

CMN U322	Popular Music as Media Form	4 SH
CMN U401	Advertising Principles and Practices	4 SH
CMN U421	Sports Broadcasting	4 SH
CMN U422	Media Audiences	4 SH
CMN U423	Foundations of Electronic Media	4 SH
CMN U424	Broadcasting Management and Programming	4 SH
CMN U622	New Media Culture	4 SH

PRODUCTION

CMN U420	Audio Production	4 SH
CMN U520	Television Studio Production	4 SH
CMN U620	Television Field Production	4 SH
CMN U621	Digital Editing for TV	4 SH

Concentration in Organizational Communication**REQUIRED COURSES**

Complete the courses in the following order:

PART ONE

Complete the following course:

CMN U531	Advanced Organizational Communication	4 SH
----------	---------------------------------------	------

PART TWO

Complete two courses from the following list:

CMN U532	Theories of Conflict and Negotiation	4 SH
CMN U533	Consultation Skills	4 SH
CMN U630	Assessment Technique and Planning	4 SH
CMN U631	Crisis Communication and Image Management	4 SH

ORGANIZATIONAL COMMUNICATION ELECTIVES

Complete two courses from the following list:

CMN U230	Interpersonal Communication	4 SH
CMN U303	Global and Intercultural Communication	4 SH
CMN U304	Communication and Gender	4 SH
CMN U401	Advertising Principles and Practices	4 SH
CMN U402	Presentation, Style, and Professional Communication	4 SH
CMN U530	Communication and Quality of Life	4 SH
CMN U534	Group Communication	4 SH

COMMUNICATIONS STUDIES MAJOR ELECTIVES

Complete three courses from any concentration or from the following list:

CMN U901	Senior Seminar in Communications	4 SH
CMN U910	Special Topics in Public Communication	4 SH
CMN U912	Special Topics in Media Studies	4 SH
CMN U914	Special Topics: Organizational Communication	4 SH
CMN U916	Organizational Communication Practicum	4 SH
CMN U924	Directed Study	4 SH
CMN U944	Internship in Communication	4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

COMMUNICATIONS STUDIES MAJOR CREDIT REQUIREMENT

Complete 52 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BA in Cinema Studies and Communication Studies

See page 71.

Minor in Communication Studies**REQUIRED COURSES**

Complete the following four courses:

CMN U101	Intro to Communication Studies	4 SH
CMN U112	Public Speaking	4 SH
CMN U220	Media, Culture, Society	4 SH
CMN U231	Principles of Organizational Communication	4 SH

ELECTIVE COURSES

Complete three courses from the following list:

CMN U230 to CMN U699
CMN U910 to CMN U914

GPA REQUIREMENT

2.000 GPA required in the minor

EARTH AND ENVIRONMENTAL SCIENCES

www.casdn.neu.edu/~geology

PETER S. ROSEN, PHD

Associate Professor and Chair

PROFESSOR

Richard H. Bailey, PhD

ASSOCIATE PROFESSORS

Malcolm D. Hill, PhD

Martin E. Ross, PhD

ACADEMIC SPECIALIST AND GIS LABORATORY DIRECTOR

Todd G. Fritch, PhD

ASSISTANT ACADEMIC SPECIALIST AND PROGRAM DIRECTOR, ENVIRONMENTAL STUDIES

Jennifer Rivers, PhD

VISITING ASSISTANT PROFESSOR

Kevin G. Harrison, PhD

The earth and environmental sciences program encompasses the multidisciplinary study of the earth, the processes of earth's surface, and human interaction with earth processes. Geologists study the physical features, composition, history, and processes of the earth, and they discover new deposits of minerals and fossil fuels. Many environmental geologists and environmental scientists are working to solve environmental problems, such as soil contamination, flooding, slope stability, or shore erosion related to changing land use, and to develop and protect water resources.

