DUAL MAJORS

The college offers dual majors with business administration, cognitive psychology, biology, mathematics, physics, digital art, multimedia studies, and music technology, as well as a dual major in computer science and information science. 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 twelve 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 Information Science

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers complete the following two courses:
- CS U221  Computer/Information Science 1 SH
- CS U222  Computer/Information Science 1 SH

Upper-level transfer students complete the following course:
- CS U223  Computer/Information Science Co-op Preparation 1 SH

Computer Science Fundamental Courses
Complete the following four courses, with corresponding labs, as indicated. A grade of C– or higher is required in each course:
- 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
- CS U290  Logic and Computation 4 SH
  with CS U291  Lab for CS U290 1 SH

Computer Science Required Courses
Complete the following eight courses:
- CS U370  Object-Oriented Design 4 SH
- CS U380  Computer Organization 4 SH
- CS U390  Theory of Computation 4 SH
- CS U430  Database Design 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

INFORMATION SCIENCE COURSES

Required Courses in Information Science
Complete the following five courses:
- IS U300  Principles of Information Science 4 SH
- IS U470  Information System Design and Development 4 SH
- IS U570  Human Computer Interaction 4 SH
- IS U580  Empirical Research Methods 4 SH
- IS U692  Information Science Senior Project 5 SH

Sociology
Complete the following course:
- SOC U528  Computers and Society 4 SH

Managing Information
Complete the following course:
- MIS U305  Information Resource Management 4 SH

BEHAVIORAL SCIENCE FOUNDATIONS

Economics
Complete the following course:
- ECN U116  Principles of Microeconomics 4 SH

Psychology
Complete the following course:
- PSY U101  Foundations of Psychology 4 SH

Organizational Behavior
Complete the following course:
- HRM U209  Organizational Behavior 4 SH

MATHEMATICS AND STATISTICS REQUIREMENTS

Calculus
Complete the following two courses with a grade of C– or higher in MTH U241:
- MTH U241  Calculus 1 for Science and Engineering 4 SH
- MTH U371  Linear Algebra 4 SH

Statistics
Complete the following course:
- ECN U350  Statistics 4 SH

REQUIRED GENERAL ELECTIVES

Science Elective
One general elective must be a science course chosen from the NU Core science/technology level 1 domain. This course may not be a technology course. Corresponding lab must be taken with lecture where applicable. Note: For this requirement, a science course is defined to be any course in the NU Core science/technology level 1 domain that is not in the College of Computer and Information Science nor in the College of Engineering.

Additional General Electives
Complete four additional general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.

MAJOR GPA REQUIREMENT
Minimum 2.000 GPA required in all CS and IS courses

NU CORE REQUIREMENTS
See page 42 for requirement list.
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 Biology

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers complete one of the following sets of courses:
CS U221 Computer/Information Science Overview 1 1 SH
with CS U222 Computer/Information Science Overview 2 1 SH
or BIO U100 Biology/Biochemistry at Northeastern 1 SH
with BIO U106 Introduction to Experiential Education 1 SH
Upper-level transfer students complete the following course:
CS U223 Computer/Information Science Co-op Preparation 1 SH

Computer Science Fundamental Courses
Complete the following four courses 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
CS U290 Logic and Computation 4 SH
with CS U291 Lab for CS U290 1 SH

Computer Science Required Courses
Complete the following three courses:
CS U370 Object-Oriented Design 4 SH
CS U430 Database Design 4 SH
CS U670 Software Development 4 SH

Senior Seminar
Complete the following course:
CS U600 Senior Seminar 1 SH

Computer Science Integrative Courses
Complete the following two courses:
CS U390 Theory of Computation 4 SH
CS U690 Algorithms and Data 4 SH

BIOLOGY COURSES

Required Biology
Complete one course with corresponding lab for Biology 1, Biology 2, and Genetics and Molecular Biology:

BIOLOGY 1
BIO U101 Principles of Biology 1 4 SH
with BIO U102 Lab for BIO U101 1 SH
BIO U111 General Biology 1 4 SH
with BIO U112 Lab for BIO U111 1 SH

