The Department of Electrical and Computer Engineering offers two distinct Bachelor of Science programs: Bachelor of Science in electrical engineering (BSEE) and Bachelor of Science in computer engineering (BSCompE). An integrated dual major is available in electrical and computer engineering for students who complete the requirements of both majors. In addition, a minor in electrical engineering, a minor in computer engineering, and a minor in biomedical engineering are available to qualified students throughout the University, including majors within the department.

Successful engineers need to organize and adapt information to solve problems. They also must work effectively in teams and communicate well. Therefore, the goal of the electrical engineering and computer engineering programs is to help students develop these skills and provide the appropriate technical background for a successful career. The objectives of the Bachelor of Science programs are that every student will develop and be able to apply in an engineering context: (1) mathematical, scientific, computational, and experiential knowledge and skills; (2) the technical skills necessary for engineering practice; (3) the communications and interpersonal skills necessary as engineering professionals; (4) a personal and professional ethic appropriate to the practice of engineering; and (5) an awareness of the social, cultural, and historical context of engineering solutions.

The curricula are continuously assessed to ensure that graduates can achieve these goals and go on to succeed as professional electrical or computer engineers. The Bachelor of Science programs allow students sufficient flexibility within the standard eight academic semesters to earn a minor in nearly any department in the University. Typical minors might include electrical engineering, computer engineering, physics, math, computer science, or business, but students might also organize their course of study to earn a minor in economics, English, or music.

The academic program is supported by extensive laboratory facilities for study and experimentation in computing, circuit analysis, electronics, digital systems, microwaves, control systems, semiconductor processing, VLSI design, and digital signal processing. Students have access to state-of-the-art computing facilities, including numerous Linux-based workstations, and Windows-based personal computers, all connected to the Internet. Many courses are taught in one of the four computer-based teaching classrooms, where students work online and practice the theory presented in lecture while still in the classroom.

More than 90 percent of department undergraduates take advantage of the cooperative education program. During the cooperative work phase of the program, the students’ levels of responsibility grow as they gain theoretical and technical knowledge through academic work. A sophomore might begin cooperative work experience as an engineering assistant and progress by the senior year to a position with responsibilities similar to those of entry-level engineers.

A senior-year design course caps the education by drawing on everything learned previously. Teams of students propose, design, and build a functioning electrical or computer engineering system—just as they might in actual practice.

**Electrical Engineering**

The components of the Information Age—global communication systems, computers and computer chips, and the software that runs them, as well as pacemakers, magnetic resonance imaging, and interplanetary space missions—are possible because of the efforts of electrical engineers. Today, electrical engineers are developing concepts and working to translate these ideas into the next generation of products, from computers and safe, energy-efficient vehicles, to radar that can detect unexploded land mines from the air, to microrobots that diagnose disease from inside the body.

Many electrical engineers work in the traditional areas of communications, computation, and control, and components required to realize such systems. They are involved in design and product development, testing and quality control, sales and marketing, and manufacturing. Others use their problem-solving skills in diverse areas such as bioengineering, health care, electronic music, meteorology, and experimental psychology. Some graduates draw on their electrical engineering backgrounds to launch successful careers as physicians, financial analysts, attorneys, and entrepreneurs.

As specified below, the BSEE degree requires a sequence of core courses and advanced study in one or more technical elective areas: electronic circuits and devices; signals and systems; fields, waves, and optics; power engineering; or computer engineering. General electives and electives in the arts and humanities and social sciences are also required.

**BSEE—Bachelor of Science in Electrical Engineering**

**ENGINEERING CATEGORICAL REQUIREMENT**

Students must complete a minimum of semester hours in the categories of math/science and engineering topics. Completing all courses in the prescribed curriculum satisfies these requirements without any additional consideration. However, any student with transfer credit or course substitutions must meet with an academic advisor to plan appropriate course work to assure that these requirements are fully satisfied.
MATHEMATICS/SCIENCE REQUIREMENT
Complete 35 semester hours in mathematics and science as indicated below.