Bachelor of Science programs are offered in geology and in environmental geology and Bachelor of Arts programs are offered in environmental studies and earth science. A number of dual-major programs are also offered. The Bachelor of Science programs require course work in mathematics (through calculus), physics, and chemistry, and a set of required and elective geology and environmental courses. All students complete the College of Arts and Sciences core curriculum. Students in the Bachelor of Arts programs take a broader array of nonscience courses and must demonstrate proficiency in a foreign language. Courses in the geology major focus on the basic composition (earth materials), structure (structural geology and stratigraphy), and surface of the earth (geomorphology and geochemistry). The environmental geology major has a greater emphasis on earth surface processes, human interactions, and land-use planning. Typical environmental geology courses include hydrogeology, geology and land-use planning, environmental planning, groundwater geochemistry, and coastal processes. Courses in environmental studies include a range of science and social science courses related to environmental issues. Fieldwork is an essential component of training in geology, and many of our courses utilize field sites throughout New England to demonstrate geological processes. In addition to sponsoring these local trips, the department has taken students on longer field excursions to Iceland, to the Cascade Mountains of Washington, to the island of San Salvador in the Bahamas, and to the Grand Canyon. Students also have the option to complete undergraduate research courses with a faculty member. Undergraduate research projects usually involve substantial fieldwork and lab work completed under the guidance of faculty. Honors students in geology have the opportunity to participate in special sections of geology courses and in special honors activities. The geology program offers basic knowledge needed to work in almost any of the geologic professions in both industry and government, or to continue studies in graduate school. The major in environmental geology is particularly popular, and many of our recent graduates work for environmental or geotechnical firms. Students participating in the co-op program typically work with local engineering or environmental consulting companies, or with government agencies. These jobs often involve assessing building sites, evaluating land use, and studying many problems concerned with groundwater contamination and remediation. Students in environmental studies are prepared to work in environmental planning, regulation, policy, or compliance. The broad-based

program also prepares students to go into environmental education or law. Co-op experiences in environmental planning may include government internships or work in environmental compliance offices. See pages 336–342 for course descriptions.

BS in Geology

COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS

See page 48 for requirement list.

GEOLOGY BREADTH COURSES

All courses must be above the requirements for the College of Arts and Sciences core.

Mathematics

Complete the following two courses:

MTH U141	Calculus 1	4 SH
MTH U142	Calculus 2	4 SH

Chemistry

Complete the following two courses and corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

Physics

Complete the following two courses and corresponding labs:

PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

Science Elective

Complete one course at the 300 level or above from the following departments:

BIO U300 to BIO U699
CHM U300 to CHM U699
CIV U300 to CIV U699
MTH U300 to MTH U699
PHY U300 to PHY U699
TOX U300 to TOX U699

GEOLOGY MAJOR REQUIREMENTS

Earth Foundations

Complete the following three courses and corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geological Analysis

Complete the following three courses and corresponding labs:

GEO U320	Igneous Petrology and Volcanology	4 SH
with GEO U321	Lab for GEO U320	1 SH
GEO U530	Structural Geology	4 SH
with GEO U531	Lab for GEO U530	1 SH

GEO U540	Sedimentary Basin Analysis	4 SH
with GEO U541	Lab for GEO U540	1 SH

Electives

Complete four approved electives.

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

GEOLOGY MAJOR CREDIT REQUIREMENT

Complete 78 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Environmental Geology**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

ENVIRONMENTAL GEOLOGY BREADTH COURSES**Mathematics**

Complete the following two courses:

MTH U141	Calculus 1	4 SH
MTH U142	Calculus 2	4 SH

Chemistry

Complete the following two courses and corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

Physics or Biology

Complete two courses from one of the two departments with the corresponding labs:

PHYSICS

PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
or PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
or PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH
or PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH
or PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH

BIOLOGY

BIO U101	Principles of Biology 1	4 SH
BIO U103	Principles of Biology 2	4 SH

Science Elective

Complete one course at the 300 level or higher from the following departments:

BIO U300 to BIO U699
CHM U300 to CHM U699
CIV U301 to CIV U699
MTH U301 to MTH U699
PHY U300 to PHY U699
TOX U300 to TOX U699

ENVIRONMENTAL GEOLOGY MAJOR REQUIREMENTS**Earth Foundations**

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geomorphology

Complete the following course and corresponding lab:

GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Hydrogeology

Complete the following course and corresponding lab:

GEO U520	Applied Hydrogeology	4 SH
with GEO U521	Lab for GEO U520	1 SH

Environmental Planning

Complete the following course:

GEO U510	Environmental Planning	4 SH
or GEO U550	Geology and Land-Use Planning	4 SH

Electives

Complete four approved electives.