BIOLOGY 2
BIO U103 Principles of Biology 2 4 SH
with BIO U104 Lab for BIO U103 1 SH
BIO U113 General Biology 2 4 SH
with BIO U114 Lab for BIO U113 1 SH

GENETICS AND MOLECULAR BIOLOGY
BIO U301 Genetics and Molecular Biology 4 SH
with BIO U302 Lab for BIO U301 1 SH

Biology Capstone
Complete the following course:
BIO U701 Biology Capstone 4 SH

Biology Integrative Courses
Complete one of the following courses with corresponding lab, where applicable:
BIO G308 Bio IT Methods 1—Genome and Proteome Analysis 4 SH
BIO G309 Bio IT Methods 2—Protein Structure and Systems 4 SH
BIO U521 Experimental Design Marine Ecology 4 SH
with BIO U522 Lab for BIO U521 1 SH

Intermediate and Advanced Biology Electives
Complete two biology courses (with labs if offered, 9–10 semester hours total) at level 311 or above. One course (with corresponding lab, 5 semester hours total) must be from the following list:
BIO U311 Ecology 4 SH
with BIO U312 Lab for BIO U311 1 SH
BIO U313 Plant Biology 4 SH
with BIO U314 Lab for BIO U313 1 SH
BIO U315 Invertebrate Zoology 4 SH
with BIO U316 Lab for BIO U315 1 SH
BIO U317 Vertebrate Zoology 4 SH
with BIO U318 Lab for BIO U317 1 SH
BIO U319 Regulatory Cell Biology 4 SH
with BIO U320 Lab for BIO U319 1 SH
BIO U321 Microbiology 4 SH
with BIO U322 Lab for BIO U321 1 SH
BIO U323 Biochemistry 4 SH
with BIO U324 Lab for BIO U323 1 SH
An additional course (with lab, if offered, 4–5 semester hours total) must be in the following range:
BIO U311 to BIO U699

Chemistry Courses
Complete the following four 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
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  

MATHEMATICS REQUIREMENTS  
Complete the following two calculus courses with a grade of C– or higher, and complete the probability and statistics course:  

Calculus  
MTH U151  Calculus and Differential Equations for Biology 1  4 SH  
MTH U152  Calculus and Differential Equations for Biology 2  4 SH  

Probability and Statistics  
MTH U481  Probability and Statistics  4 SH  

COMPUTERS AND SOCIETY  
Complete the following course:  
SOC U528  Computers and Society  4 SH  

REQUIRED GENERAL ELECTIVES  
Complete six general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement and one must be used to satisfy the NU Core social science level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.  

MAJOR GPA REQUIREMENT  
Minimum 2.000 GPA required in all CS and IS courses  

NU CORE REQUIREMENTS  
See page 42 for requirement list.  

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

COORDERATIVE EDUCATION  

UNIVERSITY-WIDE REQUIREMENTS  
140 total semester hours required  
Minimum 2.000 GPA required  

BS in Computer Science and Business Administration  

COMPUTER SCIENCE COURSES  

Computer Science Overview  
Freshmen or freshmen transfers 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 complete the following course:  
CS U223  Computer/Information Science Co-op Preparation  1 SH  

Computer Science Fundamental Courses  
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:  
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  
CS U290  Logic and Computation  4 SH  
with CS U291  Lab for CS U290  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 U430  Database Design  4 SH  
CS U480  Systems and Networks  4 SH  
CS U670  Software Development  4 SH  

Computer Science Senior Seminar  
Complete the following course:  
CS U600  Senior Seminar  1 SH  

Upper-Division CS/IS Elective  
Complete one upper-division CS/IS elective. With advisor approval, a directed study, project study, or appropriate graduate-level course may also be taken as a computer science elective:  
CS U400 to CS U999  
IS U535  Information Retrieval  4 SH  
IS U570  Human Computer Interaction  4 SH  

BUSINESS COURSES  

Required Business Courses  
Complete the following seven courses:  
ACC U201  Financial Accounting and Reporting  4 SH  
ACC U301  Managerial Accounting  4 SH  
FIN U201  Financial Management  4 SH  
HRM U201  Organizational Behavior  4 SH  
MGT U501  Strategy in Action  4 SH  
MKT U201  Introduction to Marketing  4 SH  
MSC U201  Business Statistics  4 SH  

BUSINESS CONCENTRATION  
Complete a four-course business concentration other than management information systems from the list “BSBA Business Concentrations” on page 246.  