Required Mathematics/Science
Complete each of the following courses with corresponding labs, as indicated:

- CHEM 1151 General Chemistry for Engineers 4 SH
- MATH 1341 Calculus 1 for Science and Engineering 4 SH
- MATH 1342 Calculus 2 for Science and Engineering 4 SH
- MATH 2321 Calculus 3 for Science and Engineering 4 SH
- MATH 2341 Differential Equations and Linear Algebra for Engineering 4 SH
- PHYS 1151 Physics for Engineering 1 4 SH with PHYS 1152 Lab for PHYS 1151 1 SH
- PHYS 1155 Physics for Engineering 2 4 SH with PHYS 1156 Lab for PHYS 1155 1 SH

Further Credit
2 semester hours from the following course count toward the mathematics/science requirement:

- EECE 3468 Noise and Stochastic Processes 4 SH

2 semester hours from the following lecture/lab combination count toward the mathematics/science requirement:

- CS 1500 Algorithms and Data Structures for Engineering 4 SH with CS 1501 Lab for CS 1500 1 SH

1 semester hour from the following course counts toward the mathematics/science requirement:

- GE 1111 Engineering Problem Solving and Computation 4 SH

ENGINEERING REQUIREMENT
Complete 59 semester hours in engineering as indicated below:

- EECE 2322 Digital Logic Design 4 SH with EECE 2323 Lab for EECE 2322 1 SH
- EECE 2410 Circuits 4 SH with EECE 2411 Introduction to Electrical and Computer Engineering Laboratory 1 SH
- EECE 2412 Electronics 1 4 SH with EECE 2413 Lab for EECE 2412 1 SH
- EECE 3410 Electronics 2 4 SH
- EECE 3440 Electromagnetic Fields and Waves 4 SH with EECE 3441 Lab for EECE 3440 1 SH
- EECE 3464 Linear Systems 4 SH
- EECE 4572 Communications Systems 4 SH
- EECE 4790 Electrical and Computer Engineering Capstone 1 4 SH
- EECE 4792 Electrical and Computer Engineering Capstone 2 4 SH

Electrical Engineering Technical Electives
Complete 12 semester hours from the following list:
- EECE 3324 to EECE 3392
- EECE 4512 to EECE 4538
- EECE 4574 to EECE 4698
- EECE 5150 to EECE 5686

Further Credit
3 semester hours from the following course count toward the engineering requirement:

- GE 1110 Engineering Design 4 SH
2 semester hours from each of the following courses count toward the engineering requirement:

- EECE 3468 Noise and Stochastic Processes 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

PROFESSIONAL DEVELOPMENT REQUIREMENT
Complete 8 semester hours in professional development as indicated below.

Professional Development
Complete the following three courses:

- GE 1000 Introduction to the Study of Engineering 1 SH
- EECE 2000 Introduction to Engineering Co-op Education 1 SH
- EECE 3000 Professional Issues in Engineering 1 SH

Further Credit
3 semester hours from the following lecture/lab combination count toward the professional development requirement:

- CS 1500 Algorithms and Data Structures for Engineering 4 SH with CS 1501 Lab for CS 1500 1 SH

1 semester hour from each of the following courses counts toward the professional development requirement:

- GE 1110 Engineering Design 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

ADDITIONAL NU CORE COURSES
Complete 16 semester hours in NU Core course work as indicated below.

Writing
Complete the following two courses with a grade of C or higher in each course:

- ENGL 1111 College Writing 4 SH
- ENGL 3302 Advanced Writing in the Technical Professions 4 SH

Arts/Humanities Level 1
Complete 4 semester hours from the NU Core arts/humanities level 1 domain, as described on page 26.

Social Science Level 1
Complete 4 semester hours from the NU Core social science level 1 domain, as described on page 26.
GENERAL ELECTIVES
Complete five 4-SH-equivalent academic, nonremedial, nonrepetitive courses.

RESIDENCY REQUIREMENT
32 of the final 40 semester hours must be taken at Northeastern University.

MAJOR GPA REQUIREMENT
2.000 minimum GPA required in EECE courses

NU CORE REQUIREMENTS
See page 26 for requirement list.

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

COOPERATIVE EDUCATION

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

Minor in Electrical Engineering
A minor in electrical engineering is open to all students in the University with the prerequisite calculus and physics background. The minor is designed for students who would like a coherent background in the theory and laboratory practice of electrical engineering, particularly for majors in math, science, computer engineering, or other engineering departments. The completion of a minor in electrical engineering will be recognized by a notation on the student’s transcript.

Minor in Electrical Engineering
Students must file a petition with the coordinator of undergraduate services in 404 Dana to declare the minor prior to taking any course work. A minimum of 20 semester hours of EECE courses is required with a minimum GPA of 2.000.