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

ENVIRONMENTAL GEOLOGY MAJOR CREDIT REQUIREMENT

Complete 75 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BA in Environmental Studies**COLLEGE OF ARTS AND SCIENCES****BA CORE REQUIREMENTS**

See page 46 for requirement list.

ENVIRONMENTAL STUDIES MAJOR*Science Courses*

Complete the following three courses with corresponding lab:

BIO U145	Environment and Humankind	4 SH
CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102 Lab for CHM U101		1 SH
ENV U115	Environmental Science	4 SH

History Course

Complete the following course:

HST U342	Environmental History of North America	4 SH
----------	--	------

Economics Course

Complete the following course:

ECN U116	Principles of Microeconomics	4 SH
----------	------------------------------	------

Sociology Course

Complete the following course:

SOC U246	Environment and Sociology	4 SH
----------	---------------------------	------

Political Science Courses

Complete the following two courses:

POL U150	American Government	4 SH
POL U395	Environmental Politics	4 SH

Geology Courses

Complete the following two courses:

GEO U112	Environmental Geology	4 SH
GEO U510	Environmental Planning	4 SH

Statistics Course

Complete one course with corresponding lab, where applicable, from the following list:

ECN U350	Statistics	4 SH
MTH U280	Statistics and Software	4 SH
POL U400	Quantitative Techniques	4 SH
PSY U320	Statistics in Psychological Research	4 SH
with PSY U321 Lab for PSY U320		1 SH
SOC U320	Statistical Analysis in Sociology	4 SH

Upper-Division Electives

Complete six courses in one area. See department for area options.

Senior Thesis

Complete the following course:

ENV U700	Senior Thesis	4 SH
----------	---------------	------

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

ENVIRONMENTAL STUDIES MAJOR**CREDIT REQUIREMENT**

Complete 73 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BA in Earth Science

Pending Trustees' approval

COLLEGE OF ARTS AND SCIENCES**BA CORE REQUIREMENTS**

See page 46 for requirement list.

EARTH SCIENCE BREADTH COURSES*Mathematics*

Complete the following two courses:

MTH U121	Precalculus	4 SH
MTH U141	Calculus 1	4 SH

Biology

Complete the following two courses with corresponding labs:

BIO U101	Principles of Biology 1	4 SH
with BIO U102 Lab for BIO U101		1 SH
BIO U103	Principles of Biology 2	4 SH
with BIO U104 Lab for BIO U103		1 SH

Chemistry

Complete the following course with corresponding lab:

CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102 Lab for CHM U101		1 SH

Physics

Complete two courses with corresponding labs from the following list, or complete two ELMO courses:

PHY U111	Astronomy	4 SH
PHY U121	Introduction to Science	4 SH
PHY U132	Energy, Environment, and Society	4 SH
PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146 Lab for PHY U145		1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148 Lab for PHY U147		1 SH

ELMO COURSES

INT U255	Music ELMO: Magic, Mystery, and Secrets of Sound and Music	4 SH
INT U257	Music Technology ELMO: The Science of Sound and Music	4 SH
INT U265	Visual Arts ELMO: Magic, Mystery, and Secrets of Light and Color	4 SH
INT U275	Theatre ELMO: Magic, Mystery, and Secrets of Light and Sound	4 SH

Science Elective

Complete one course from the following list:

BIO U300 to BIO U699
 CHM U300 to CHM U699
 CIV U301 to CIV U699
 MTH U301 to MTH U699
 PHY U300 to PHY U699
 TOX U300 to TOX U699

EARTH SCIENCE MAJOR REQUIREMENTS**Earth and Environment**

Complete the following four courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH
GEO U340	Earth Landforms and Processes	4 SH

Planning

Complete one of the following courses:

GEO U510	Environmental Planning	4 SH
or GEO U550	Geology and Land-Use Planning	4 SH

Electives

Complete one GEO course or one approved intermediate elective course from another department.

APPROVED MINOR

Complete an approved minor.

