ELECTRICAL AND COMPUTER ENGINEERING

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SHEILA S. HEMAMI, PhD
Professor and Chair

CHARLES DI MARZIO, PhD
Associate Professor and Associate Chair

409 Dana Research Center
617.373.4159
617.373.4431 (fax)

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.

Combined Major in Electrical Engineering and Physics

This intercollege combined 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 major combines a major in physics from the Department of Physics in the College of Science 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, a combined 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 Department of Electrical and Computer Engineering or the Department of Physics as early as possible, preferably prior to registering for freshman courses.

BSEE in Electrical Engineering and Physics

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
2.000 minimum GPA required in EECE courses

MATHEMATICS/SCIENCE REQUIREMENT
Complete 57 semester hours in mathematics and science as indicated below.
 Required Mathematics/Science
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
with PHYS 1152 Lab for PHYS 1151 1 SH
with PHYS 1153 Interactive Learning Seminar for PHYS 1151 1 SH
or PHYS 1161 Physics 1 4 SH
with PHYS 1162 Lab for PHYS 1161 1 SH
PHYS 1155 Physics for Engineering 2 3 SH
with PHYS 1156 Lab for PHYS 1155 1 SH
with PHYS 1157 Interactive Learning Seminar for PHYS 1155 1 SH
or PHYS 1165 Physics 2 4 SH
with PHYS 1166 Lab for PHYS 1165 1 SH
PHYS 2303 Modern Physics 4 SH
PHYS 2305 Thermodynamics and Statistical Mechanics 4 SH
PHYS 3600 Advanced Physics Laboratory 4 SH
PHYS 3602 Electricity and Magnetism 4 SH
PHYS 5115 Quantum Mechanics 4 SH
Advanced Physics Elective
Complete one of the following courses:
MATH 4606 Mathematical and Computational Methods for Physics 4 SH
PHYS 3600 to PHYS 7999
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 REQUIREMENT
Complete 51 semester hours in engineering as indicated below.
Required Courses
EECE 2150 Circuits and Signals: Biomedical Applications 4 SH
with EECE 2151 Lab for EECE 2150 1 SH
EECE 2160 Embedded Design Enabling Robotics 3 SH
with EECE 2161 Lab for EECE 2160 1 SH
Electrical Engineering Fundamentals
EECE 2412 Fundamentals of Electronics 4 SH
with EECE 2413 Lab for EECE 2412 1 SH
EECE 2520 Fundamentals of Linear Systems 4 SH
EECE 2530 Fundamentals of Electromagnetics 4 SH
with EECE 2531 Lab for EECE 2530 1 SH
Computer Engineering Fundamentals
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
with 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 Capstone 1 4 SH
EECE 4792 Electrical and Computer Engineering Capstone 2 4 SH
EECE Technical Electives
Complete two of the following courses:
EECE 2322 Fundamentals of Digital Design and Computer Organization 4 SH
with 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
Required 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 one academic, nonremedial, nonrepetitive course, 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