• NU Core: Humanities level 1.
• NUpath: Interpreting culture, engaging difference and diversity.

WMNS 1103 Introduction to Women’s, Gender, and Sexuality Studies (4 SH)
Offers an interdisciplinary course introducing key themes in gender and sexuality studies. Offers students an opportunity to learn core concepts that inform our understanding of how gender and sexuality are socially constructed and are experienced in everyday life. Drawing on women’s studies, queer studies, masculinity studies, and allied areas, the course analyzes gender, sexuality, and other dimensions of identity; explores critical issues of gender, sex, and power; and studies gendered/sexed identities in both national and transnational contexts. Topics include the gendered conceptions of love, sexuality, and violence; biological arguments about gender and sexuality; the social construction of sexuality and gender; intersections of gender, race, class, and sexuality; masculinities and femininities; theories of sexual difference; gender and the state; and gender and popular culture.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 1103, PHIL 1103, and SOCL 1103.

WMNS 1185 Gender in the African Diaspora (4 SH)
Studies variations in gender roles throughout the African Diaspora, from precolonial Africa to the modern United States. Areas of the African Diaspora include Africa, the West Indies, Latin America, Europe, and the Islamic world. Issues include sexuality, labor, reproduction, and social constructions of gender.
• Cross-list: AFRS 1185 and INTL 1185.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: AFRS 1185 and INTL 1185.

WMNS 1225 Gender, Race, and Medicine (4 SH)
Examines the basic tenets of “scientific objectivity” and foundational scientific ideas about race, sex, and gender and what these have meant for marginalized groups in society, particularly when they seek medical care. Introduces feminist science theories ranging from linguistic metaphors of the immune system, to the medicalization of race, to critiques of the sexual binary. Emphasizes contemporary as well as historical moments to trace the evolution of “scientific truth” and its impact on the U.S. cultural landscape. Offers students an opportunity to develop the skills to critically question what they “know” about science and the scientific process and revisit their disciplinary training as a site for critical analysis.
• Cross-list: AFAM 1225 and HIST 1225.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Engaging difference and diversity.
• Equivalent: AFAM 1225 and HIST 1225.

WMNS 1255 Sociology of the Family (4 SH)
Focuses on families historically and across cultures and classes. Considers changes in contemporary families in terms of gender, family composition; women’s labor force participation, divorce, cohabitation, and other transformations.
• Cross-list: SOCL 1255.
• NU Core: Social science level 1.
• Equivalent: SOCL 1255.

WMNS 1256 Violence in the Family (4 SH)
Examines physical, emotional, and sexual violence in families. Covers definitions, prevalence, causes, prevention, and treatment of specific cases of domestic violence as well as social policy issues and problems of legal intervention.
• Cross-list: SOCL 1256.
• NU Core: Social science level 1.
• Equivalent: SOCL 1256.

WMNS 1260 Gender in a Changing Society (4 SH)
Considers why and how gender is socially constructed in U.S. society and looks at different theories of gender. Explores gender as an institution as well as different (cultural) expressions of masculinities and femininities. Includes topics of gender in everyday life as well as gender as an organizing principle in the institutions of families, education, workplaces, sexualities, religion, the media, politics, and forms of gender violence.
• Cross-list: SOCL 1260.
• NU Core: Comparative study of cultures, social science level 1.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: SOCL 1260.
WMNS 1271 Sex in Judaism, Christianity, and Islam (4 SH)
Explores approaches to gender, social organization of sexuality and gender, sexual ethics, and marriage in Judaism, Christianity, and Islam. Explores various sources within each tradition that serve as normative foundations, contemporary cultural and sociological dynamics that challenge those foundations, and psychological/existential considerations for understanding the general nature of human sexuality. Addresses how these traditions understand gender and gender roles, seek to shape and control interactions between men and women, regulate sexual relations outside of and within marriage, view sexuality education, regard homosexuality, and examine historical and contemporary approaches to marriage, divorce, and parenting.
• Cross-list: PHIL 1271.
• NU Core: Humanities level 1, comparative study of cultures.
• NUpath: Engaging difference and diversity, employing ethical reasoning.
• Equivalent: PHIL 1271 and RELS 1271.