CORE COURSE
Complete one of the following courses with corresponding lab:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 2210</td>
<td>Electrical Engineering</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2211</td>
<td>Lab for EECE 2210</td>
<td>1</td>
</tr>
<tr>
<td>EECE 2410</td>
<td>Circuits</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2411</td>
<td>Introduction to Electrical and Computer Engineering Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

ELECTIVE CORE COURSES
Complete two of the following courses with corresponding labs:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 2322</td>
<td>Digital Logic Design</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2323</td>
<td>Lab for EECE 2322</td>
<td>1</td>
</tr>
<tr>
<td>EECE 2412</td>
<td>Electronics 1</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2413</td>
<td>Lab for EECE 2412</td>
<td>1</td>
</tr>
<tr>
<td>EECE 3440</td>
<td>Electromagnetic Fields and Waves</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 3441</td>
<td>Lab for EECE 3440</td>
<td>1</td>
</tr>
</tbody>
</table>

ELECTRICAL ENGINEERING TECHNICAL ELECTIVES
Complete 5 semester hours of electrical engineering technical electives from the following list:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 3392</td>
<td>Electronic Materials</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3410</td>
<td>Electronics 2</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3440</td>
<td>Electromagnetic Fields and Waves</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 3441</td>
<td>Lab for EECE 3440</td>
<td>1</td>
</tr>
<tr>
<td>EECE 3464</td>
<td>Linear Systems</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3468</td>
<td>Noise and Stochastic Processes</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4524</td>
<td>VLSI Design</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 4525</td>
<td>Lab for EECE 4524</td>
<td>1</td>
</tr>
<tr>
<td>EECE 4572</td>
<td>Communications Systems</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4574</td>
<td>Wireless Communication Circuits</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4576</td>
<td>Wireless Personal Communications</td>
<td>4</td>
</tr>
</tbody>
</table>

GPA REQUIREMENT
2.000 GPA required in the minor

Computer Engineering

The use of computer technology is exploding, driven by applications in wireless communications, multimedia, portable devices, and Internet computing. At the core of these technological advances are computer engineers who research, design, and develop hardware and software. With a degree in computer engineering you might develop a full-featured multimedia phone, design the next-generation microprocessor, program computer-guided cameras to inspect nanomanufacturing facilities, or start your own software company.

The computer engineering major acquires a strong foundation in engineering principles and the physical sciences in addition to a powerful mix of theory and practice in hardware and software design. The core of the computer engineering curriculum comprises courses in computer organization and architecture,
computer networks, computer-aided design, programming languages, optimization theory, and software design.

As specified below, the BSCompE degree requires a sequence of core courses, technical electives, general electives, and electives in the arts and humanities and social sciences.

**BSCompE—Bachelor of Science in Computer Engineering**

**ENGINEERING CATEGORICAL REQUIREMENT**
Students must complete a minimum of semester hours in the categories of math/science and engineering topics. Completing all courses in the prescribed curriculum satisfies these requirements without any additional consideration. However, any student with transfer credit or course substitutions must meet with an academic advisor to plan appropriate course work to assure that these requirements are fully satisfied.

**MATHEMATICS/SCIENCE REQUIREMENT**
Complete 37 semester hours in mathematics and science as indicated below.

**Required Mathematics/Science**
Complete each of the following courses with corresponding labs, as indicated:

- CHEM 1151 General Chemistry for Engineers 4 SH
- MATH 1341 Calculus 1 for Science and Engineering 4 SH
- MATH 1342 Calculus 2 for Science and Engineering 4 SH
- MATH 2310 Discrete Mathematics 4 SH
- MATH 2341 Differential Equations and Linear Algebra for Engineering 4 SH
- MATH 3081 Probability and Statistics 4 SH
- PHYS 1151 Physics for Engineering 1 4 SH
  with PHYS 1152 Lab for PHYS 1151 1 SH
- PHYS 1155 Physics for Engineering 2 4 SH
  with PHYS 1156 Lab for PHYS 1155 1 SH

**Further Credit**
2 semester hours from the following lecture/lab combination count toward the mathematics/science requirement:

- CS 1500 Algorithms and Data Structures for Engineering 4 SH
  with CS 1501 Lab for CS 1500 1 SH

1 semester hour from the following course counts toward the mathematics/science requirement:

- GE 1111 Engineering Problem Solving and Computation 4 SH

**ENGINEERING REQUIREMENT**
Complete 57 semester hours in engineering as indicated below.

**Required Engineering**
Complete each of the following courses with corresponding labs, as indicated:

- EECE 2322 Digital Logic Design 4 SH
  with EECE 2323 Lab for EECE 2322 1 SH
- EECE 2410 Circuits 4 SH
  with EECE 2411 Introduction to Electrical and Computer Engineering Laboratory 1 SH
- EECE 2412 Electronics 1 4 SH
  with EECE 2413 Lab for EECE 2412 1 SH
- EECE 3324 Computer Architecture and Organization 4 SH
- EECE 3326 Optimization Methods 4 SH
- EECE 4628 Computer and Telecommunication Networks 4 SH
  with EECE 4629 Internetworking Design Lab 1 SH
- EECE 4790 Electrical and Computer Engineering Capstone 1 4 SH
- EECE 4792 Electrical and Computer Engineering Capstone 2 4 SH

**Electrical and Computer Engineering Technical Electives**
Complete 16 semester hours from the following list. Only one course may be in CS:

- EECE 3392 Electronic Materials 4 SH
- EECE 3410 to EECE 3468 4 SH
- EECE 4512 to EECE 4626 4 SH
- EECE 4630 to EECE 4698 4 SH
- EECE 5150 to EECE 5686 4 SH

**Further Credit**
3 semester hours from the following course count toward the engineering requirement:

- GE 1110 Engineering Design 4 SH

2 semester hours from the following course count toward the engineering requirement:

- GE 1111 Engineering Problem Solving and Computation 4 SH

**PROFESSIONAL DEVELOPMENT REQUIREMENT**
Complete 8 semester hours in professional development as indicated below.

**Professional Development**
Complete the following three courses:

- GE 1000 Introduction to the Study of Engineering 1 SH
- EECE 2000 Introduction to Engineering Co-op Education 1 SH
- EECE 3000 Professional Issues in Engineering 1 SH
Further Credit
3 semester hours from the following lecture/lab combination count toward the professional development requirement:
CS 1500 Algorithms and Data Structures for Engineering 4 SH
with CS 1501 Lab for CS 1500 1 SH
1 semester hour from each of the following courses counts toward the professional development requirement:
GE 1110 Engineering Design 4 SH
GE 1111 Engineering Problem Solving and Computation 4 SH

ADDITIONAL NU CORE COURSES
Complete 16 semester hours in NU Core course work as indicated below.

Writing
Complete the following two courses with a grade of C or higher in each course:
ENGL 1111 College Writing 4 SH
ENGL 3302 Advanced Writing in the Technical Professions 4 SH

Arts/Humanities Level 1
Complete 4 semester hours from the NU Core arts/humanities level 1 domain, as described on page 26.

Social Science Level 1
Complete 4 semester hours from the NU Core social science level 1 domain, as described on page 26.

GENERAL ELECTIVES
Complete five 4-SH-equivalent academic, nonremedial, nonrepetitive courses.

RESIDENCY REQUIREMENT
32 of the final 40 semester hours must be taken at Northeastern University.

MAJOR GPA REQUIREMENT
2.000 minimum GPA required in EECE courses

NU CORE REQUIREMENTS
See page 26 for requirement list.

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

COORDERATIVE EDUCATION

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

Minor in Computer Engineering
The minor in computer engineering is open to all students in the University. The minor is designed for students who would like a coherent background in the theory and laboratory practice of computer engineering. The completion of a minor in computer engineering will be recognized by a notation on the student’s transcript.

Minor in Computer Engineering
Students must file a petition with the coordinator of undergraduate services in 404 Dana to declare the minor prior to taking any course work. A minimum of 18 semester hours is required with a minimum GPA of 2.000.

CORE COURSE
Complete the following course with corresponding lab:
CS 1500 Algorithms and Data Structures for Engineering 4 SH
with CS 1501 Lab for CS 1500 1 SH
Computer science majors may substitute the following course with corresponding lab:
CS 2500 Fundamentals of Computer Science 1 4 SH
with CS 2501 Lab for CS 2500 1 SH

MAJOR CORE COURSES
Complete the following two courses with corresponding lab, as indicated:
EECE 2322 Digital Logic Design 4 SH
with EECE 2323 Lab for EECE 2322 1 SH
EECE 3324 Computer Architecture and Organization 4 SH
Computer science majors may substitute the following two courses for EECE 3324:
CS 2600 Computer Organization 4 SH
EECE 3230 Computer Architecture for Computer Scientists 4 SH