INFORMATION RESOURCE MANAGEMENT  

Information Resource Management  
Complete the following course. Note: MIS U305 is an integrative course:  
MIS U305  Information Resource Management  4 SH  

NORTHEASTERN UNIVERSITY
MATHEMATICS AND GENERAL REQUIREMENTS

Mathematics
Complete one of the following courses:
MTH U131 Calculus for Business and Economics 4 SH
MTH U241 Calculus 1 for Science and Engineering

Economics
Complete the following two courses:
ECN U115 Principles of Macroeconomics 4 SH
ECN U116 Principles of Microeconomics 4 SH

Computers and Society
Complete the following course:
SOC U528 Computers and Society 4 SH

REQUIRED GENERAL ELECTIVES
Complete three general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives. Note: Computer science/business administration dual majors may satisfy the latter requirement by completing the following course:
INB U203 International Business and Global Social Responsibility

MAJOR GPA REQUIREMENT
Minimum 2.000 GPA required in all CS and IS courses

NU CORE REQUIREMENTS
See page 42 for requirement list.

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 Cognitive Psychology

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers complete the following two courses:
CS U221 Computer/Information Science 1 SH Overview 1
CS U222 Computer/Information Science 1 SH Overview 2
Upper-level transfer students complete the following course:
CS U223 Computer/Information Science 1 SH Co-op Preparation

Computer Science Fundamental Courses
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:
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
CS U290 Logic and Computation 4 SH
with CS U291 Lab for CS U290 1 SH

Computer Science Required Courses
Complete the following five courses. Note: CS U520, CS U670, and IS U570 are integrative courses:
CS U370 Object-Oriented Design 4 SH
CS U390 Theory of Computation 4 SH
CS U520 Artificial Intelligence 4 SH
CS U670 Software Development 4 SH
IS U570 Human Computer Interaction 4 SH

Computer Science Senior Seminar
Complete the following course:
CS U600 Senior Seminar 1 SH

Computer Science Elective Courses
Complete two upper-division computer science courses. With advisor approval, directed study, project study, and appropriate graduate-level courses may also be taken as computer science electives.
CS U380 to CS U999
IS U535 Information Retrieval 4 SH

PSYCHOLOGY COURSES

Required Courses
Complete the following four courses:
PSY U101 Foundations of Psychology 4 SH
PSY U320 Statistics in Psychological Research 4 SH
PSY U464 Psychology of Language 4 SH
PSY U466 Cognition 4 SH

Advanced Psychology
Complete one course from the following list:
PSY U452 Sensation and Perception 4 SH
PSY U458 Psychobiology 4 SH

Laboratory in Psychology
Complete one course from the following list:
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 course from the following list:
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. Note: Courses satisfying the categories above cannot be reused:

- PSY U402 Social Psychology 4 SH
- PSY U450 Learning and Motivation 4 SH
- PSY U452 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 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
- PSY U970 Junior/Senior Honors Project 1 4 SH
- with PSY U971 Junior/Senior Honors Project 2 4 SH

ADDITIONAL REQUIREMENTS
Calculus
Complete the following course:
- MTH U241 Calculus 1 for Science and Engineering 4 SH

Computers and Society
Complete the following course:
- SOC U528 Computers and Society 4 SH

REQUIRED GENERAL ELECTIVES
Complete eight general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.

MAJOR GPA REQUIREMENT
Minimum 2.000 GPA required in all CS and IS courses

NU CORE REQUIREMENTS
See page 42 for requirement list.

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 Digital Art
Note: “TBD” stands for “to be determined.”