WMNS 1273 Sociology of Gender and Work (4 SH)
Explores how gender both shapes and is shaped by experiences in the labor market. Considers the extent to which work is “gendered” and the ways in which this influences the jobs that men and women perform, the rewards they receive for their efforts, and their experiences in the workplace and at home. Underscores the relationship between paid and unpaid work (especially household labor).
• Cross-list: SOCL 1273.
• Equivalent: SOCL 1273.

WMNS 2259 Sex and Gender in the Jewish Experience (4 SH)
Explores how sexuality and gender have shaped Jewish culture and religion throughout history. Studies how ideas about masculinity and femininity have varied dramatically over time and place within the Jewish community and have often departed considerably from those of non-Jewish society. Begins with the role of Biblical texts in the construction of Western conceptions of gender and sexuality and continues through medieval and early modern Europe, up to contemporary feminist Judaism and current Jewish ideas about “queerness” and non-normative ways of living. Uses a wide range of primary sources (memoirs, fiction, religious texts, etc.) and secondary literature from multiple disciplines. Seeks to answer: Does ethnicity have a sex? Is religious identity gendered? What do “Jewish femininity” and “Jewish masculinity” mean?
• Cross-list: JWSS 2259.
• NU Core: Comparative study of cultures.
• Equivalent: HIST 1259, JWSS 2259, and SOCL 1259.

WMNS 2302 Gender and Sexuality: A Cross-Cultural Perspective (4 SH)
Examines popular and scientific notions about sex, gender relations, family, and kinship. Examines why our images of family, masculinity, and femininity are not universal by analyzing the patterns of sex roles, sexual practices, and kinship in other cultures. Discusses how and why relations between men and women change during times of socioeconomic and political change.
• Prerequisite: ANTH 1101 or SOCL 1101.
• Cross-list: ANTH 2302.
• NU Core: Comparative study of cultures.
• Equivalent: ANTH 2302.

WMNS 2303 Gender and Reproductive Justice (4 SH)
Effective Spring 2017
Introduces the social, legal, and economic barriers to accessing reproductive healthcare domestically and internationally. Draws on various theoretical and analytic tools including critical race theory, critical legal theory, sociology of science, human rights, feminist theory, and a range of public health methods. Access to reproductive health services, including abortion, is one of the most contested political, social, cultural, and religious issues today. Covers domestic, regional, and international legal and regulatory frameworks on sexual reproductive health.
• Cross-list: HIST 2303.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: HIST 2303.

WMNS 2304 Communication and Gender (4 SH)
Presents a theoretical and practical examination of the ways in which communication is gendered in a variety of contexts. Integrates into this analysis how different institutions and interpersonal situations affect our understanding of gender roles.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: COMM 2304.
WMNS 2373 Gender and Sexuality in World History (4 SH)
Introduces key concepts in the fields of gender and identity studies as they apply to world history since about 1800. Offers students an opportunity to understand the critical significance of gender, sex, sexuality, and identity to world events and how these contentious subjects influence the contemporary world. Surveys a series of major movements in geopolitics, labor, economics, culture, and society in order to analyze how individual and group identities, as well as mass assumptions about behavior and performance, have shaped these events. Gender, sex, and sexuality are integral to class discussions of work, welfare, art, culture, violence, war, and activism.
- Cross-list: HIST 2373.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: HIST 2373.

WMNS 2455 American Women Writers (4 SH)
Effective Spring 2017
Surveys the diversity of American women’s writing to ask what it means to describe writers as disparate as Phillis Wheatley, Edith Wharton, Toni Morrison, and Alison Bechdel as part of the same “tradition.” With attention to all genres of American women’s writing, introduces issues of genre and gender; literary identification; canons; the politics of recuperation; silence and masquerade; gender and sexuality; intersectionality; sexual and literary politics, compulsory heterosexuality, and more.
- Prerequisite: ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
- Cross-list: ENGL 2455.
- NU Core: Comparative study of cultures.
- NUpath: Interpreting culture, engaging difference and diversity.
- Equivalent: ENGL 2455.