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

EARTH SCIENCE MAJOR CREDIT REQUIREMENT

Complete 62 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required
 Transition students are required to complete 132 total semester hours
 Minimum 2.000 GPA required

BA in Environmental Geology and Environmental Studies**COLLEGE OF ARTS AND SCIENCES BA CORE REQUIREMENTS FOR SPECIFIED PROGRAMS FOR NATURAL SCIENCE MAJORS**

See page 47 for requirement list.

ENVIRONMENTAL GEOLOGY BREADTH COURSES**Mathematics**

Complete the following two calculus courses:

MTH U121	Precalculus	4 SH
MTH U141	Calculus 1	4 SH

Chemistry

Complete the following course with corresponding lab:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH

Science Requirement

Complete one course with corresponding lab:

PHYSICS		
PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH

BIOLOGY

BIO U101	Principles of Biology 1	4 SH
with BIO U102	Lab for BIO U101	1 SH

ENVIRONMENTAL GEOLOGY REQUIREMENTS**Earth Foundations**

Complete the following two courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geomorphology

Complete the following course with corresponding lab:

GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Environmental Geology Intermediate/Advanced Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

ENVIRONMENTAL STUDIES REQUIREMENTS**Environmental Science**

Complete the following course:

ENV U115	Environmental Science	4 SH
----------	-----------------------	------

Statistics Course

Complete one course from the following list:

ECN U350	Statistics	4 SH
MTH U280	Statistics and Software	4 SH
POL U400	Quantitative Techniques	4 SH
PSY U320	Statistics in Psychological Research	4 SH
SOC U320	Statistical Analysis in Sociology	4 SH

Geographical Information Systems

Complete the following course with corresponding lab:

GEO U560	Geographic Information Systems	4 SH
with GEO U561	Lab for GEO U560	1 SH

Social Sciences

Complete four courses from the following disciplines:

ECONOMICS		
ECN U116	Principles of Microeconomics	4 SH

HISTORY

HST U342 Environmental History of North America 4 SH

POLITICAL SCIENCE

POL U150 American Government 4 SH

POL U395 Environmental Politics 4 SH

PHILOSOPHY

PHL U180 Environmental Ethics 4 SH

PHL U480 Environmental Philosophy 4 SH

SOCIOLOGY

SOC U246 Environment and Sociology 4 SH

ENVIRONMENTAL GEOLOGY/ENVIRONMENTAL STUDIES INTEGRATIVE REQUIREMENTS*Integrative Course Requirements*

Complete the following two courses:

GEO U510 Environmental Planning 4 SH

GEO U550 Geology and Land-Use Planning 4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

ENVIRONMENTAL GEOLOGY/ENVIRONMENTAL STUDIES DUAL-MAJOR CREDIT REQUIREMENT

Complete 78 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Geology and Chemistry**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES*Mathematics*

Complete the following two courses:

MTH U141 Calculus 1 4 SH

MTH U142 Calculus 2 4 SH

Science Requirement

Complete two physics courses or two biology courses from the following lists with corresponding labs:

PHYSICS

PHY U161 Physics 1 4 SH

with PHY U162 Lab for PHY U161 1 SH

PHY U165 Physics 2 4 SH

with PHY U166 Lab for PHY U165 1 SH

BIOLOGY

BIO U111 General Biology 1 4 SH

with BIO U112 Lab for BIO U111 1 SH

BIO U113 General Biology 2 4 SH

with BIO U114 Lab for BIO U113 1 SH

GEOLOGY REQUIREMENTS*Earth Foundations*

Complete the following three courses with corresponding labs:

GEO U200 Dynamic Earth 4 SH

with GEO U201 Lab for GEO U200 1 SH

GEO U220 History of Earth and Life 4 SH

with GEO U221 Interpreting Earth History 1 SH

GEO U310 Earth Materials 4 SH

with GEO U311 Lab for GEO U310 1 SH

Geological Analysis

Complete the following two courses and corresponding labs:

GEO U320 Igneous Petrology and Volcanology 4 SH

with GEO U321 Lab for GEO U320 1 SH

GEO U540 Sedimentary Basin Analysis 4 SH

with GEO U541 Lab for GEO U540 1 SH

or GEO U530 Structural Geology 4 SH

with GEO U531 Lab for GEO U530 1 SH

Geology Electives

Complete one intermediate or advanced elective from the following list:

