

# College of Computer and Information Science

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The invention of powerful computers and the development of complex software programs have fundamentally transformed the way people work and live. Computers are now essential tools in business, industry, science, medicine, and human services. Computers also enhance the efforts of individuals and volunteer groups to meet their goals. In addition, the most sophisticated work in music, film, and video often makes use of computer technology. The College of Computer and Information Science believes that computing is one of the most exciting fields of study and that its applications are limitless.

The college offers undergraduate degree programs in computer science (BS and BA) and information science (BS), and three dual majors with cognitive psychology, mathematics, and physics. The BS in computer science emphasizes strong technical competence in computer science, mathematics, science, and electrical engineering while the BA in computer science combines computer science with a broad-based liberal arts education. The BS in information science integrates studies in computer science, information science, business, psychology, and social science. Each of the dual majors offers the opportunity for intense study in two disciplines. The BS in computer science follows the ACM-IEEE Curriculum 2001 recommendations and is accredited by the Computing Accreditation Commission of ABET.

## Academic Progression Standards

The following are the minimum requirements for freshmen to achieve sophomore status.

- At least 25 SHs of credit
- A minimum overall GPA of 1.800
- A minimum computer science GPA of 1.800
- Successful completion of the following required courses:
  - CS U211 and CS U200 – each with a grade of at least C–
  - ENG U111 or equivalent – ENG U102
  - An arts and sciences core course

The minimum overall grade point averages required for students to advance to the next rank and to graduate are:

Middler	2.000
Junior	2.000
Senior	2.000
To graduate	2.000

In addition, students must achieve a minimum overall GPA of 2.000 and a minimum overall GPA in CS/IS courses of 2.000 for graduation. For additional information, consult the *College of Computer and Information Science Undergraduate Student Guidebook*.

## Computer Science

Computer science involves the application of theoretical concepts in the context of software development to the solution of problems that arise in almost every human endeavor. Computer science as a discipline draws its inspiration from mathematics, logic, science, and engineering. From these roots, computer science has fashioned paradigms for program structures, algorithms, data representations, efficient use of computational resources, robustness and security, and communication within computers and across networks. The ability to frame problems, select computational models, design program structures, and develop efficient algorithms is as important in computer science as software implementation skill. Computer science is concerned with bringing together all of the intellectual resources needed to enable the rapid and effective development of software to meet the needs of business, research, and end users.

The goal of the undergraduate program in computer science is to teach students the conceptual and practical skills that will enable them to contribute to the development of computational principles and to play a productive role in the software community. To that end, the undergraduate program focuses on the fundamentals of program design including object-oriented design, software development, computer organization, systems and networks, theory of computation, principles of languages, and advanced algorithms and data. The program also offers a variety of electives at the upper undergraduate and beginning graduate levels ranging from more theoretical courses to those that focus on important applications.

## College of Computer and Information Science Approved Courses: Diversity

Each College of Computer and Information Science degree program below references the following list of approved diversity courses:

AFR U109	Foundations of Black Culture 1	4 SH	AFR U609	History of South Africa	4 SH
AFR U128	Music of Africa	4 SH	ASL U150	Deaf People in Society	4 SH
AFR U131	Music of Latin America and the Caribbean	4 SH	ASL U350	Deaf History and Culture	4 SH
AFR U140	African-American History	4 SH	CIN U240	Latin American Film	4 SH
AFR U180	African History	4 SH	CIN U255	Chinese Film: Gender, Ethnicity	4 SH
AFR U185	Gender in the African Diaspora	4 SH	CIN U260	Japanese Film	4 SH
AFR U212	History of Race	4 SH	CIN U265	Spanish Civil War on Film	4 SH
AFR U261	The Modern Caribbean	4 SH	CIN U270	Modern German Film and Literature	4 SH
AFR U270	Economic Status of Ethnic Minorities	4 SH	CIN U280	French Film and Culture	4 SH
AFR U307	Africa Today	4 SH	CIN U460	Jewish Film	4 SH
AFR U320	The Black Family	4 SH	CJ U102	Ethics, Values, and Diversity	4 SH
AFR U325	African-American Women	4 SH	CJ U522	Comparative Criminal Justice	4 SH
AFR U337	African-American History before 1900	4 SH	ECN U270	Economic Status of Ethnic Minorities	4 SH
AFR U338	African-American History since 1900	4 SH	ENG U671	Multiethnic Literature of the U.S.	4 SH
AFR U365	Blacks and Jews	4 SH	ENG U672	Asian-American Literature	4 SH
AFR U391	Modern African Civilization	4 SH	ENG U673	U.S. Latino/Latina Literature	4 SH
AFR U392	African Diaspora	4 SH	ENG U674	American Indian Literature	4 SH
AFR U399	Black Community and Social Change	4 SH	ENG U675	Gay and Lesbian Literature	4 SH
AFR U460	Contemporary Government and Politics in Africa	4 SH	HNR U300	Topics in Research and Inquiry: A Diversity Perspective	4 SH
			HNR U320	Topics in Urban Experience: A Diversity Perspective	4 SH
			HNR U340	Topics in Contemporary Issues: A Diversity Perspective	4 SH
			HS U560	Jewish Studies, Human Services, and the Judeo-Christian Tradition	4 SH
			HST U103	Women's Studies	4 SH
			HST U140	Introduction to African-American History	4 SH
			HST U150	East Asian Studies	4 SH
			HST U180	African History	4 SH
			HST U204	Third World Women	4 SH
			HST U212	History of Race	4 SH
			HST U242	Women in America	4 SH
			HST U261	The Modern Caribbean	4 SH
			HST U290	Modern Middle East	4 SH
			HST U337	African-American History before 1900	4 SH
			HST U338	African-American History since 1900	4 SH
			HST U350	Modern China	4 SH
			HST U351	Japan since 1850	4 SH
			HST U372	Gender and Society in Modern Europe	4 SH
			HST U391	Modern African Civilization	4 SH
			HST U392	African Diaspora	4 SH
			HST U393	Islam and Empires	4 SH
			HST U394	Islamic Nationalism	4 SH
			HST U432	Latin America in Boston	4 SH
			INT U285	Jewish Religion and Culture	4 SH
			INT U560	Jewish Studies, Human Services, and the Judeo-Christian Tradition	4 SH
			LNC U150	Backgrounds of Chinese Culture	4 SH
			LNC U255	Chinese Film: Gender and Ethnicity	4 SH
			LNF U150	Introduction to French Culture	4 SH
			LNJ U150	Introduction to Japanese Pop Culture	4 SH
			LNR U285	Russian Civilization	4 SH
			LNS U150	Spanish Culture	4 SH
			LNS U160	Latin American Culture	4 SH
			LNS U170	Caribbean Literature and Culture	4 SH