COMPUTER ENGINEERING TECHNICAL ELECTIVES
Complete 4 semester hours from the following list (computer science majors should complete 8 semester hours):
EECE 3326 Optimization Methods 4 SH
EECE 4520 Software Engineering 1 4 SH
EECE 4522 Software Engineering 2 4 SH
EECE 4524 VLSI Design 4 SH
with EECE 4525 Lab for EECE 4524 1 SH
EECE 4526 High-Speed Digital Design 4 SH
EECE 4528 CAD for Design and Test 4 SH
EECE 4530 Hardware Description Languages and Synthesis 4 SH
EECE 4534 Microprocessor-Based Design 4 SH
with EECE 4535 Lab for EECE 4534 1 SH
EECE 4622 Parallel and Distributed Processing 4 SH
EECE 4626 Image Processing and Pattern Recognition 4 SH
Minor in Biomedical Engineering

Medical imaging and biomedical electronics are important areas of biomedical engineering that are within the province of electrical engineering. The minor in biomedical engineering is open to all students in the University with the prerequisite calculus and physics background. The minor is particularly designed for majors in electrical or computer engineering, biology, health science fields, or other engineering departments who would like a background in relevant aspects of biology and electrical engineering, with the opportunity to complete an interdisciplinary biomedical engineering (capstone) design project. Course work in anatomy and physiology and other health science topics is combined with technical engineering courses related to biomedical imaging and instrumentation. Specific curriculum information about the biomedical engineering minor may be obtained from the Department of Electrical and Computer Engineering office, 411 Dana Research Center, from the department Web site, or by calling 617.373.2165.

Minor in Biomedical Engineering

Students must file a petition with the coordinator of undergraduate services in 404 Dana to declare the minor prior to taking any course work. A minimum of 26 semester hours is required with a minimum GPA of 2.000.

REQUIRED CORE COURSES

Complete the following three courses with corresponding lab, as indicated:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 1117</td>
<td>Integrated Anatomy and Physiology 1</td>
<td>4</td>
</tr>
<tr>
<td>with BIOL 1118</td>
<td>Lab for BIOL 1117</td>
<td>1</td>
</tr>
<tr>
<td>EECE 2411</td>
<td>Introduction to Electrical and Computer Engineering Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EECE 4512</td>
<td>Biomedical Electronics</td>
<td>4</td>
</tr>
<tr>
<td>or EECE 4664</td>
<td>Biomedical Signal Processing and Medical Imaging</td>
<td>4</td>
</tr>
</tbody>
</table>

REQUIRED CAPSTONE-DESIGN COURSES

Complete two courses on a biologically oriented project:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 4790</td>
<td>Electrical and Computer Engineering Capstone 1</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4792</td>
<td>Electrical and Computer Engineering Capstone 2</td>
<td>4</td>
</tr>
</tbody>
</table>

ELECTIVE COURSES

Complete eight semester hours with courses from the following list:

<table>
<thead>
<tr>
<th>Department</th>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering</td>
<td>EECE 2210</td>
<td>Electrical Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Biology</td>
<td>BIOL 1119</td>
<td>Integrated Anatomy and Physiology 2</td>
<td>4</td>
</tr>
<tr>
<td>with BIOL 1120</td>
<td>Lab for BIOL 1119</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIOL 2319</td>
<td>Regulatory Cell Biology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>with BIOL 2320</td>
<td>Lab for BIOL 2319</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIOL 2321</td>
<td>Microbiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>with BIOL 2322</td>
<td>Lab for BIOL 2321</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIOL 3405</td>
<td>Neurobiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BIOL 5551</td>
<td>Principles of Animal Physiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>with BIOL 5552</td>
<td>Lab for BIOL 5551</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIOL 5573</td>
<td>Medical Microbiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>with BIOL 5574</td>
<td>Lab for BIOL 5573</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIOL 5587</td>
<td>Comparative Neurobiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>PHYS 4621</td>
<td>Biological Physics 1</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 4623</td>
<td>Medical Physics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PHYS 4651</td>
<td>Medical Physics Seminar 1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td>PSYC 3452</td>
<td>Sensation and Perception</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 3458</td>
<td>Psychobiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Cardiopulmonary and Exercise Sciences</td>
<td>EXSC 4500</td>
<td>Exercise Physiology 1</td>
<td>4</td>
</tr>
<tr>
<td>with EXSC 4501</td>
<td>Lab for EXSC 4500</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EXSC 4504</td>
<td>Clinical Kinesiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>with EXSC 4505</td>
<td>Lab for EXSC 4504</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>PT 5138</td>
<td>Neuroscience</td>
<td>4</td>
</tr>
<tr>
<td>with PT 5139</td>
<td>Lab for PT 5138</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PT 5170</td>
<td>Motor Control</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Speech-Language Pathology and Audiology</td>
<td>SLPA 1103</td>
<td>Anatomy and Physiology of the Vocal Mechanism</td>
<td>4</td>
</tr>
<tr>
<td>SLPA 1202</td>
<td>Neurological Bases of Communication</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>SLPA 1203</td>
<td>Introduction to Audiology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>SLPA 1205</td>
<td>Speech and Hearing Science</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

