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). A combined 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 program educational objectives of the Bachelor of Science programs are that graduates should (1) obtain successful careers in electrical and computer engineering and related disciplines through substantial technical contributions, continued employment, professional recognition, advancement in responsibilities, a professional network, and personal satisfaction; and (2) pursue advanced study such as graduate study in engineering or related disciplines, if desired.

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, very large-scale integration (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, healthcare, 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**

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified.

**NU CORE REQUIREMENTS**

See page Error! Bookmark not defined. for requirement list.

**MAJOR GPA REQUIREMENT**

Minimum 2.000 GPA required in EECE courses.
MATHEMATICS/SCIENCE REQUIREMENT
Complete 33 semester hours in mathematics and science as indicated below:

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 3 SH
PHYS 1152 Lab for PHYS 1151 1 SH
PHYS 1153 Interactive Learning Seminar for PHYS 1151 1 SH
PHYS 1155 Physics for Engineering 2 3 SH
PHYS 1156 Lab for PHYS 1155 1 SH
PHYS 1157 Interactive Learning Seminar for PHYS 1155 1 SH

Supplemental Credit
Partial credit from the following courses counts toward the mathematics/science requirement:

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

ENGINEERING
Complete 59 semester hours in engineering as indicated below.

Required Courses
EECE 2150 Circuits and Signals: Biomedical Applications 4 SH
EECE 2160 Embedded Design Enabling Robotics 3 SH
EECE 2161 Lab for EECE 2160 1 SH

Electrical Engineering Fundamentals
EECE 2412 Fundamentals of Electronics 4 SH
EECE 2413 Lab for EECE 2412 1 SH
EECE 2520 Fundamentals of Linear Systems 4 SH
EECE 2530 Fundamentals of Electromagnetics 4 SH
EECE 2531 Lab for EECE 2530 1 SH

Computer Engineering Fundamental
Complete one of the following courses. If more than one computer engineering fundamentals course is taken, it can count as a technical elective:

EECE 2322 Fundamentals of Digital Design and Computer Organization 4 SH
EECE 2323 Lab for EECE 2322 1 SH
EECE 2540 Fundamentals of Networks 4 SH
EECE 2560 Fundamentals of Engineering Algorithms 4 SH

Capstone Courses
EECE 4790 Electrical and Computer Engineering 4 SH
EECE 4792 Electrical and Computer Engineering 4 SH

Electrical Engineering Technical Electives
Complete 16 semester hours from the following list:
EECE 2322 Fundamentals of Digital Design and Computer Organization 4 SH
EECE 2323 Lab for EECE 2322 1 SH
EECE 2540 Fundamentals of Networks 4 SH
EECE 2560 Fundamentals of Engineering Algorithms 4 SH
EECE 3324 to EECE 3392
EECE 4512 to EECE 4534
EECE 4574 to EECE 4698
EECE 4993 Independent Study 4 SH
EECE 5576 to EECE 5698
ENGR 4608 Nanotechnology in Engineering 4 SH
ENGR 5670 Sustainable Energy: Materials, Conversion, Storage, and Usage 4 SH

Supplemental Credit
Partial credit from the following courses counts toward the engineering requirement:

EECE 3468 Noise and Stochastic Processes 4 SH
GE 1110 Engineering Design 4 SH
GE 1111 Engineering Problem Solving and Computation 4 SH

PROFESSIONAL DEVELOPMENT

Professional Development
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

Additional Required Courses
Partial credit for the following courses counts toward requirements above:
GE 1110 Engineering Design 4 SH
GE 1111 Engineering Problem Solving and Computation 4 SH
EECE 3468 Noise and Stochastic Processes 4 SH

ADDITIONAL NU CORE COURSES

Writing
A grade of C or higher is required:
ENGW 1111 First-Year Writing 4 SH
ENGW 3302 Advanced Writing in the Technical Professions 4 SH
or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines 4 SH
Arts/Humanities Level 1
Complete one course from the NU Core arts/humanities level 1 domain, as described on page Error! Bookmark not defined.

Social Science Level 1
Complete one course from the NU Core social science level 1 domain, as described on page Error! Bookmark not defined.

REQUIRED GENERAL ELECTIVES
Complete five academic, nonremedial, nonrepetitive courses, each equivalent to 4 semester hours.

COURSE WORK THAT DOES NOT COUNT TOWARD THE ENGINEERING DEGREE
Students in engineering are allowed to count a maximum of two pass/fail courses toward their degree program. Only general electives outside the College of Engineering may be taken on a pass/fail grading basis. A maximum of one pass/fail course is allowed per semester.

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

COOPERATIVE EDUCATION

RESIDENCY REQUIREMENT
Students must earn a minimum of 64 Northeastern University semester hours in order to receive a bachelor’s degree.

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

Electrical Engineering Minor
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
Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified.

Note: 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 GPA of 2.000 is required. This minor is not open to students in the Department of Electrical and Computer Engineering because of overlap with the majors.

CORE COURSE
Complete one of the following courses:
EECE 2150 Circuits and Signals: Biomedical Applications 4 SH
with EECE 2151 Lab for EECE 2150 1 SH
EECE 2210 Electrical Engineering 4 SH
with EECE 2211 Lab for EECE 2210 1 SH

FUNDAMENTAL CORE COURSES
Complete two of the following courses:
EECE 2412 Fundamentals of Electronics 4 SH
with EECE 2413 Lab for EECE 2412 1 SH
EECE 2530 Fundamentals of Electromagnetics 4 SH
with EECE 2531 Lab for EECE 2530 1 SH
EECE 2520 Fundamentals of Linear Systems 4 SH

ELECTRICAL ENGINEERING TECHNICAL ELECTIVES
Complete one course from the following lists:

Circuits/Devices
EECE 4524 VLSI Design 4 SH
EECE 4574 Wireless Communication Circuits 4 SH
EECE 5606 Micro- and Nanofabrication 4 SH
EECE 5576 Wireless Communication Systems 4 SH
EECE 5684 Power Electronics 4 SH

Waves/Optics
EECE 4642 Antennas 4 SH
EECE 4644 Microwave Circuits and Networks 4 SH
EECE 4646 Optics for Engineers 4 SH
EECE 4692 Subsurface Sensing and Imaging 4 SH
EECE 5680 Electric Drives 4 SH
EECE 5682 Power Systems Analysis 1 4 SH
EECE 5686 Electrical Machines 4 SH

Signals/Systems
EECE 3468 Noise and Stochastic Processes 4 SH
EECE 4572 Communications Systems 4 SH
EECE 4574 Wireless Communication Circuits 4 SH
EECE 5576 Wireless Communication Systems 4 SH
EECE 5580 Classical Control Systems 4 SH
EECE 5666 Digital Signal Processing 4 SH

GPA REQUIREMENT
2.000 GPA required in the minor