WMNS 2480 Women and World Politics (4 SH)
Introduces a variety of issues facing women across the globe. Focuses on the gender dynamics of key issues in international affairs. These could include economic policy, conflict and war, human rights/women’s rights, political power, and collective action. Draws on examples from various world regions since the twentieth century to analyze similarities and differences across cases around the globe.
- Prerequisite: INTL 1101 and sophomore or junior standing.
- Cross-list: INTL 2480.
- Equivalent: INTL 2480.

WMNS 2500 Women and Social Change in the Middle East (4 SH)
Introduces the complex position and changing role of women in the Middle East during the vast sociocultural and political transformation of the last 200 years. Focuses on the State of Israel, where the encounter between East and West has been most obvious. Based on sociohistorical research and documentaries, discusses the traditional position of women among the various religions and ethno-social groups in the Middle East and the impact of modernization, nationalism, and religion on their changing position and growing participation in society and politics. Examines the main issues and challenges women face; their achievements and disabilities in the family, professional, and public life; and the role of women’s liberation movements and organizations.
- Cross-list: MSCR 2505.
- NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major.
- Equivalent: MSCR 2505.

WMNS 2505 Digital Feminisms (4 SH)
Explores the unique ways that feminist activism and theory are impacted by the increasing digital nature of our world. From hashtags to Tumblr, feminists are using digital tools and platforms to aid in the pursuit of social justice. Offers students an opportunity to develop a timeline that traces feminists’ engagement with the Internet, new media, and technological innovations from the late seventies to the present. Examines the strengths and challenges that the digital world creates for feminist engagement.
- Cross-list: MSCR 2505.
- NUpath: Exploring creative expression and innovation, interpreting culture, writing intensive in the major.
- Equivalent: MSCR 2505.

WMNS 2800 Sexual Orientation and Gender Expression in Practice and Policy (4 SH)
Introduces students to efforts among social and nonprofit organizations working to reduce heterosexism, homophobia, and transphobia in institutions, communities, and the society as a whole. Discusses practice across the life span for social professionals (social workers, counselors, advocates, and educators) in varied settings such as criminal justice, mental health, adoption, adult day health, and residential programs. Applying theories and current scholarship on LGBTQ identity development, social movements, media, and advocacy, offers students an opportunity to evaluate contemporary issues of controversy for institutions, social practitioners, and policy.
- Prerequisite: Sophomore standing or above.
- Cross-list: HUSV 2800.
- Equivalent: HUSV 2800.
WMNS 3100 Gender, Social Justice, and Transnational Activism (4 SH)
Introduces key issues, themes, and debates in feminist transnational theory, practice, and activism in contemporary contexts and how it has changed under socioeconomic, political, and cultural processes of globalization. Examines differences among women relating to race, class, sexuality, national identity, and political economy in reckoning with possibilities for sustainable social justice. Students interrogate the relationship between the local and global; the production of knowledge in different regional spaces; the pragmatics of political mobilization; the varying contours of “social justice”; and other key issues. Offers students an opportunity to discuss the impact of globalization, neoliberalism, and state and intimate violence on gendered politics and relations and to contend with the politics of difference, to debate its challenges, and to imagine possible futures for transnational gender justice.
• Cross-list: POLS 3100 and SOCL 3100.
• NU Core: Comparative study of cultures.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: POLS 3100 and SOCL 3100.

WMNS 3304 Communication and Inclusion (4 SH)
Explores theoretical and practical issues in the relationships between communication, social identity, and social inclusion. Focuses on how communication shapes perceptions and positions of salient social identity groups and how individuals and groups resist and transform identity and promote inclusion through communication. Specifically focuses on communication and inclusion in the contexts of gender, race, sexual identity, social class, ability, and age. Course topics cover a range of theoretical and practical issues, including diversity in organizational settings and the social construction of identity.
• Prerequisite: (a) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102 and (b) junior or senior standing.
• Cross-list: COMM 3304.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Engaging difference and diversity, writing intensive in the major.
• Equivalent: COMM 1304, COMM 3304, and WMNS 1304.