MTH U201	History of Mathematics	4 SH
MUS U106	Women in Music	4 SH
MUS U128	Music of Africa	4 SH
MUS U130	Music of Asia	4 SH
MUS U131	Music of Latin America and the Caribbean	4 SH
MUS U132	Music of the Jewish People	4 SH
PHL U103	Women's Studies	4 SH
PHL U130	Ethics: East and West	4 SH
PHL U270	Western Religions	4 SH
PHL U275	Eastern Religions	4 SH
PHL U280	Islam	4 SH
PHL U285	Jewish Religion and Culture	4 SH
PHL U290	Chinese Philosophy and Religion	4 SH
POL U375	Gender and Politics	4 SH
POL U380	Latino Politics in the United States	4 SH
POL U460	Government and Politics in Africa	4 SH
POL U465	Government and Politics in the Middle East	4 SH
POL U470	Arab-Israeli Conflict	4 SH
POL U475	Government and Politics in Latin America	4 SH
POL U480	Government and Politics in Japan	4 SH
POL U485	Government and Politics in China	4 SH
POL U487	Politics of Developing Nations	4 SH
SOA U200	On Location in the Middle East	4 SH
SOA U210	Hot-Button Issues in the Middle East	4 SH
SOA U220	Latino, Latin American, and Caribbean Studies	4 SH
SOA U302	Gender and Sexuality: A Cross-Cultural Perspective	4 SH
SOA U307	Social Movements in the Third World	4 SH
SOA U310	Individual Culture	4 SH
SOA U400	Muslims, Jews, and Christians in the Middle East	4 SH
SOA U500	Latin American Society and Development	4 SH
SOA U505	Native North Americans	4 SH
SOC U215	Society and Culture in Russia	4 SH
SOC U260	Gender in a Changing Society	4 SH
SOC U270	Race and Ethnic Relations	4 SH
SOC U460	Sociology of Latino Society	4 SH
SOC U520	Race, Class, and Gender	4 SH

## BSCS—Bachelor of Science in Computer Science

### ENGLISH REQUIREMENT

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

### MATHEMATICS, SCIENCE, AND SOCIAL SCIENCE CORE FOR BS

#### Sociology

Complete the following course:

SOC U528	Computers and Society	4 SH
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#### Symbolic Logic

Complete the following course with a grade of C– or higher:

PHL U215	Symbolic Logic	4 SH
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#### Mathematics Courses

Complete the following four courses. A grade of C– or higher is required in MTH U241 and MTH U242:

MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U242	Calculus 2 for Science and Engineering	4 SH
MTH U371	Linear Algebra	4 SH
MTH U481	Probability and Statistics	4 SH

#### Science Requirement

Complete a pair of courses and corresponding lab or recitation for one of the following sciences:

##### BIOLOGY

Complete the required lecture and lab and then choose a second lecture/lab:

##### REQUIRED

BIO U111	General Biology 1	4 SH
with BIO U112	Lab for BIO U111	1 SH

##### COMPLETE ONE

BIO U113	General Biology 2	4 SH
with BIO U114	Lab for BIO U113	1 SH
BIO U301	Genetics and Molecular Biology	4 SH
with BIO U302	Lab for BIO U301	1 SH

##### CHEMISTRY

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

Complete two sets of lecture/labs from one group:

##### GROUP 1

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

##### GROUP 2

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
GEO U340	Earth Landforms and Processes	4 SH
with GEO U341	Lab for GEO U340	1 SH
GEO U520	Applied Hydrogeology	4 SH
with GEO U521	Lab for GEO U520	1 SH
GEO U544	Sedimentation	4 SH
with GEO U545	Lab for GEO U544	1 SH
GEO U546	Coastal Processes	4 SH
with GEO U547	Lab for GEO U546	1 SH
GEO U560	Geographic Information Systems	4 SH
with GEO U561	Lab for GEO U560	1 SH

##### GROUP 3

GEO U220	History of Earth and Life	4 SH
with GEO U221	Interpreting Earth History	1 SH
GEO U542	Fossils and Paleocology	4 SH
with GEO U543	Lab for GEO U542	1 SH

**PHYSICS**

Complete one group of courses:

**GROUP 1**

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

**GROUP 2**

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

**GROUP 3**

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

**Electrical Engineering**

Complete the following course:

ECE U230	Computer Architecture for Computer Scientists	4 SH
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**COMPUTER SCIENCE MAJOR REQUIREMENTS****Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221	Computer/Information Science Overview 1	1 SH
CS U222	Computer/Information Science Overview 2	1 SH

Upper-level transfer students must complete the following course:

CS U223	Computer/Information Science Co-op Preparation	1 SH
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and must also make up 1 semester hour of credit.

**Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C- or higher:

CS U200	Discrete Structures	4 SH
CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

**Computer Science Required Courses**

Complete the following seven courses:

CS U370	Object-Oriented Design	4 SH
CS U380	Computer Organization	4 SH
CS U390	Theory of Computation	4 SH
CS U480	Systems and Networks	4 SH
CS U660	Programming Languages	4 SH
CS U670	Software Development	4 SH
CS U690	Algorithms and Data	4 SH

**Computer Science Elective Courses**

Complete three CS elective courses including one capstone course from the following list. With adviser approval, directed

study, project study, and appropriate graduate-level courses may also be taken as computer science electives:

CS U400 to CS U999

IS U535	Information Retrieval	4 SH
IS U570	Human Computer Interaction	4 SH

**Computer Science Capstone**

The computer science capstone is an extended activity that demands a significant individual effort, although it may be a team project as long as each student contributes substantial work. It generally consists of (1) a substantial programming or design project of at least one month in duration or (2) a research survey project in which the student explores and critically analyzes material beyond what is covered in a course and prepares a document to disseminate publicly what is learned to other members of the college. The requirement is usually satisfied through a course that is designated as a capstone course. See the college for a list of capstone courses.

**Computer Science Senior Seminar**

Complete one senior seminar:

CS U600	Senior Seminar	1 SH
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**DIVERSITY**

Satisfy the diversity course option, the residence-abroad option, the international co-op/study-abroad option, or the community service option.

**Diversity Course Option**

Complete one course from the list "College of Computer and Information Science Approved Courses: Diversity" on page 162.

**Residence-Abroad Option**

Provide documentation that you lived in a country other than the United States or Canada for at least two years after your tenth birthday.

**International Co-op/Study-Abroad Option**

Participate in a six-month international co-op assignment or study abroad in a country other than Canada.

**Community Service Option**

Complete one hundred hours of preapproved diversity-related community service and file a report describing the work completed.

**ARTS AND SCIENCES CORE REQUIREMENTS**

Complete either the foreign language option or the arts, humanities, and social sciences option. Note that the following courses are unacceptable: PHL U114, PHL U115, PHL U215, or SOC U528; any courses from BIO, CHM, GEO, MTH, or PHY; and any courses that are explicitly required for the major.

**Foreign Language Option**

Complete two courses in the same language with a grade of C or higher. Proficiency at elementary-level two or higher is required.

**Arts, Humanities, and Social Sciences Option**

Complete two courses from the following lists. Note that the following courses are unacceptable: PHL U114, PHL U115, PHL U215, or SOC U528; any courses from BIO, CHM, GEO, MTH, or PHY; and any courses that are explicitly required for the major.

“Approved Courses: Methods of Inquiry—Arts Context” on page 47

“Approved Courses: Methods of Inquiry—Humanities Context” on page 47

“Approved Courses: Methods of Inquiry—Social World Context” on page 48

“Approved Courses: Historical, Ethical, and Aesthetic Perspectives” on page 49

“Approved Courses: Analysis” on page 50

“College of Computer and Information Science Approved Courses: Diversity” on page 162

### ELECTIVES OUTSIDE COMPUTER AND INFORMATION SCIENCE

Complete three courses from either the depth option or the breadth option, and complete three open electives.

#### Depth Option

Complete three courses in one department outside CS and IS, including at least one course at the intermediate level (300 level or above). For the purposes of this requirement, all business courses are considered to be in the same department.

#### Breadth Option

Complete three courses in arts, humanities, or social sciences.

#### Open Electives

Complete three courses from any department, provided that the courses are not more elementary than the courses taken to satisfy other requirements in this program.