GPA REQUIREMENT

2.000 GPA required in the minor
Integrated Dual Major in Electrical and Computer Engineering

Students may choose to major in both electrical and computer engineering by following the integrated dual-major program leading to a Bachelor of Science in Electrical Engineering or Bachelor of Science in Computer Engineering. Students take the required courses for both majors along with technical electives distributed among the areas of computer engineering; fields, waves, and optics; signals and systems; power engineering; and electronic circuits and devices. A general elective and electives in the arts and humanities and social sciences are also required.

BSEE or BSCompE—Bachelor of Science in Electrical/Computer Engineering

ENGINEERING CATEGORICAL REQUIREMENT

Students must complete a minimum of semester hours in the categories of math/science and engineering topics. Completing all courses in the prescribed curriculum satisfies these requirements without any additional consideration. However, any student with transfer credit or course substitutions must meet with an academic advisor to plan appropriate course work to assure that these requirements are fully satisfied.

MATHEMATICS/SCIENCE REQUIREMENT

Complete 39 semester hours in mathematics and science as indicated below.

Required Mathematics/Science

Complete each of the following courses with corresponding labs, as indicated:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1151</td>
<td>General Chemistry for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1341</td>
<td>Calculus 1 for Science and Engineering</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1342</td>
<td>Calculus 2 for Science and Engineering</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2310</td>
<td>Discrete Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2321</td>
<td>Calculus 3 for Science and Engineering</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2341</td>
<td>Differential Equations and Linear Algebra for Engineering</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1151</td>
<td>Physics for Engineering 1</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1152</td>
<td>Lab for PHYS 1151</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 1155</td>
<td>Physics for Engineering 2</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1156</td>
<td>Lab for PHYS 1155</td>
<td>1</td>
</tr>
</tbody>
</table>

Further Credit

2 semester hours from the following course count toward the mathematics/science requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 3468</td>
<td>Noise and Stochastic Processes</td>
<td>4</td>
</tr>
</tbody>
</table>

2 semester hours from the following lecture/lab combination count toward the mathematics/science requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1500</td>
<td>Algorithms and Data Structures for Engineering</td>
<td>4</td>
</tr>
<tr>
<td>CS 1501</td>
<td>Lab for CS 1500</td>
<td>1</td>
</tr>
</tbody>
</table>

1 semester hour from the following course counts toward the mathematics/science requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 1111</td>
<td>Engineering Problem Solving and Computation</td>
<td>4</td>
</tr>
</tbody>
</table>

ENGINEERING REQUIREMENT

Complete 76 semester hours in engineering as indicated below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 2322</td>
<td>Digital Logic Design</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2323</td>
<td>Lab for EECE 2322</td>
<td>1</td>
</tr>
<tr>
<td>EECE 2410</td>
<td>Circuits</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2411</td>
<td>Introduction to Electrical and Computer Engineering Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EECE 2412</td>
<td>Electronics 1</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 2413</td>
<td>Lab for EECE 2412</td>
<td>1</td>
</tr>
<tr>
<td>EECE 3324</td>
<td>Computer Architecture and Organization</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3326</td>
<td>Optimization Methods</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3410</td>
<td>Electrons 2</td>
<td>4</td>
</tr>
<tr>
<td>EECE 3440</td>
<td>Electromagnetic Fields and Waves</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 3441</td>
<td>Lab for EECE 3440</td>
<td>1</td>
</tr>
<tr>
<td>EECE 3464</td>
<td>Linear Systems</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4572</td>
<td>Communications Systems</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4628</td>
<td>Computer and Telecommunication Networks</td>
<td>4</td>
</tr>
<tr>
<td>with EECE 4629</td>
<td>Internetworking Design Lab</td>
<td>1</td>
</tr>
<tr>
<td>EECE 4790</td>
<td>Electrical and Computer Engineering Capstone 1</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4792</td>
<td>Electrical and Computer Engineering Capstone 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Electrical and Computer Engineering Technical Electives