GEO U300 to GEO U699

CHEMISTRY REQUIREMENTS*General Chemistry*

Complete the following two courses with corresponding labs:

CHM U211 General Chemistry 1 4 SH

with CHM U212 Lab for CHM U211 1 SH

CHM U214 General Chemistry 2 4 SH

with CHM U215 Lab for CHM U214 1 SH

Intermediate-Level Chemistry

Complete the following five courses with corresponding labs:

CHM U311 Organic Chemistry 1 4 SH

with CHM U312 Lab for CHM U311 1 SH

CHM U313 Organic Chemistry 2 4 SH

with CHM U314 Lab for CHM U313 1 SH

CHM U321 Analytical Chemistry 4 SH

with CHM U322 Lab for CHM U321 1 SH

CHM U401 Physical Chemistry 1 4 SH

with CHM U402 Lab for CHM U401 1 SH

CHM U403 Physical Chemistry 2 4 SH

with CHM U404 Lab for CHM U403 1 SH

Advanced-Level Chemistry

Complete the following course with corresponding lab:

CHM U521 Instrumental Methods of Analysis 1 SH

with CHM U522 Lab for CHM U521 4 SH

GEOLOGY AND CHEMISTRY INTEGRATIVE REQUIREMENTS*Integrative Course Requirements*

Complete the following two courses:

CHM U501 Inorganic Chemistry 4 SH

GEO U410 Environmental Geochemistry 4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

GEOLOGY AND CHEMISTRY DUAL-MAJOR CREDIT REQUIREMENT

Complete 95 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Environmental Geology and Chemistry**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES**Mathematics**

Complete the following two courses:

MTH U141	Calculus 1	4 SH
MTH U142	Calculus 2	4 SH

Science Requirement

Complete two physics courses or two biology courses from the following lists with corresponding labs:

PHYSICS

PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

BIOLOGY

BIO U101	Principles of Biology 1	4 SH
with BIO U102	Lab for BIO U101	1 SH
BIO U103	Principles of Biology 2	4 SH
with BIO U104	Lab for BIO U103	1 SH

ENVIRONMENTAL GEOLOGY REQUIREMENTS**Earth Foundations**

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geomorphology

Complete the following course with corresponding lab:

GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Environmental Geology Intermediate/Advanced Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

CHEMISTRY REQUIREMENTS**General Chemistry**

Complete the following two courses with corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

Intermediate-Level Chemistry

Complete the following five courses with corresponding labs:

CHM U311	Organic Chemistry 1	4 SH
with CHM U312	Lab for CHM U311	1 SH
CHM U313	Organic Chemistry 2	4 SH
with CHM U314	Lab for CHM U313	1 SH
CHM U321	Analytical Chemistry	4 SH
with CHM U322	Lab for CHM U321	1 SH
CHM U401	Physical Chemistry 1	4 SH
with CHM U402	Lab for CHM U401	1 SH
CHM U403	Physical Chemistry 2	4 SH
with CHM U404	Lab for CHM U403	1 SH

Advanced-Level Chemistry

Complete the following course with corresponding lab:

CHM U521	Instrumental Methods of Analysis	1 SH
with CHM U522	Lab for CHM U521	4 SH

ENVIRONMENTAL GEOLOGY AND CHEMISTRY INTEGRATIVE REQUIREMENTS**Integrative Course Requirements**

Complete two courses from the following list:

GEO U410	Environmental Geochemistry	4 SH
GEO U523	Soil Science	4 SH
GEO U582	Groundwater Geochemistry	4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

ENVIRONMENTAL GEOLOGY AND CHEMISTRY DUAL-MAJOR CREDIT REQUIREMENT

Complete 94 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Geology and Mathematics**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES*Chemistry*

Complete the following two courses with corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

GEOLOGY REQUIREMENTS*Earth Foundations*

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geological Analysis

Complete the following two courses with corresponding labs:

GEO U320	Igneous Petrology and Volcanology	4 SH
with GEO U321	Lab for GEO U320	1 SH
GEO U540	Sedimentary Basin Analysis	4 SH
with GEO U541	Lab for GEO U540	1 SH
or GEO U530	Structural Geology	4 SH
with GEO U531	Lab for GEO U530	1 SH

Geology Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

MATHEMATICS REQUIREMENTS*Calculus*

Complete the following three courses with a C or higher:

MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U242	Calculus 2 for Science and Engineering	4 SH
MTH U341	Calculus 3 for Science and Engineering	4 SH

Intermediate and Advanced Math

Complete the following five courses:

MTH U345	Ordinary Differential Equations	4 SH
MTH U371	Linear Algebra	4 SH
MTH U481	Probability and Statistics	4 SH
MTH U575	Group Theory	4 SH
or MTH U550	Real Analysis	4 SH
MTH U581	Statistics and Stochastic Processes	4 SH
or MTH U525	Applied Analysis	4 SH
or MTH U545	Fourier Series and PDEs	4 SH

Mathematics Elective

Complete one course from the following list:

MTH U401 to MTH U799

GEOLOGY AND MATHEMATICS INTEGRATIVE REQUIREMENTS*Physics*

Complete the following two courses with corresponding labs:

PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

GEOLOGY AND MATHEMATICS DUAL-MAJOR CREDIT REQUIREMENT

Complete 89 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Environmental Geology and Mathematics**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES*Chemistry*

Complete the following two courses with corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

ENVIRONMENTAL GEOLOGY REQUIREMENTS*Earth Foundations*

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geomorphology

Complete the following course with corresponding lab:

GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Geology Advanced Course

Complete one of the following courses:

GEO U510	Environmental Planning	4 SH
GEO U550	Geology and Land-Use Planning	4 SH

Environmental Geology Intermediate/Advanced Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

MATHEMATICS REQUIREMENTS**Calculus**

Complete the following three courses with a C or higher:

MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U242	Calculus 2 for Science and Engineering	4 SH
MTH U341	Calculus 3 for Science and Engineering	4 SH

Intermediate and Advanced Math

Complete the following five courses:

MTH U345	Ordinary Differential Equations	4 SH
MTH U371	Linear Algebra	4 SH
MTH U481	Probability and Statistics	4 SH
MTH U575	Group Theory	4 SH
or MTH U550	Real Analysis	4 SH
MTH U581	Statistics and Stochastic Processes	4 SH
or MTH U525	Applied Analysis	4 SH
or MTH U545	Fourier Series and PDEs	4 SH

Mathematics Electives

Complete one course from the following list:

MTH U401 to MTH U799

ENVIRONMENTAL GEOLOGY AND MATHEMATICS INTEGRATIVE REQUIREMENTS**Required Physics**

Complete the following two courses with corresponding labs:

PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

ENVIRONMENTAL GEOLOGY AND MATHEMATICS DUAL-MAJOR CREDIT REQUIREMENT

Complete 83 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Geology and Physics**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES**Mathematics**

Complete the following four courses:

MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U242	Calculus 2 for Science and Engineering	4 SH
MTH U341	Calculus 3 for Science and Engineering	4 SH
MTH U345	Ordinary Differential Equations	4 SH

Chemistry

Complete the following two courses with corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

GEOLOGY REQUIREMENTS**Earth Foundations**

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geological Analysis

Complete the following two courses with corresponding labs:

GEO U320	Igneous Petrology and Volcanology	4 SH
with GEO U321	Lab for GEO U320	1 SH
GEO U540	Sedimentary Basin Analysis	4 SH
with GEO U541	Lab for GEO U540	1 SH
or GEO U530	Structural Geology	4 SH
with GEO U531	Lab for GEO U530	1 SH

Geology Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

PHYSICS REQUIREMENTS**Introductory Physics**

Complete the following two courses with corresponding labs:

PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
or PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH
or PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH

Intermediate Physics

Complete the following three courses:

PHY U303	Modern Physics	4 SH
PHY U305	Thermodynamics and Statistical Mechanics	4 SH
PHY U371	Electronics	4 SH

Advanced Physics

Complete the following three courses:

PHY U600	Advanced Physics Laboratory 1	4 SH
PHY U602	Electricity and Magnetism	4 SH
PHY U617	Quantum Mechanics	4 SH

GEOLOGY AND PHYSICS INTEGRATIVE REQUIREMENTS**Integrative Course Requirements**

Complete the following two courses:

GEO U418	Geophysics	4 SH
PHY U132	Energy, Environment, and Society	4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

GEOLOGY AND PHYSICS DUAL-MAJOR CREDIT REQUIREMENT

Complete 101 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Environmental Geology and Physics**COLLEGE OF ARTS AND SCIENCES BS CORE REQUIREMENTS FOR NATURAL SCIENCE MAJORS**

See page 48 for requirement list.