### MAJOR GPA REQUIREMENT

Minimum 2.000 GPA required in all CS and IS courses

### GENERAL ELECTIVES

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

### COOPERATIVE EDUCATION

### UNIVERSITY-WIDE REQUIREMENTS

135 total semester hours required

Minimum 2.000 GPA required

### BACS—Bachelor of Arts in Computer Science

#### ENGLISH REQUIREMENT

Complete the following course:

ENG U111 College Writing 4 SH  
and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

#### BA CORE REQUIREMENTS

##### Foreign Language

Complete two courses in the same language. Proficiency at elementary-level two or higher is required.

##### Methods of Inquiry

Complete one course for each of the contexts below. Courses in the major may not be used.

#### ARTS CONTEXT

Complete one course from the list “Approved Courses: Methods of Inquiry—Arts Context” on page 47.

#### HUMANITIES CONTEXT

Complete the following course with a grade of C– or higher:

PHL U215 Symbolic Logic 4 SH

#### SOCIAL WORLD CONTEXT

Complete one course from the list “Approved Courses: Methods of Inquiry—Social World Context” on page 48.

#### Diversity

Complete two courses from the the list “College of Computer and Information Science Approved Courses: Diversity” on page 162.

#### Historical, Ethical, and Aesthetic Perspectives

Complete two courses from the list “Approved Courses: Historical, Ethical, and Aesthetic Perspectives” on page 49.

#### Analysis

Complete the following course:

SOC U528 Computers and Society 4 SH

#### Required General Electives

Complete five general electives.

### MATHEMATICS AND SCIENCE CORE FOR BA

#### Mathematics Courses

Complete the following three courses. A grade of C– or higher is required in MTH U241 and MTH U242:

MTH U241 Calculus 1 for Science and Engineering 4 SH

MTH U242 Calculus 2 for Science and Engineering 4 SH

MTH U481 Probability and Statistics 4 SH

#### Science Courses

Complete one course and corresponding lab or recitation for one of the following groups:

##### BIOLOGY

BIO U111 General Biology 1 4 SH

with BIO U112 Lab for BIO U111 1 SH

##### CHEMISTRY

CHM U101 General Chemistry for Health Sciences 4 SH

with CHM U102 Lab for CHM U101 1 SH

CHM U151 General Chemistry for Engineers 4 SH

with CHM U152 Lab for CHM U151 1 SH

##### GEOLOGY

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

##### PHYSICS

PHY U145 Physics for Life Sciences 1 4 SH

with PHY U146 Lab for PHY U145 1 SH

PHY U151 Physics for Engineering 1 4 SH

with PHY U152 Lab for PHY U151 1 SH

PHY U161 Physics 1 4 SH

with PHY U162 Lab for PHY U161 1 SH

**COMPUTER SCIENCE MAJOR REQUIREMENTS****Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221	Computer/Information Science Overview 1	1 SH
CS U222	Computer/Information Science Overview 2	1 SH

Upper-level transfer students must complete the following course:

CS U223	Computer/Information Science Co-op Preparation	1 SH
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and must also make up 1 semester hour of credit.

**Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C– or higher:

CS U200	Discrete Structures	4 SH
CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

**Computer Science Required Courses**

Complete the following six courses:

CS U370	Object-Oriented Design	4 SH
CS U380	Computer Organization	4 SH
CS U390	Theory of Computation	4 SH
CS U480	Systems and Networks	4 SH
CS U670	Software Development	4 SH
CS U690	Algorithms and Data	4 SH

**Computer Science Elective Courses**

Complete two upper-division courses from the CS, IS, or MTH departments. *Note:* Only one course may be selected from the MTH department. With adviser approval, directed study courses, project study courses, and appropriate graduate-level courses may also be taken as computer science electives.

CS U400 to CS U699

IS U535 to IS U570

MTH U300 to MTH U699

**Computer Science Senior Seminar**

Complete one senior seminar:

CS U600	Senior Seminar	1 SH
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**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**GENERAL ELECTIVES**

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

**COOPERATIVE EDUCATION****UNIVERSITY-WIDE REQUIREMENTS**

134 total semester hours required

Minimum 2.000 GPA required

**Minor in Computer Science**

The requirements for the minor in computer science are shown below. Students who wish to take a particular course must have taken its prerequisites listed in the catalog.

**REQUIRED COURSES**

Complete the following two courses with corresponding labs with a grade of C– or higher:

CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

**COMPUTER SCIENCE ELECTIVES**

Complete three courses from the following list:

CS U300 to CS U699

IS U535	Information Retrieval	4 SH
IS U570	Human Computer Interaction	4 SH

**GPA REQUIREMENT**

2.000 GPA required in the minor

**Information Science**

Making the most of information technology—ensuring that it serves the goals and needs of users, clients, and society—is a tremendous challenge, one that requires a unique blend of knowledge and skills. The field of information science (IS) focuses on the relationship between computers, the people who use them, and the contexts in which they operate. IS seeks to further our understanding of: 1) information itself: where it comes from, how it is organized, and how it is used; 2) the design of computer applications that are usable, socially acceptable, and achieve the goals for which they were created; 3) the impact of information technology (IT) on human life and work; and 4) how the nature of the information, the goals of the users, and the relevant social policies and laws both influence and are influenced by the technical aspects of computer systems.