Complete 16 semester hours from the following list:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 3392</td>
<td>Electronic Materials</td>
<td>4</td>
</tr>
<tr>
<td>EECE 4512 to EECE 4535</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EECE 4574 to EECE 4626</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EECE 4630 to EECE 4698</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EECE 5150 to EECE 5686</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 3200</td>
<td>Database Design</td>
<td>4</td>
</tr>
<tr>
<td>CS 3500</td>
<td>Object-Oriented Design</td>
<td>4</td>
</tr>
<tr>
<td>CS 3600</td>
<td>Systems and Networks</td>
<td>4</td>
</tr>
<tr>
<td>CS 3800</td>
<td>Theory of Computation</td>
<td>4</td>
</tr>
<tr>
<td>CS 4100</td>
<td>Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>CS 4300</td>
<td>Computer Graphics</td>
<td>4</td>
</tr>
<tr>
<td>CS 4400</td>
<td>Programming Languages</td>
<td>4</td>
</tr>
<tr>
<td>CS 4410</td>
<td>Compilers</td>
<td>4</td>
</tr>
<tr>
<td>CS 4550</td>
<td>Web Development</td>
<td>4</td>
</tr>
<tr>
<td>CS 4600</td>
<td>Topics in Operating Systems</td>
<td>4</td>
</tr>
<tr>
<td>CS 4740</td>
<td>Network Security</td>
<td>4</td>
</tr>
</tbody>
</table>

Further Credit

3 semester hours from the following course count toward the engineering requirement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 1110</td>
<td>Engineering Design</td>
<td>4</td>
</tr>
</tbody>
</table>
2 semester hours from each of the following courses count toward the engineering requirement:

EECE 3468 Noise and Stochastic Processes 4 SH
GE 1111 Engineering Problem Solving and Computation

PROFESSIONAL DEVELOPMENT REQUIREMENT
Complete 8 semester hours in professional development as indicated below.

Professional Development
Complete the following three courses:

GE 1000 Introduction to the Study of Engineering 1 SH
EECE 2000 Introduction to Engineering Co-op Education 1 SH
EECE 3000 Professional Issues in Engineering 1 SH

Further Credit
3 semester hours from the following lecture/lab combination count toward the professional development requirement:

CS 1500 Algorithms and Data Structures for Engineering 4 SH
with CS 1501 Lab for CS 1500 1 SH
1 semester hour from each of the following courses counts toward the professional development requirement:

GE 1110 Engineering Design 4 SH
GE 1111 Engineering Problem Solving and Computation

ADDITIONAL NU CORE COURSES
Complete 16 semester hours in NU Core course work as indicated below.

Writing
Complete the following two courses with a grade of C or higher in each course:

ENGL 1111 College Writing 4 SH
ENGL 3302 Advanced Writing in the Technical Professions 4 SH

Arts/Humanities Level 1
Complete 4 semester hours from the NU Core arts/humanities level 1 domain, as described on page 26.

Social Science Level 1
Complete 4 semester hours from the NU Core social science level 1 domain, as described on page 26.

RESIDENCY REQUIREMENT
32 of the final 40 semester hours must be taken at Northeastern University.

MAJOR GPA REQUIREMENT
2.000 minimum GPA required in EECE courses

NU CORE REQUIREMENTS
See page 26 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

Integrated Dual Major in Electrical Engineering and Physics
This intercollege dual major serves students who would like to explore their interest in physics while earning the benefit of an accredited Bachelor of Science degree in engineering. The dual major combines a major in physics from the Department of Physics in the College of Arts and Sciences with the Bachelor of Science in Electrical Engineering degree from the Department of Electrical and Computer Engineering.

Because of the large body of shared knowledge between electrical engineering and physics, an integrated dual major between these two disciplines is a logical course of study and can be accomplished within a student’s usual five-year program (including three co-op placements) without requiring course overloading in any semester. A student graduating from this program will have studied both the physical fundamentals and the applications of electronic devices and systems. The program is a particularly appropriate course of study for students who wish to pursue a career in solid-state devices, microelectromechanical systems, or nanotechnology.

Students interested in this program should contact the electrical and computer engineering department or the physics department as early as possible, preferably prior to registering for freshman courses.

BSEE in Electrical Engineering and Physics

ENGINEERING CATEGORICAL REQUIREMENT
Students must complete a minimum of semester hours in the categories of math/science and engineering topics. Completing all courses in the prescribed curriculum satisfies these requirements without any additional consideration. However, any student with transfer credit or course substitutions must meet with an academic advisor to plan appropriate course work to assure that these requirements are fully satisfied.