BREADTH COURSES**Mathematics**

Complete the following four courses:

MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U242	Calculus 2 for Science and Engineering	4 SH
MTH U341	Calculus 3 for Science and Engineering	4 SH
MTH U345	Ordinary Differential Equations	4 SH

Chemistry

Complete the following two courses with corresponding labs:

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

ENVIRONMENTAL GEOLOGY REQUIREMENTS**Earth Foundations**

Complete the following three courses with corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH

Geomorphology

Complete the following course with corresponding lab:

GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Geology Advanced Course

Complete one of the following courses:

GEO U510	Environmental Planning	4 SH
GEO U550	Geology and Land-Use Planning	4 SH

Environmental Geology Intermediate/Advanced Electives

Complete two intermediate or advanced electives from the following list:

GEO U300 to GEO U699

PHYSICS REQUIREMENTS**Introductory Physics**

Complete the following two courses with corresponding labs:

PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
or PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH
or PHY U155	Physics for Engineering 2	4 SH
with PHY U156	Lab for PHY U155	1 SH

Intermediate Physics

Complete the following three courses:

PHY U303	Modern Physics	4 SH
PHY U305	Thermodynamics and Statistical Mechanics	4 SH
PHY U371	Electronics	4 SH

Advanced Physics

Complete the following three courses:

PHY U600	Advanced Physics Laboratory 1	4 SH
PHY U602	Electricity and Magnetism	4 SH
PHY U617	Quantum Mechanics	4 SH

GEOLOGY AND PHYSICS INTEGRATIVE REQUIREMENTS**Integrative Course Requirements**

Complete the following two courses:

GEO U418	Geophysics	4 SH
PHY U132	Energy, Environment, and Society	4 SH

EXPERIENTIAL EDUCATION REQUIREMENT

Complete one course in experiential education. Please see department for approved courses.

GEOLOGY AND PHYSICS DUAL-MAJOR**CREDIT REQUIREMENT**

Complete 100 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

BS in Biology and Geology

See page 67.

Minor in Geology**REQUIRED COURSES**

Complete the following four courses and corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH
GEO U320	Igneous Petrology and Volcanology	4 SH
with GEO U321	Lab for GEO U320	1 SH

GEOLOGY ELECTIVE

Complete one geology course.

GPA REQUIREMENT

2.000 GPA required in the minor

Minor in Environmental Geology**REQUIRED COURSES**

Complete the following four courses and corresponding labs:

GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH
GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U310	Earth Materials	4 SH
with GEO U311	Lab for GEO U310	1 SH
GEO U510	Environmental Planning	4 SH
or GEO U550	Geology and Land-Use Planning	4 SH

GEOLOGY ELECTIVE

Complete one geology course.

GPA REQUIREMENT

2.000 GPA required in the minor

Minor in Environmental Studies**SCIENCE COURSES**

Complete two courses from the following list:

BIO U145	Environment and Humankind	4 SH
CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
GEO U112	Environmental Geology	4 SH
GEO U200	Dynamic Earth	4 SH
with GEO U201	Lab for GEO U200	1 SH

SOCIAL SCIENCE COURSES

Complete two courses from the following list:

ECN U116	Principles of Microeconomics	4 SH
HST U342	Environmental History of North America	4 SH
POL U150	American Government	4 SH
SOC U246	Environment and Sociology	4 SH

INTERDISCIPLINARY COURSES

Complete two courses from the following list:

GEO U510	Environmental Planning	4 SH
GEO U550	Geology and Land-Use Planning	4 SH
POL U395	Environmental Politics	4 SH

GPA REQUIREMENT

2.000 GPA required in the minor

For more information on the environmental studies minor, contact the program director, Professor Jennifer Rivers (14 Holmes), at 617.373.3039 or at je.rivers@neu.edu.