WMNS 3392 Gender and Film (4 SH)
Examines the representation of gender in film. Uses concepts and research from film and media studies to investigate the influences and consequences of gender representations in film.
• Prerequisite: CINE 1895, MSCR 1220, or permission of instructor; sophomore standing or above.
• Cross-list: CINE 3392.
• Equivalent: CINE 3392.

WMNS 3402 Feminist Perspectives on Society (4 SH)
Examines social science and interdisciplinary feminist literature that focuses on women in families and at work, and that deals with physical issues including violence against women and abortion. Incorporates the perspectives of women of color. Considers and evaluates women’s views of social life as well as recognizes the differences among women.
• Prerequisite: (a) SOCL 1101 and (b) one 2000-level course.
• Cross-list: SOCL 3402.
• NU Core: Comparative study of cultures.
• Equivalent: SOCL 3402.

WMNS 3441 Topics in Women’s, Gender, and Sexuality Studies (4 SH)
Covers special topics in women’s, gender, and sexuality studies.
• Repeatability: May be repeated without limit.

WMNS 3451 Women’s Studies Module (1 SH)
Permits specialized women’s studies topics to be studied as part of more general courses.
• Repeatability: May be repeated without limit.

WMNS 3500 Sexuality, Gender, and the Law (4 SH)
Examines the legal regulation of gender and sexuality. Investigates concrete legal cases to study the history of constitutional interpretation and the current status of rights for women and sexual minorities. Focuses on important theoretical issues emerging in the writings of diverse feminist and queer legal scholars. Addresses debates over the value of conventional equality approaches in legal doctrine; equality vs. difference perspectives; ways in which legal language constructs gender and sexuality; the incorporation of sexuality and gender in ideologies of law; and the intersections of gender, sexuality, and race in legal doctrine and legal theory.
• Prerequisite: Sophomore standing or above.
• Cross-list: PHIL 3500.
• NUpath: Understanding societies and institutions, employing ethical reasoning.
• Equivalent: PHIL 3500.

WMNS 4010 Gender, Crime, and Justice (4 SH)
Examines the topics of femininities and masculinities and their influence on participants in the criminal justice system. Explores topics such as gender and criminological theory, the notion of gender and offending, women and men as victims of violence, and women and men as professionals within the criminal justice system.
• Prerequisite: CRIM 1100 or CRIM 2200 or permission of instructor.
• Cross-list: CRIM 4010.
• NUpath: Understanding societies and institutions, engaging difference and diversity.
• Equivalent: CRIM 4010.
WMNS 4520 Race, Class, and Gender (4 SH)
Considers the intersection of race, class, and gender in social structure, institutions, and people’s lives. Utilizes an interdisciplinary approach to focus on the socially constructed nature of these concepts and how they shape and create meaning in individual lives. Difference with an emphasis on inequality and varying life chances is central for understanding our society and is central to our work. Requires a significant amount of reading. Class format is like a seminar; students are expected to participate, take responsibility, and write a paper.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: SOCL 4520.
• NU Core: Comparative study of cultures, writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: SOCL 4520.

WMNS 4523 Sexualities (4 SH)
Offers a primarily sociological overview of the field of sexuality studies. Explores the ways in which sexual behaviors and identities are shaped by social norms, values, and expectations; the meanings and statuses ascribed to sexual acts, behaviors, identities, and communities; and the interactive processes by which sexualities are achieved. Emphasizes how our understandings of sexuality interact with categories of gender, race, nation, and class. Examines a variety of topics, such as transgenderism, power, extreme and illicit sex, socialization, pornography, and politics.
• Prerequisite: (a) Sophomore standing or above and (b) SOCL 1101, ANTH 1101, CRIM 1100, HUSV 1101, INTL 1101, POLS 1140, POLS 1160, or WMNS 1103 and (c) ENGW 1111, ENGW 1102, ENGL 1111, or ENGL 1102.
• Cross-list: SOCL 4523.
• NU Core: Writing intensive in the major.
• NUpath: Writing intensive in the major.
• Equivalent: SOCL 4523.

WMNS 4991 Research (4 SH)
Offers an opportunity to conduct research under faculty supervision.
• NUpath: Integrating knowledge and skills through experience.

WMNS 4992 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

WMNS 4993 Independent Study (1 to 4 SH)
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor.
• Repeatability: May be repeated without limit.