Information science majors acquire a strong technical foundation by taking classes in mathematics, logic, and computer science. They also require a strong foundation in behavioral science by taking classes in cognitive psychology, economics, and statistics. A course in the principles of information science introduces students to important intellectual frameworks such as decision theory, general systems theory, and social informatics, and to topics of current importance such as digital copyright, trusted systems, and Internet privacy policy. Building on these foundations, the IS core develops expertise in the design, management, and evaluation of information technology-based resources and systems. Elective courses cover topics such as text/hypertext retrieval, artificial intelligence, information security, e-commerce, and data mining.

**BSIS—Bachelor of Science in Information Science****ENGLISH REQUIREMENT**

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

**BEHAVIORAL SCIENCE FOUNDATIONS****Sociology**

Complete the following course:

SOC U528	Computers and Society	4 SH
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**Psychology**

Complete the following two courses:

PSY U101	Foundations of Psychology	4 SH
PSY U466	Cognition	4 SH

**Economics**

Complete the following course:

ECN U116	Principles of Microeconomics	4 SH
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**Organizational Behavior**

Complete the following course:

HRM U201	Organizational Behavior	4 SH
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**Elective Courses**

Complete a total of four elective courses outside computer and information science.

**MATHEMATICS AND SCIENCE REQUIREMENTS****Statistics and Calculus**

Complete the following two courses. A grade of C– or higher is required in MTH U241:

ECN U350	Statistics	4 SH
MTH U241	Calculus 1 for Science and Engineering	4 SH

**Symbolic Logic**

Complete the following course with a grade of C– or higher:

PHL U215	Symbolic Logic	4 SH
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**Science Elective**

Complete one course, and corresponding lab if applicable, from the natural world context option or the BACS science option.

**NATURAL WORLD CONTEXT OPTION**

Excluding math courses and courses intended for students in specific colleges, complete one course and any corresponding lab from the list “Approved Courses: Methods of Inquiry—Natural World Context” on page 48.

**BACS SCIENCE OPTION**

Complete one course and corresponding lab or recitation for one of the following groups:

**BIOLOGY**

BIO U111	General Biology 1	4 SH
with BIO U112	Lab for BIO U111	1 SH

**CHEMISTRY**

CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102	Lab for CHM U101	1 SH
CHM U151	General Chemistry for Engineers	4 SH
with CHM U152	Lab for CHM U151	1 SH

**GEOLOGY**

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

**PHYSICS**

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
PHY U151	Physics for Engineering 1	4 SH
with PHY U152	Lab for PHY U151	1 SH
PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH

**COMPUTER SCIENCE FOUNDATION COURSES****Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221	Computer/Information Science Overview 1	1 SH
CS U222	Computer/Information Science Overview 2	1 SH

Upper-level transfer students must complete the following course:

CS U223	Computer/Information Science Co-op Preparation	1 SH
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and must also make up 1 semester hour of credit.

**Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C– or higher:

CS U200	Discrete Structures	4 SH
CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

**Computer Science Required Courses**

Complete the following two courses:

CS U370	Object-Oriented Design	4 SH
CS U380	Computer Organization	4 SH

**INFORMATION SCIENCE COURSES****Required Courses in Information Science**

Complete the following five courses:

IS U300	Principles of Information Science	4 SH
IS U570	Human Computer Interaction	4 SH
IS U580	Empirical Research Methods	4 SH
IS U691	Information Science Field Study	1 SH
IS U692	Information Science Senior Project	5 SH

**Databases and Networks**

Complete the following two courses:

CS U430	Database Design	4 SH
CS U480	Systems and Networks	4 SH

**Information System Design and Development**

Complete the following course:

IS U470	Information System Design and Development	4 SH
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**Managing Information**

Complete the following course:

MIS U305 Information Resource Management 4 SH

**Information Science Electives**

Complete two courses from the following list:

CS U300 to CS U699

IS U301 to IS U699

ACC U201 Financial Accounting and Reporting 4 SH

ACC U403 Accounting Information Systems 4 SH

CMN U231 Principles of Organizational  
Communication 4 SH

CMN U531 Advanced Organizational Communication 4 SH

CMN U532 Theories of Conflict and Negotiation 4 SH

ECN U560 Applied Econometrics 4 SH

ENG U450 Syntax 4 SH

ENG U452 Semantics 4 SH

LIN U450 Syntax 4 SH

LIN U452 Semantics 4 SH

LIN U464 Psychology of Language 4 SH

LIN U520 Language and the Brain 4 SH

LIN U610 Laboratory in Psycholinguistics 4 SH

MIS U408 Knowledge Management 4 SH

MIS U501 Business Systems Integration 4 SH

POL U390 Science, Technology, and Public Policy 4 SH

PSY U450 Learning and Motivation 4 SH

PSY U452 Introduction to Sensation and Perception 4 SH

PSY U458 Psychobiology 4 SH

PSY U464 Psychology of Language 4 SH

PSY U520 Language and the Brain 4 SH

PSY U604 Laboratory in Learning and Motivation 4 SH

PSY U606 Laboratory in Psychobiology 4 SH

PSY U610 Laboratory in Psycholinguistics 4 SH

PSY U612 Laboratory in Cognition 4 SH

PSY U622 Laboratory in Sensation and Perception 4 SH

**DIVERSITY**

Satisfy the diversity course option, the residence-abroad option, the international co-op/study-abroad option, or the community service option.