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers complete the following two courses:
- CS U221 Computer/Information Science 1 SH
- CS U222 Computer/Information Science Overview 2

Upper-level transfer students complete the following course:
- CS U223 Computer/Information Science Co-op Preparation 1 SH

Computer Science Fundamental Courses
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:
- 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
- CS U290 Logic and Computation 4 SH
with CS U291 Lab for CS U290 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 U430 Database Design 4 SH
- CS U670 Software Development 4 SH

Computer Science Senior Seminar
Complete the following course:
- CS U600 Senior Seminar 1 SH

Integrative Courses
Complete the following two courses:
- CS U540 Computer Graphics 4 SH
- IS U570 Human Computer Interaction 4 SH

Computer Science Elective Courses
Complete two upper-division computer science courses. With advisor approval, directed study, project study, and appropriate graduate-level courses may also be taken as computer science electives:
- CS U380 to CS U999
- IS U535 Information Retrieval 4 SH

DIGITAL ART COURSES

Required Digital Art Courses
Complete the following four courses with corresponding tools courses, as indicated:
- ART U130 Visual Studies Foundation 1 4 SH
- with ART U123 2D Tools for ART U130 1 SH
- ART U131 Visual Studies Foundation 2 4 SH
- with ART U125 3D Tools for ART U131 1 SH
ART U132  4D Foundation  4 SH  
with ART U133  4D Tools for ART U132  1 SH  
ART U134  Interactive Foundation  4 SH  
with ART U135  Interactive Tools for ART U134  1 SH  

**Digital Art Electives**

Complete six courses with corresponding tools courses, as indicated, from the six categories below. Normally, students are expected to complete all prerequisites for courses they wish to take. For exceptions based on some form of alternate experience, seek permission of instructor:

**BASICS**

ART U160  Photography 1  4 SH  
with ART U161  Photo Tools for ART U160  1 SH  
ART U175  Animation Basics  4 SH  
with ART U176  Animation Tools for ART U175  1 SH  
ART U180  Video Basics  4 SH  
with ART U181  Video Tools for ART U180  1 SH  

**PHOTOGRAPHY**

ART U360  Photography 2  4 SH  
ART U385  Still Digital Imaging  4 SH  
ART U601  Alternative Analog and Digital Processes  4 SH  
ART U602  Fine Art Digital Imaging  4 SH  

**ANIMATION**

ART U275  Animation Studio 1  4 SH  
ART U375  Animation Studio 2  4 SH  
ART U475  Animation Studio 3  4 SH  

**VIDEO**

ART U381  Video Project  4 SH  
TBD  Video 2  4 SH  
TBD  Video 3  4 SH  

**DIGITAL ART HISTORY**

ART U212  Survey of the Still and Moving Image  4 SH  

**CONTEMPORARY DIRECTIONS**

TBD  Contemporary Directions in Digital Art  4 SH  

**Digital Art Capstone Requirement**

Complete the following course:

TBD  Digital Art Degree Project  4 SH  

**REQUIRED GENERAL ELECTIVES**

Complete four general electives. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must be one of the general electives.

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses.

**NU CORE REQUIREMENTS**

See page 42 for requirement list.

**GENERAL ELECTIVES**

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

**COOPERATIVE EDUCATION**

**UNIVERSITY-WIDE REQUIREMENTS**

137 total semester hours required  
Minimum 2.000 GPA required

**BS in Computer Science and Mathematics**

**COMPUTER SCIENCE COURSES**

**Computer Science Overview**

Freshmen or freshmen transfers 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 complete the following course:

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

**Computer Science Fundamental Courses**

Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:

- 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  
- CS U290  Logic and Computation  4 SH  
with CS U291  Lab for CS U290  1 SH  

**Computer Science Required Courses**

Complete the following five courses. Note: CS U540 is an integrative course:

- CS U370  Object-Oriented Design  4 SH  
- CS U390  Theory of Computation  4 SH  
- CS U540  Computer Graphics  4 SH  
- CS U670  Software Development  4 SH  
- CS U690  Algorithms and Data  4 SH  

**Computer Science Senior Seminar**

Complete the following course:

- CS U600  Senior Seminar  1 SH  

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**GENERAL REQUIREMENTS**

**Social Science Level 1**

Complete the following course, which satisfies the NU Core social science level 1 requirement. Note: PSY U101 is required:

- PSY U101  Foundations of Psychology  4 SH  

**Mathematics**

Complete the following course:

- MTH U371  Linear Algebra  4 SH  

**Computers and Society**

Complete the following course:

- SOC U528  Computers and Society  4 SH  

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**NORTHEASTERN UNIVERSITY**
**Computer Science Elective Courses**

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

- CS U380 to CS U999
- 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 course after the first co-op is completed:

- MTH U300 Co-op Reflections Seminar 1 1 SH

**Mathematics Electives**

Complete three upper-division mathematics courses:

- MTH U401 to MTH U699

**COMPUTERS AND SOCIETY**

Complete the following course:

- SOC U528 Computers and Society 4 SH

**REQUIRED GENERAL ELECTIVES**

Complete seven general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement and one must be used to satisfy the NU Core social science level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**NU CORE REQUIREMENTS**

See page 42 for requirement list.

**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

**BS in Computer Science and Multimedia Studies**

*Note: “TBD” stands for “to be determined.”*

**COMPUTER SCIENCE COURSES**

**Computer Science Overview**

Freshmen or freshmen transfers 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 complete the following course:

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

**Computer Science Fundamental Courses**

Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:

- CS U200 Discrete Structures 4 SH
- CS U211 Fundamentals of Computer Science 1 Lab for CS U211 1 SH
- CS U213 Fundamentals of Computer Science 2 Lab for CS U213 1 SH
- CS U290 Logic and Computation 4 SH
- CS U291 Lab for CS U290 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 U430 Database Design 4 SH
- CS U670 Software Development 4 SH

**Computer Science Senior Seminar**

Complete the following course:

- CS U600 Senior Seminar 1 SH

**Integrative Courses**

Complete the following two courses:

- IS U570 Human Computer Interaction 4 SH
- MMS U500 Multimedia Studies History 4 SH

**Computer Science Elective Courses**

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

- CS U380 to CS U999
- IS U535 Information Retrieval 4 SH
MULTIMEDIA STUDIES COURSES

Required Courses
Complete the following eight courses with corresponding tools courses, as indicated:

- ART U130 Visual Studies Foundation 1 4 SH
- with ART U123 2D Tools for ART U130 1 SH
- ART U132 4D Foundation 4 SH
- with ART U135 Interactive Tools for ART U134 1 SH
- MMS U300 Narrative for Multimedia 4 SH
- MMS U305 Programming for Multimedia 4 SH
- MMS U400 Hypermedia 4 SH
- with MMS U401 Web Tools: Intermediate 1 SH
- MMS U700 Multimedia Capstone 1 4 SH
- MMS U701 Multimedia Capstone 2 4 SH
- MUS U220 Music and Technology 1 4 SH

Multimedia Studies Electives
Complete three additional courses from one or more of the following areas with corresponding tools courses, as indicated:

- MULTIMEDIA STUDIES
  - MMS U450 Special Topics in Hypermedia 4 SH
  - MMS U460 Special Topics in Multimedia 4 SH
  - MMS U600 Business, Law, and Multimedia 4 SH
  - MMS U500 to MMS U999

- ANIMATION AND VIDEO
  - ART U131 Visual Studies Foundation 2 4 SH
  - with ART U125 3D Tools for ART U131 1 SH
  - ART U175 Animation Basics 4 SH
  - with ART U176 Animation Tools for ART U175 1 SH
  - ART U180 Video Basics 4 SH
  - with ART U181 Video Tools for ART U180 1 SH
  - ART U275 Animation Studio 1 4 SH
  - ART U375 Animation Studio 2 4 SH
  - ART U381 Video Project 4 SH
  - ART U475 Animation Studio 3 4 SH
  - TBD Video 2 4 SH
  - TBD Video 3 4 SH

- PHOTOGRAPHY
  - ART U160 Photography 1 4 SH
  - with ART U161 Photo Tools for ART U160 1 SH
  - ART U360 Photography 2 4 SH
  - ART U385 Still Digital Imaging 4 SH
  - TBD Studio Photography 4 SH
  - ART U601 Alternative Analog and Digital Processes 4 SH

