CIVIL AND ENVIRONMENTAL ENGINEERING

www.civ.neu.edu

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Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. They also plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; and design and build systems for water distribution, wastewater treatment, waste disposal, and environmental remediation.

The civil engineering program at Northeastern University seeks to prepare students to contribute to society as civil engineers and in other professions that benefit from a technical education. Our goal is to graduate students who will be technically competent, creative, critical thinkers, and skilled as communicators. Their educational background qualifies them to seek licensure as professional engineers and/or to pursue graduate study in civil engineering. They have an opportunity to obtain a broad knowledge base in science, engineering, and general studies that allows them flexibility in career development and graduate education. At the same time, our graduates should be responsible and scientifically educated citizens, prepared to contribute personally as well as professionally to an educated, democratic society.

By participating in our cooperative education program, our graduates will have an opportunity to explore what career objectives fit their own skills and interests. The goal of this program is to offer students valuable professional experience and contacts that will help get them started in their professional career, as well as the development of career management skills.

The program educational objectives are as follows. The civil engineering program at Northeastern University prepares graduates to contribute to society as civil engineers and in other professions that benefit from a technical education. Within a few years of graduation, many of our graduates will be working in responsible engineering positions that will qualify them to take the PE exam, and they will be prepared to successfully pursue advanced study in civil engineering and other fields.

The civil engineering program is designed to provide students with a broad education appropriate for a variety of career choices and lifelong learning. Experience tells us that civil engineering graduates will enter almost every field imaginable. The knowledge and skills acquired—understanding science, critical thinking, effective communication, and understanding the social context, among them—form an excellent foundation for a host of careers, as well as for a fulfilling life outside the world of work. The civil engineering program has been designed with five general electives that permit students to explore or acquire further depth in other fields of interest. Students can use these electives to earn a minor in business, architectural history, music, computer science, or any number of other fields.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior-level co-op assignments, students are often working alongside engineers on design teams.

BSCE—Bachelor of Science in Civil 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
2.000 minimum required in CIVE courses

MATHEMATICS/SCIENCE REQUIREMENT
Complete 34 semester hours in mathematics and science as indicated below.

Required Mathematics/Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 1151</td>
<td>General Chemistry for Engineers</td>
<td>4 SH</td>
</tr>
<tr>
<td>or CHEM 1211</td>
<td>General Chemistry 1</td>
<td>4 SH</td>
</tr>
<tr>
<td>or CHEM 1214</td>
<td>General Chemistry 2</td>
<td>4 SH</td>
</tr>
<tr>
<td>MATH 1341</td>
<td>Calculus 1 for Science and Engineering</td>
<td>4 SH</td>
</tr>
<tr>
<td>MATH 1342</td>
<td>Calculus 2 for Science and Engineering</td>
<td>4 SH</td>
</tr>
<tr>
<td>MATH 2321</td>
<td>Calculus 3 for Science and Engineering</td>
<td>4 SH</td>
</tr>
<tr>
<td>MATH 2341</td>
<td>Differential Equations and Linear Algebra for Engineering</td>
<td>4 SH</td>
</tr>
<tr>
<td>PHYS 1151</td>
<td>Physics for Engineering 1</td>
<td>3 SH</td>
</tr>
<tr>
<td>with PHYS 1152</td>
<td>Lab for PHYS 1151</td>
<td>1 SH</td>
</tr>
<tr>
<td>with PHYS 1153</td>
<td>Interactive Learning Seminar for PHYS 1151</td>
<td>1 SH</td>
</tr>
<tr>
<td>or PHYS 1161</td>
<td>Physics 1</td>
<td>4 SH</td>
</tr>
<tr>
<td>with PHYS 1162</td>
<td>Lab for PHYS 1161</td>
<td>1 SH</td>
</tr>
<tr>
<td>PHYS 1155</td>
<td>Physics for Engineering 2</td>
<td>3 SH</td>
</tr>
<tr>
<td>with PHYS 1156</td>
<td>Lab for PHYS 1155</td>
<td>1 SH</td>
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<tr>
<td>with PHYS 1157</td>
<td>Interactive Learning Seminar for PHYS 1155</td>
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</tr>
<tr>
<td>or PHYS 1165</td>
<td>Physics 2</td>
<td>4 SH</td>
</tr>
<tr>
<td>with PHYS 1166</td>
<td>Lab for PHYS 1165</td>
<td>1 SH</td>
</tr>
</tbody>
</table>
Complete 11 semester hours from the following list:

Civil Engineering Technical Electives
- CIVE 3425 Probability and Engineering Economy for Civil Engineering 4 SH
- CIVE 3464 Engineering Problem Solving and Computation 4 SH