**Diversity Course Option**

Complete one course from the list “College of Computer and Information Science Approved Courses: Diversity” on page 162.

**Residence-Abroad Option**

Provide documentation that you lived in a country other than the United States or Canada for at least two years after your tenth birthday.

**International Co-op/Study-Abroad Option**

Participate in a six-month international co-op assignment or study abroad in a country other than Canada.

**Community Service Option**

Complete one hundred hours of preapproved diversity-related community service and file a report describing the work completed.

**ARTS AND SCIENCES CORE REQUIREMENTS**

Complete either the foreign language option or the arts, humanities, and social sciences option. *Note:* The following courses are unacceptable: PHL U114, PHL U115, PHL U215, or SOC U528; any courses from BIO, CHM, GEO, MTH, or PHY; and any courses that are explicitly required for the major.

**Foreign Language Option**

Complete two courses in the same language with a grade of C or higher. Proficiency at elementary-level two or higher is required.

**Arts, Humanities, and Social Sciences Option**

Complete two courses from the following lists. *Note:* The following courses are unacceptable: PHL U114, PHL U115, PHL U215, or SOC U528; any courses from BIO, CHM, GEO, MTH, or PHY; and any courses that are explicitly required for the major.

“Approved Courses: Methods of Inquiry—Arts Context” on page 47

“Approved Courses: Methods of Inquiry—Humanities Context” on page 47

“Approved Courses: Methods of Inquiry—Social World Context” on page 48

“Approved Courses: Historical, Ethical, and Aesthetic Perspectives” on page 49

“Approved Courses: Analysis” on page 50

“College of Computer and Information Science Approved Courses: Diversity” on page 162

**REQUIRED GENERAL ELECTIVES**

Complete four general electives.

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**GENERAL ELECTIVES**

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

**COOPERATIVE EDUCATION****UNIVERSITY-WIDE REQUIREMENTS**

133 total semester hours required

Minimum 2.000 GPA required

**Minor in Information Science**

The requirements for the minor in information science are shown below. Students who wish to take a particular course must have taken its prerequisites listed in the catalog.

**REQUIRED COURSES**

Complete the following three courses with corresponding labs with a grade of C– or higher in CS U211 and CS U213:

CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH
IS U300	Principles of Information Science	4 SH

**INFORMATION SCIENCE ELECTIVES**

Complete two courses from the following list:

IS U300 to IS U699	
CS U430 Database Design	4 SH

**GPA REQUIREMENT**

2.000 GPA required in the minor

**Dual Majors**

The college offers three dual majors with cognitive psychology, mathematics, and physics. Each of the dual majors offers the opportunity for intense study in two disciplines with appropriate breadth in the liberal arts. Students take eight to ten courses in each discipline and two or three integrative courses that bind the disciplines together. These programs offer an excellent educational opportunity for the ambitious student.

**BS in Computer Science and Cognitive Psychology****ENGLISH REQUIREMENT**

Complete the following course:

ENG U111 College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

**BS CORE REQUIREMENTS****Methods of Inquiry**

Courses from your major cannot count toward the core.

**LOGIC**

Complete the following course with a grade of C– or higher:

PHL U215 Symbolic Logic	4 SH
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**ARTS, HUMANITIES, OR SOCIAL WORLD CONTEXT**

Complete one course from one of the following contexts:

**ARTS CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Arts Context” on page 47.

**HUMANITIES CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Humanities Context” on page 47.

**SOCIAL WORLD CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Social World Context” on page 48.

**Diversity**

Complete one course from the list “College of Computer and Information Science Approved Courses: Diversity” on page 162.

**Historical, Ethical, and Aesthetic Perspectives**

Complete one course from the list “Approved Courses: Historical, Ethical, and Aesthetic Perspectives” on page 49.

**Analysis**

Complete the following course:

SOC U528 Computers and Society	4 SH
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**Required General Electives**

Complete five general electives.