- GRAPHIC DESIGN
  - ART U333 Design 1 and Drawing 4 SH
  - ART U334 Typography 1 4 SH
  - with ART U338 Type Tools for ART U334 1 SH
  - ART U635 Time-Based Design 4 SH
  - ART U644 Interactive Design 4 SH

- MUSIC TECHNOLOGY
  - MUS U221 Music and Technology 2 4 SH
  - MUS U232 Music Recording 1 4 SH
  - MUS U320 Sound Design 4 SH
  - MUS U421 Digital Audio Processing 4 SH

GENERAL REQUIREMENTS
Courses from your major cannot count toward the core.

Social Science Level 1
Complete the following course:

- PSY U101 Foundations of Psychology 4 SH

Computers and Society
Complete the following course:

- SOC U528 Computers and Society 4 SH

REQUIRED GENERAL ELECTIVES
Complete five general electives. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must be one of the general electives.

MAJOR GPA/GRADE REQUIREMENT
Minimum 2.670 GPA required in all CS and IS courses. A grade of C or higher is required in all major courses. See page 263 for additional grade and progression requirements.

NU CORE REQUIREMENTS
See page 42 for requirement list.

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

BS in Computer Science and Music with Concentration in Music Technology

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers complete the following two courses:

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

Upper-level transfer students complete the following course:

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

Computer Science Fundamental Courses
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:

- 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
CS U290 Logic and Computation 4 SH
with CS U291 Lab for CS U290 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 U430 Database Design 4 SH
- CS U670 Software Development 4 SH

**Computer Science Senior Seminar**
Complete the following course:
- CS U600 Senior Seminar 1 SH

**Computer Science Integrative Course**
Complete the following course:
- IS U570 Human Computer Interaction 4 SH

**Computer Science Elective Courses**
Complete two upper-division computer science courses. With advisor approval, directed study, project study, and appropriate graduate-level courses may also be taken as computer science electives:
- CS U380 to CS U999
- IS U535 Information Retrieval 4 SH

**MUSIC TECHNOLOGY COURSES**

**Music Theory**
Complete the following two courses. Music Theory and Musicianship should be taken concurrently, as indicated:
- MUS U201 Music Theory 1 4 SH
  with MUS U241 Musicianship 1 1 SH
- MUS U202 Music Theory 2 4 SH
  with MUS U242 Musicianship 2 1 SH

**Music Literature and History**
Complete the following two courses. Note: MUS U308 is a prerequisite for MUS U315:
- MUS U308 Principles of Music Literature 4 SH
- MUS U315 History of Electronic Music 4 SH

**Music Technology**
Complete the following four courses in the order indicated:
- MUS U220 Music and Technology 1 4 SH
- MUS U221 Music and Technology 2 4 SH
- MUS U422 Music Composition Seminar 2 4 SH
- MUS U520 Interactive Real-Time Performance 4 SH

**Electronic Composition and Performance**
Complete the following two courses in the order indicated:
- MUS U610 Composition for Electronic Instruments 4 SH
- MUS U611 Music Technology Capstone/Senior Recital 4 SH

**Music Technology Integrative Course**
Complete the following course:
- MUS U421 Digital Audio Processing 4 SH

**Music Lessons**
Complete the following (repeatable) course four times:
- MUS U903 Composition Lessons 1 SH

**Music Elective Requirements**
Complete two additional courses from the following list with corresponding musicianship courses, as indicated. Note:
- MUS U303 is a prerequisite for MUS U304; MUS U308 is a prerequisite for MUS U311, MUS U312, and MUS U313:
  - MUS U305 Programming for Multimedia 4 SH
  - MUS U233 Music Production for Radio and Web 4 SH
  - MUS U303 Music Theory 3 4 SH
  - with MUS U343 Musicianship 3 1 SH
  - MUS U304 Music Theory 4 4 SH
  - with MUS U344 Musicianship 4 1 SH
  - MUS U311 Historical Traditions 1: America 4 SH
  - MUS U312 Historical Traditions 2: Classical 4 SH
  - MUS U313 Historical Traditions 3: World 4 SH
  - MUS U320 Sound Design 4 SH
  - MUS U699 Advanced Television Production 4 SH

**GENERAL REQUIREMENTS**

**Foundations of Psychology**
Complete the following course:
- PSY U101 Foundations of Psychology 4 SH

**Computers and Society**
Complete the following course:
- SOC U528 Computers and Society 4 SH

**REQUIRED GENERAL ELECTIVES**
Complete four general electives. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must be one of the general electives.