WMNS 4994 Internship (4 SH)
Offers students an opportunity for internship work.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

WMNS 4996 Experiential Education Directed Study (4 SH)
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
• NU Core: Experiential learning.
• NUpath: Integrating knowledge and skills through experience.
• Repeatability: May be repeated without limit.

WMNS 6100 Theorizing Gender and Sexuality (3 SH)
Seeks to challenge and expand our understanding of the relationship between biological sex; gendered identities; and sexual “preferences,” practices, and life ways. This interdisciplinary course offers debates around sex, gender, sexuality, and the body that push beyond binary models reliant on a simple “nature/culture” distinction. Focuses on dynamic and variable aspects of sexuality, sex, and gender within and across cultures, representational forms, and historical periods, analyzing the circumstances in which they undergo significant challenge or transformation. Uses particular paradigmatic “case studies” to push hard at the boundaries of sex and gender and to dialogue around contesting conceptualizations of “the body,” “sex,” and “gender,” particularly as they circulate in specific discourses of feminism, queer theory, and poststructuralism; ethnic studies; critical race theory; and cultural studies.

WMNS 7100 Queer Theory: Sexualities, Genders, Politics (3 SH)
Introduces the core texts and key debates that have shaped queer theory and examines the intersections between queer theory and feminism and critical race theory. Seeks to provide an understanding of expansive and radical contemporary queer politics by analyzing foundational queer and feminist texts, pushing beyond narrow constructions of identity politics, anti-discrimination policy, and rights-based reforms. Engages queer theory by means of a rich philosophical and political interrogation of the meaning and content of “queer.”
• Cross-list: SOCL 7100.
• Equivalent: SOCL 7100.
WMNS 7615 Feminist Inquiry (3 SH)
Investigates theories and practices of feminist inquiry across a range of disciplines by studying a series of pairings of humanist and social science works by feminist scholars. Reflects on the ways that feminist inquiry/ies transform knowledge and inform varied forms of activism. Functions as an interdisciplinary course and engages students in questioning disciplinary assumptions and methodologies, seeking new ways to frame scholarly questions, and reconsidering the relationship between subjects and objects of study. Offers students an opportunity to meet with several of the feminist scholars read over the semester and to focus on specific theoretical and methodological choices as these are evidenced in practice.

WMNS 7635 Understanding the Pornographic and the Obscene (3 SH)
Introduces feminist scholars’ criticisms and celebrations of pornography as well as more ecumenical efforts to study and understand what pornography is and has been and its adjacency to other media. Offers students an opportunity to develop an understanding of how pornography has been defined by various cultures and across time periods throughout history; how it is produced and consumed and by whom; the impacts of pornography consumption on individuals, families, communities, and societal norms; and how pornography interacts with the multiple forms of oppression and expression, based on race, class, national identity, gender, and sexual identities.

WMNS 7642 Gender, Race, and the Complexities of Science and Technology (3 SH)
Builds on work that examines the social construction of scientific enterprises to analyze how strictures around gender, race, and other forms of identity restrict wider access to and understanding of the production of scientific knowledge and technologies. Offers students an opportunity to participate in innovative, problem-based learning, develop critical faculties as investigators, and learn tools and processes for teaching and engagement with wider communities.

WMNS 7645 Motherhood and Mothering: Theory, Discourse, Practice, and Change (3 SH)
Explores the complex intellectual and practical issues contemporary American motherhood raises for feminist scholars by drawing on rhetoric and sociology to examine motherhood as an intellectual concern, a social institution, and a site of competing discourses. Interweaves theory, discourse, practice, and change as students develop knowledge regarding a variety of approaches to motherhood and mothering as key theoretical concerns and as pivotal sites of women’s resistance, social action, and change.

WMNS 7900 Special Topics in Women’s, Gender, and Sexuality Studies (3 SH)
Examines selected topics in women’s, gender, and sexuality studies.
* Repeatability: May be repeated up to 5 times.

WMNS 7976 Directed Study (1 to 4 SH)
Offers independent work under the direction of members of the department on chosen topics.
* Repeatability: May be repeated without limit.