**MATHEMATICS REQUIREMENT**

Complete the following course:

MTH U241 Calculus 1 for Science and Engineering	4 SH
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**PSYCHOLOGY COURSES****Required Courses**

Complete the following four courses and corresponding lab:

PSY U101 Foundations of Psychology	4 SH
PSY U320 Statistics in Psychological Research	4 SH
with PSY U321 Lab for PSY U320	1 SH
PSY U464 Psychology of Language	4 SH
PSY U466 Cognition	4 SH

**Advanced Psychology**

Complete one of the following courses:

PSY U452 Introduction to Sensation and Perception	4 SH
PSY U458 Psychobiology	4 SH

**Laboratory in Psychology**

Complete one of the following courses:

PSY U610 Laboratory in Psycholinguistics	4 SH
PSY U612 Laboratory in Cognition	4 SH
PSY U622 Laboratory in Sensation and Perception	4 SH

**Seminar in Psychology**

Complete one of the following courses:

PSY U658 Seminar in Psycholinguistics	4 SH
PSY U660 Seminar in Cognition	4 SH
PSY U668 Seminar in Sensation and Perception	4 SH

**Psychology Electives**

Complete two courses from the following list (courses satisfying the categories above cannot be reused):

PSY U450 Learning and Motivation	4 SH
PSY U452 Introduction to Sensation and Perception	4 SH
PSY U458 Psychobiology	4 SH
PSY U520 Language and the Brain	4 SH
PSY U522 Psychology of Reading	4 SH
PSY U524 Language and Cognitive Development	4 SH
PSY U526 Categorization and Reasoning	4 SH
PSY U610 Laboratory in Psycholinguistics	4 SH
PSY U612 Laboratory in Cognition	4 SH
PSY U622 Laboratory in Sensation and Perception	4 SH
PSY U652 Seminar in Ethics in Psychology	4 SH
PSY U658 Seminar in Psycholinguistics	4 SH
PSY U660 Seminar in Cognition	4 SH
PSY U668 Seminar in Sensation and Perception	4 SH

**COMPUTER SCIENCE COURSES****Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221 Computer/Information Science Overview 1	1 SH
CS U222 Computer/Information Science Overview 2	1 SH

Upper-level transfer students must complete the following course:

CS U223	Computer/Information Science Co-op Preparation	1 SH
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and must also make up 1 semester hour of credit.

#### **Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C– or higher:

CS U200	Discrete Structures	4 SH
CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

#### **Computer Science Required Courses**

Complete the following four courses:

CS U370	Object-Oriented Design	4 SH
CS U390	Theory of Computation	4 SH
CS U520	Artificial Intelligence	4 SH
IS U570	Human Computer Interaction	4 SH

#### **Computer Science Senior Seminar**

Complete one senior seminar:

CS U600	Senior Seminar	1 SH
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#### **Integrative Courses**

Complete either the following software development course or two junior/senior project courses:

CS U670	Software Development	4 SH
PSY U970	Junior/Senior Project 1	4 SH
with PSY U971	Junior/Senior Project 2	4 SH

#### **Computer Science Elective Courses**

Complete two upper-division courses from the CS department. With adviser approval, directed study courses, project study courses, and appropriate graduate-level courses may also be taken as computer science electives:

CS U380 to CS U699		
IS U535	Information Retrieval	4 SH

### **MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

### **GENERAL ELECTIVES**

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

### **COOPERATIVE EDUCATION**

### **UNIVERSITY-WIDE REQUIREMENTS**

133 total semester hours required

Minimum 2.000 GPA required

## **BS in Computer Science and Mathematics**

### **ENGLISH REQUIREMENT**

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

## **BS CORE REQUIREMENTS**

### **Methods of Inquiry**

Courses from your major cannot count toward the core.

#### **LOGIC**

Complete the following course with a grade of C– or higher:

PHL U215	Symbolic Logic	4 SH
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#### **ARTS, HUMANITIES, OR SOCIAL WORLD CONTEXT**

Complete one course from one of the following contexts:

##### **ARTS CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Arts Context” on page 47.

##### **HUMANITIES CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Humanities Context” on page 47.

##### **SOCIAL WORLD CONTEXT**

Complete one course from the list “Approved Courses: Methods of Inquiry—Social World Context” on page 48.

### **Diversity**

Complete one course from the list “College of Computer and Information Science Approved Courses: Diversity” on page 162.

### **Historical, Ethical, and Aesthetic Perspectives**

Complete one course from the list “Approved Courses: Historical, Ethical, and Aesthetic Perspectives” on page 49.

### **Analysis**

Complete the following course:

SOC U528	Computers and Society	4 SH
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### **Required General Electives**

Complete five general electives.

## **COMPUTER SCIENCE COURSES**

### **Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221	Computer/Information Science Overview 1	1 SH
CS U222	Computer/Information Science Overview 2	1 SH

Upper-level transfer students must complete the following course:

CS U223	Computer/Information Science Co-op Preparation	1 SH
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and must also make up 1 semester hour of credit.

### **Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C– or higher:

CS U200	Discrete Structures	4 SH
CS U211	Fundamentals of Computer Science 1	4 SH
with CS U212	Lab for CS U211	1 SH
CS U213	Fundamentals of Computer Science 2	4 SH
with CS U214	Lab for CS U213	1 SH

### **Computer Science Required Courses**

Complete the following four courses:

CS U370	Object-Oriented Design	4 SH
CS U390	Theory of Computation	4 SH

CS U670	Software Development	4 SH
CS U690	Algorithms and Data	4 SH

**Computer Science Senior Seminar**

Complete one senior seminar:

CS U600	Senior Seminar	1 SH
or CS U610	Honors Senior Seminar	4 SH

**Integrative Courses**

Complete one of the following courses:

CS U540	Computer Graphics	4 SH
or CS G252	Cryptography and Communications Security	4 SH

**Computer Science Elective Courses**

Complete two upper-division courses from the CS department.