**MAJOR GPA REQUIREMENT**
Minimum 2.000 GPA required in all CS and IS courses

**NU CORE REQUIREMENTS**
See page 42 for requirement list.

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

**COOPERATIVE EDUCATION**

**UNIVERSITY-WIDE REQUIREMENTS**
139 total semester hours required
Minimum 2.000 GPA required
BS in Computer Science and Physics

**COMPUTER SCIENCE COURSES**

*Computer Science Overview*

Freshmen or freshmen transfers complete the following two courses:
- CS U221 Computer/Information Science 1 SH
- CS U222 Computer/Information Science 1 SH

Upper-level transfer students complete the following course:
- CS U223 Computer/Information Science 1 SH

*Computer Science Fundamental Courses*

Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:
- CS U200 Discrete Structures 4 SH
- CS U211 Fundamentals of Computer Science 1 and CS U212 Lab for CS U211 1 SH
- CS U213 Fundamentals of Computer Science 2 and CS U214 Lab for CS U213 1 SH
- CS U290 Logic and Computation 4 SH
- CS U291 Lab for CS U290 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 the following course:
- CS U600 Senior Seminar 1 SH

*Computer Science Elective Course*

Complete one upper-division computer science course. Either this course or one physics elective must satisfy the NU Core capstone requirement. With advisor approval, a directed study, project study, or appropriate graduate-level course may also be taken as a computer science elective:
- CS U380 to CS U999
- IS U535 Information Retrieval 4 SH
- IS U570 Human Computer Interaction 4 SH

**PHYSICS COURSES**

*Required Courses*

Complete the following two courses with 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 Electives*

Complete two upper-division courses from the PHY department. One of these courses or one computer science elective must satisfy the NU Core capstone requirement:
- 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

**COMPUTERS AND SOCIETY**

Complete the following course:
- SOC U528 Computers and Society 4 SH

**REQUIRED GENERAL ELECTIVES**

Complete six general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement and one must be used to satisfy the NU Core social science level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in all CS and IS courses

**NU CORE REQUIREMENTS**

See page 42 for requirement list.

**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 Information Science and Business Administration

COMPUTER SCIENCE COURSES

Computer Science Overview
Freshmen or freshmen transfers 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 complete the following course:
CS U223 Computer/Information Science Co-op Preparation 1 SH

Computer Science Fundamental Courses
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:
CS U200 Discrete Structures 1 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
CS U290 Logic and Computation 4 SH
with CS U291 Lab for CS U290 1 SH

Computer Science Required Courses
Complete the following two courses:
CS U370 Object-Oriented Design 4 SH
CS U430 Database Design 4 SH

Computer Science Senior Seminar
Complete the following course:
CS U600 Senior Seminar 1 SH

Information Science Required Courses
Complete the following three courses:
IS U300 Principles of Information Science 4 SH
IS U470 Information System Design and Development 4 SH
IS U580 Empirical Research Methods 4 SH

Integrative Courses
Complete the following two courses:
MIS U305 Information Resource Management 4 SH
MIS U404 Business Data Communications 4 SH

Upper-Division IS Elective
Complete one upper-division IS elective. With advisor approval, a directed study, project study, or appropriate graduate-level course may also be taken as an information science elective:
CS U380 to CS U999
IS U400 to IS U999

BUSINESS COURSES

Required Business Courses
Complete the following seven courses:
ACC U201 Financial Accounting and Reporting 4 SH
ACC U301 Managerial Accounting 4 SH
FIN U201 Financial Management 4 SH
HRM U201 Organizational Behavior 4 SH
MGT U501 Strategy in Action 4 SH
MKT U201 Introduction to Marketing 4 SH
MSC U201 Business Statistics 4 SH

BUSINESS CONCENTRATION
Complete a four-course business concentration other than management information systems from the list “BSBA Business Concentrations” on page 246.