ELECTRICAL ENGINEERING AND PHYSICS GENERAL EDUCATION

Mathematics and Science
CALCULUS 1 AND 2 FOR SCIENCE/ENGINEERING
Complete the following two courses:

MATH 1341 Calculus 1 for Science and Engineering 4 SH
MATH 1342 Calculus 2 for Science and Engineering 4 SH
PHYSICS 1 AND 2
Complete the following two courses with corresponding labs:

- PHYS 1161 Physics 1 4 SH
  with PHYS 1162 Lab for PHYS 1161 1 SH
- or PHYS 1151 Physics for Engineering 1 4 SH
  with PHYS 1152 Lab for PHYS 1151 1 SH

- PHYS 1165 Physics 2 4 SH
  with PHYS 1166 Lab for PHYS 1165 1 SH
- or PHYS 1155 Physics for Engineering 2 4 SH
  with PHYS 1156 Lab for PHYS 1155 1 SH

CHEMISTRY
Complete the following course:

- CHEM 1151 General Chemistry for Engineers 4 SH

DIFFERENTIAL EQUATIONS/LINEAR ALGEBRA
Complete the following course:

- MATH 2341 Differential Equations and Linear Algebra for Engineering 4 SH
  or complete the following set of courses:
- MATH 2351 Ordinary Differential Equations 4 SH
- and MATH 2331 Linear Algebra 4 SH

CALCULUS 3 FOR SCIENCE/ENGINEERING
Complete the following course:

- MATH 2321 Calculus 3 for Science and Engineering 4 SH

ALGORITHMS AND DATA STRUCTURES
Complete the following course with corresponding lab:

- CS 1500 Algorithms and Data Structures for Engineering 4 SH
  with CS 1501 Lab for CS 1500 1 SH

Arts/Humanities Level 1
Complete one course in the NU Core arts/humanities level 1 domain, as described on page 26.

Social Science Level 1
Complete one course in the NU Core social science level 1 domain, as described on page 26.

GENERAL ELECTIVE
Complete one 4-SH-equivalent academic, nonremedial, nonrepetitive course.

ELECTRICAL ENGINEERING MAJOR REQUIREMENTS

First-Year Engineering
Complete the following two courses:

- GE 1110 Engineering Design 4 SH
- GE 1111 Engineering Problem Solving and Computation 4 SH

General Engineering
Complete the following three courses:

- GE 1000 Introduction to the Study of Engineering 1 SH

- EECE 2000 Introduction to Engineering Co-op 1 SH
- or EECE 3000 Professional Issues in Engineering 1 SH

Electrical Engineering Lab
Complete the following course:

- EECE 2401 Introduction to Electrical and Computer Engineering Lab 1 SH

Linear Circuits
Complete the following course:

- EECE 2400 Linear Circuits 4 SH

Electronics
Complete the following course with corresponding lab:

- EECE 2402 Electronics 4 SH
  with EECE 2403 Lab for EECE 2402 1 SH

Digital Logic Design
Complete the following course with corresponding lab:

- EECE 2322 Digital Logic Design 4 SH
  with EECE 2323 Lab for EECE 2322 1 SH

Linear Systems
Complete the following course:

- EECE 3464 Linear Systems 4 SH

Electromagnetic Fields and Waves
Complete the following course with corresponding lab:

- EECE 3440 Electromagnetic Fields and Waves 4 SH
  with EECE 3441 Lab for EECE 3440 1 SH

Noise and Stochastic Processes
Complete the following course:

- EECE 3468 Noise and Stochastic Processes 4 SH

Communications Systems
Complete the following course:

- EECE 4572 Communications Systems 4 SH

Electrical Engineering Technical Electives
Complete two 4-SH-equivalent courses in the following range:

- EECE 2001 to EECE 5999

Capstone Design
Complete the following two courses:

- EECE 4790 Electrical and Computer Engineering Capstone 1 4 SH
- EECE 4792 Electrical and Computer Engineering Capstone 2 4 SH

PHYSICS MAJOR REQUIREMENTS

Required Physics
Complete the following five courses:

- PHYS 2303 Modern Physics 4 SH
- PHYS 2305 Thermodynamics and Statistical Mechanics 4 SH
- PHYS 3600 Advanced Physics Laboratory 1 4 SH
- PHYS 3602 Electricity and Magnetism 4 SH
- PHYS 5115 Quantum Mechanics 4 SH
Advanced Physics Elective
Complete one PHYS course in the following range:
PHYS 3600 to PHYS 4999

MAJOR GPA REQUIREMENT
2.000 minimum GPA required in EECE courses

NU CORE REQUIREMENTS
See page 26 for requirement list.

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

COOPERATIVE EDUCATION

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

BS/MS in Applied Physics and Engineering
See page 196.