Required Engineering
- CIVE 2221 Statics and Strength of Materials 4 SH
- CIVE 2260 Civil Engineering Materials 3 SH
- CIVE 2261 Materials and Measurements Lab 2 SH
- CIVE 2320 Structural Analysis 1 4 SH
- CIVE 2324 Reinforced Concrete Design 4 SH
- CIVE 3325 Steel Design 4 SH
- CIVE 3331 Fluid Mechanics 4 SH
- CIVE 3340 Soil Mechanics 4 SH
- CIVE 2341 Lab for CIVE 2340 1 SH

Senior Design Project
- CIVE 4765 Senior Design Project—Environmental 5 SH
- CIVE 4766 Senior Design Project—Geotechnical 5 SH
- CIVE 4767 Senior Design Project—Structural 5 SH
- CIVE 4768 Senior Design Project—Transportation 5 SH

Civil Engineering Project Elective
- CIVE 5536 Hydrologic Engineering 4 SH
- CIVE 4542 Foundation Engineering 4 SH
- CIVE 4554 Highway Engineering 4 SH

Civil Engineering Technical Electives
Complete 11 semester hours from the following list:
- CIVE 3425 Steel Design 4 SH
- CIVE 5522 Structural Analysis 2 4 SH
- CIVE 4534 Environmental Engineering 2 3 SH
- CIVE 4535 Lab for CIVE 4534 1 SH
- CIVE 5536 Hydrologic Engineering 4 SH
- CIVE 4542 Foundation Engineering 4 SH
- CIVE 4554 Highway Engineering 4 SH
- CIVE 4566 Design for Sustainable Transportation: European and U.S. Perspectives 4 SH
- CIVE 4575 Construction Management 3 SH
- CIVE 4990 Elective 4 SH
- CIVE 5321 Geoenvironmental Engineering 4 SH
- CIVE 5373 Transportation Planning and Engineering 4 SH
- CIVE 5376 Traffic Engineering 4 SH
- CIVE 2324 Reinforced Concrete Design 4 SH
- CIVE 5699 Special Topics in Civil Engineering 4 SH

Supplemental Credit
3 semester hours from the following course count toward the engineering requirement:
- GE 1110 Engineering Design 4 SH

PROFESSIONAL DEVELOPMENT
Professional Development
- GE 1000 Introduction to the Study of Engineering 1 SH
- CIVE 2000 Introduction to Engineering Co-op Education 1 SH
- CIVE 3000 Professional Issues in Engineering 1 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

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—Macroeconomics or Microeconomics
Complete one of the following courses, thus satisfying the NU Core social science level 1 domain requirement:
- ECON 1115 Principles of Macroeconomics 4 SH
- ECON 1116 Principles of Microeconomics 4 SH

Science Elective
Complete one of the following courses:
- BIOL 1111 General Biology 1 4 SH
- BIOL 1115 General Biology 1 for Engineers 4 SH
- BIOL 1117 Integrated Anatomy and Physiology 1 4 SH
- BIOL 1121 Basic Microbiology 4 SH
- BIOL 1151 Introduction to Marine Biology 4 SH
- CHEM 2311 Organic Chemistry 1 4 SH
- CHEM 2321 Analytical Chemistry 4 SH
- CHEM 3401 Chemical Thermodynamics and Kinetics 4 SH
- ENVR 1101 Environmental Science 4 SH
- ENVR 1200 Dynamic Earth 4 SH
- ENVR 2310 Earth Materials 4 SH
- ENVR 3400 Field Geology 4 SH
- ENVR 3300 Geographic Information Systems 4 SH
- ENVR 3302 Introduction to Remote Sensing 4 SH
- ENVR 4505 Wetlands 4 SH
- ENVR 5280 Groundwater Modeling 4 SH
ENVR 5282  Groundwater Geochemistry  4 SH
ENVR 5290  Engineering Geology  4 SH
PHYS 2303  Modern Physics  4 SH
PHYS 2305  Thermodynamics and Statistical Mechanics  4 SH
PHYS 3601  Classical Dynamics  4 SH
PHYS 4623  Medical Physics  4 SH
PHYS 5111  Astrophysics and Cosmology  4 SH

**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**
135 total semester hours required
Minimum 2.000 GPA required

**BS/MS in Civil Engineering**
Undergraduate students apply to the PlusOne bachelor’s/master’s program through the graduate school. Once admitted, students may count a maximum of 16 semester hours of graduate credit toward the undergraduate degree. Consult the department for information on this program.