MATHEMATICS AND GENERAL REQUIREMENTS

Mathematics
Complete one of the following courses with a grade of C– or better:
MTH U131 Calculus for Business and Economics 4 SH
MTH U241 Calculus 1 for Science and Engineering 4 SH

Economics
Complete the following two courses:
ECN U115 Principles of Macroeconomics 4 SH
ECN U116 Principles of Microeconomics 4 SH

Computers and Society
Complete the following course:
SOC U528 Computers and Society 4 SH

REQUIRED GENERAL ELECTIVES

Complete three general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives. Note: Information science/business administration dual majors may satisfy the latter requirement by completing the following course:
INB U203 International Business and Global Social Responsibility 4 SH

MAJOR GPA REQUIREMENT
Minimum 2.000 GPA required in all CS and IS courses

NU CORE REQUIREMENTS
See page 42 for requirement list.

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 Information Science and Cognitive Psychology**

**COMPUTER AND INFORMATION SCIENCE COURSES**

**Computer Science Overview**
Freshmen or freshmen transfers complete the following two courses:
- CS U221 Computer/Information Science 1 SH Overview 1
- CS U222 Computer/Information Science 1 SH Overview 2

Upper-level transfer students complete the following course:
- CS U223 Computer/Information Science 1 SH Co-op Preparation

**Computer Science Fundamental Courses**
Complete the following four courses with corresponding labs, as indicated. A grade of C– or higher is required in each course:
- CS U200 Discrete Structures 4 SH
- CS U211 Fundamentals of Computer Science 1 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
- CS U290 Logic and Computation 4 SH with CS U291 Lab for CS U290 1 SH

**Computer Science Required Courses**
Complete the following three courses. Note: CS U520 is an integrative course:
- CS U370 Object-Oriented Design 4 SH
- CS U390 Theory of Computation 4 SH
- CS U520 Artificial Intelligence 4 SH

**Information Science**
Complete the following five courses, including senior project. Note: IS U570 and IS U692 are integrative courses:
- IS U300 Principles of Information Science 4 SH
- IS U470 Information System Design and Development 4 SH
- IS U570 Human Computer Interaction 4 SH
- IS U580 Empirical Research Methods 4 SH
- IS U692 Information Science Senior Project 5 SH

**PSYCHOLOGY COURSES**

**Required Courses**
Complete the following four courses:
- PSY U101 Foundations of Psychology 4 SH
- PSY U320 Statistics in Psychological Research 4 SH
- PSY U464 Psychology of Language 4 SH
- PSY U466 Cognition 4 SH

**Advanced Psychology**
Complete one course from the following list:
- PSY U452 Sensation and Perception 4 SH
- PSY U458 Psychobiology 4 SH

**Laboratory in Psychology**
Complete one course from the following list:
- 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 course from the following list:
- 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. Note: Courses satisfying the categories above cannot be reused:
- PSY U402 Social Psychology 4 SH
- PSY U450 Learning and Motivation 4 SH
- PSY U452 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 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 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
- PSY U970 Junior/Senior Honors Project 1 4 SH with PSY U971 Junior/Senior Honors Project 2 4 SH

**ADDITIONAL REQUIREMENTS**

**Calculus**
Complete the following course:
- MTH U241 Calculus 1 for Science and Engineering 4 SH

**Computers and Society**
Complete the following course:
- SOC U528 Computers and Society 4 SH

**REQUIRED GENERAL ELECTIVES**
Complete seven general electives. One of these electives must be used to satisfy the NU Core arts/humanities level 1 requirement. If the NU Core comparative study of cultures requirement is to be satisfied by taking a course, then it must also be one of the general electives.

**MAJOR GPA REQUIREMENT**
Minimum 2.000 GPA required in all CS and IS courses

**NU CORE REQUIREMENTS**
See page 42 for requirement list.
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