With adviser approval, directed study courses, project study courses, and appropriate graduate-level courses may also be taken as computer science electives:

CS U380 to CS U699		
IS U535	Information Retrieval	4 SH
IS U570	Human Computer Interaction	4 SH

**MATHEMATICS COURSES****Calculus Courses**

Complete the following three courses with a grade of C– or higher in MTH U241 and MTH U242:

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

**Mathematics Courses**

Complete the following five courses:

MTH U345	Ordinary Differential Equations	4 SH
MTH U371	Linear Algebra	4 SH
MTH U430	Number Theory	4 SH
MTH U481	Probability and Statistics	4 SH
MTH U575	Group Theory	4 SH

**Co-op Seminar**

Complete the following two courses:

MTH U300	Co-op Reflections Seminar 1	1 SH
MTH U400	Co-op Reflections Seminar 2	1 SH

**Mathematics Electives**

Complete two upper-division courses from the mathematics department:

MTH U401 to MTH U699

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**GENERAL ELECTIVES**

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

**COOPERATIVE EDUCATION****UNIVERSITY-WIDE REQUIREMENTS**

135 total semester hours required

Minimum 2.000 GPA required

**BS in Computer Science and Physics****ENGLISH REQUIREMENT**

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

**BS CORE REQUIREMENTS****Methods of Inquiry**

Courses from your major cannot count toward the core.

**LOGIC**

Complete the following course with a grade of C– or higher:

PHL U215	Symbolic Logic	4 SH
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**ARTS, HUMANITIES, OR SOCIAL WORLD CONTEXT**

Complete one course from one of the following contexts:

**ARTS CONTEXT**

Complete one course from the list “Approved Courses:

Methods of Inquiry—Arts Context” on page 47.

**HUMANITIES CONTEXT**

Complete one course from the list “Approved Courses:

Methods of Inquiry—Humanities Context” on page 47.

**SOCIAL WORLD CONTEXT**

Complete one course from the list “Approved Courses:

Methods of Inquiry—Social World Context” on page 48.

**Diversity**

Complete one course from the list “College of Computer and Information Science Approved Courses: Diversity” on page 162.

**Historical, Ethical, and Aesthetic Perspectives**

Complete one course from the list “Approved Courses:

Historical, Ethical, and Aesthetic Perspectives” on page 49.

**Analysis**

Complete the following course:

SOC U528	Computers and Society	4 SH
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**Required General Electives**

Complete five general electives.

**PHYSICS COURSES****Required Courses**

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

**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 two courses:

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

**Physics Elective**

Complete one upper-division course from the physics department:

PHY U400 to PHY U699

**MATHEMATICS INTEGRATIVE COURSES****Calculus**

Complete the following three courses with a grade of C– or higher in MTH U241 and MTH U242:

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

**Additional Math Requirements**

Complete the following two courses:

MTH U345 Ordinary Differential Equations 4 SH

MTH U525 Applied Analysis 4 SH

**COMPUTER SCIENCE COURSES****Computer Science Overview**

Freshmen or freshmen transfers must complete the following two courses:

CS U221 Computer/Information Science Overview 1 1 SH

CS U222 Computer/Information Science Overview 2 1 SH

Upper-level transfer students must complete the following course:

CS U223 Computer/Information Science Co-op Preparation 1 SH

and must also make up 1 semester hour of credit.

**Computer Science Fundamental Courses**

Complete the following three courses and corresponding labs with a grade of C– or higher:

CS U200 Discrete Structures 4 SH

CS U211 Fundamentals of Computer Science 1 4 SH

with CS U212 Lab for CS U211 1 SH

CS U213 Fundamentals of Computer Science 2 4 SH

with CS U214 Lab for CS U213 1 SH

**Computer Science Required Courses**

Complete the following four courses:

CS U370 Object-Oriented Design 4 SH

CS U390 Theory of Computation 4 SH

CS U670 Software Development 4 SH

CS U690 Algorithms and Data 4 SH

**Computer Science Senior Seminar**

Complete one senior seminar:

CS U600 Senior Seminar 1 SH

**Computer Science Elective Course**

Complete one upper-division course from the CS department.

With adviser approval, a directed study course, project study course, or appropriate graduate-level course may be taken as a computer science elective:

CS U380 to CS U699

IS U535 Information Retrieval 4 SH

IS U570 Human Computer Interaction 4 SH

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**GENERAL ELECTIVES**

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

**COOPERATIVE EDUCATION****UNIVERSITY-WIDE REQUIREMENTS**

135 total semester hours required

Minimum 2.000 GPA required

**Program Length**

Normally, the undergraduate program is five years, with seven full academic semesters, two summer half semesters, and three semesters of cooperative education. Some students may complete the program in four years with a reduced cooperative education component. The college is strongly committed to the cooperative education program since it believes that the opportunity to integrate academic learning with practical experience in industry can greatly contribute to a student's personal and professional development.