Minor in Environmental Science**COURSE WORK****Introductory Course Work**

Complete one of the following courses or course/lab combinations:

BIO U121	Basic Microbiology	4 SH
with BIO U122	Lab for BIO U121	1 SH
ENV U115	Environmental Science	4 SH

Science or Engineering

Complete one of the following courses or course/lab combinations based on your major:

ENGINEERING MAJORS

CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

OTHER MAJORS

CHM U311	Organic Chemistry 1	4 SH
with CHM U312	Lab for CHM U311	1 SH
CHM U321	Analytical Chemistry	4 SH
with CHM U322	Lab for CHM U321	1 SH
CIV U334	Environmental Engineering 1	4 SH

Social Sciences

Complete one of the following courses:

ECN U423	Environmental Economics	4 SH
PHL U180	Environmental Ethics	4 SH
POL U395	Environmental Politics	4 SH

SOC U246	Environment and Sociology	4 SH
SOC U485	Environment, Technology, and Society	4 SH

ELECTIVES

Complete any two courses or course/lab combinations from the following list. Only one of the courses may be at the 100 level. Only one course or course/lab combination may be selected from a group:

Physics Group

For nonengineering/science majors only:

PHY U132	Energy, Environment, and Society	4 SH
----------	----------------------------------	------

Biology Group

BIO U311	Ecology	4 SH
BIO U317	Vertebrate Zoology	4 SH
BIO U559	Entomology	4 SH
BIO U561	Herpetology	4 SH
BIO U563	Ornithology	4 SH
BIO U565	Mammalogy	4 SH
BIO U567	Wildlife Biology	4 SH

Environmental Planning Group

GEO U510	Environmental Planning	4 SH
GEO U550	Geology and Land-Use Planning	4 SH

Geology Group

ENV U523	Soil Science	4 SH
GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH

Hydrogeology Group

GEO U520	Applied Hydrogeology	4 SH
with GEO U521	Lab for GEO U520	1 SH
GEO U580	Groundwater Modeling	4 SH
GEO U582	Groundwater Geochemistry	4 SH

Geographic Information Systems Group

GEO U560	Geographic Information Systems	4 SH
with GEO U561	Lab for GEO U560	1 SH

Civil Engineering Group

CIV U534	Environmental Engineering 2	3 SH
CIV U536	Hydrologic Engineering	4 SH

INTERDISCIPLINARY WORK**Independent Project**

See environmental science program adviser for approval before embarking on the project.

Applied Experience

See environmental science program adviser for details.

Environmental Safety Program

See environmental science program adviser for details.

GPA REQUIREMENT

2.000 GPA required in the minor

ECONOMICS

www.economics.neu.edu

STEVEN A. MORRISON, PhD

Professor and Chair

NEAL F. FINNEGAN CHAIR

John E. Kwoka Jr., PhD

PROFESSORS

M. Shahid Alam, PhD
Daryl A. Hellman, PhD
Sungwoo Kim, PhD
Andrew M. Sum, MA

ASSOCIATE PROFESSORS

Neil O. Alper, PhD
Oscar T. Brookins, PhD
Kamran M. Dadkhah, PhD
Alan W. Dyer, PhD
Gregory H. Wassall, PhD

ASSISTANT PROFESSORS

Jeffrey P. Ballou, PhD
Helen C. Connolly, PhD
Maria José Luengo-Prado, PhD
Jody Schimmel, MA
Jean-Philippe Stijns, PhD
Zhongming Wang, PhD

LECTURER

Ilter Bakkal, PhD

Economics is the study of how societies produce and exchange goods and services to satisfy material needs. In the economics program, students examine the sources of economic growth—how societies produce more of what they need. Undergraduates may study economics as part of a broad interest in the social sciences to develop specialized skills useful in today's complex labor market. The major in economics is also a good foundation for graduate studies in advanced economics, public policy, law, or business.

Macroeconomics, which focuses on the overall economy, deals with such problems as inflation, unemployment, growth and instability, economic development, and governmental monetary and fiscal policies.

Microeconomics examines the economic behavior of individuals, households, firms, industries, and trade among countries. It seeks to assess the economic effects of market power and environmental damage and analyzes the economic aspects of natural resources, poverty, health, income distribution, trade unions, and government regulation.

Courses in economics cover international trade; the behavior of families, firms, and industries in the market economy; the environmental costs of growth; and the economic aspects of