Environmental Geology and Chemistry, BS

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617.373.2822

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The Departments of Marine and Environmental Sciences and Chemistry provide education in basic environmental science and chemistry-related disciplines. The overall objective of this combined major is to provide the fundamental scientific background and practical training for students as they prepare for environmental and chemically related careers or advanced study in fields including the traditional specialties such as toxicology, pollution, bio-remediation, environmental protection, education, law, and other endeavors that may draw upon an understanding of the chemical basis of the environment and the changes that will likely result from global warming.

Key general objectives are the development of qualitative and quantitative problem-solving skills and effective communication skills. Specific learning objectives for this combined major include the development of conceptual understanding and problem-solving abilities in the fundamental dynamics between the environment and its chemistry, be it analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry. Students will perform quantitative measurements; learn proper laboratory practices, including safety; develop proficiency with modern instruments and computers for data acquisition and analysis; and learn the relevance of chemistry within the context of the abiotic and biotic environments.

Most of our combined majors will participate in the cooperative education program and thereby gain invaluable professional experience to augment their classroom and laboratory work. Not only does that experience add immensely to the overall education received, it also has the potential to provide contacts and references for later employment or graduate school admissions. Students in this major may also undertake research projects for at least one semester under the supervision of a faculty member. Sufficient electives are available in the program either to take more advanced courses or research within the department or to add courses in an area of special interest.

Program Requirements
Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

University-Wide Requirements
All undergraduate students are required to complete the University-Wide Requirements (http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements).

Environmental Geology Major Requirements

Earth Foundations
ENVR 1200  Dynamic Earth
and ENVR 1201  and Lab for ENVR 1200  5
ENVR 1202  History of Earth and Life
and ENVR 1203  and Interpreting Earth History  5
ENVR 2310  Earth Materials
and ENVR 2311  and Lab for ENVR 2310  5

Geomorphology
ENVR 2340  Earth Landforms and Processes
and ENVR 2341  and Lab for ENVR 2340  5

Environmental Geology Intermediate/Advanced Electives
Complete two intermediate or advanced electives from ENVR 2300 to ENVR 5999. 8-10

Supporting Courses for Environmental Geology

Mathematics
MATH 1241  Calculus 1  4
MATH 1242  Calculus 2  4

Science Requirement
Complete one of the following options: 10

Biology Option
BIOL 1111  General Biology 1
and BIOL 1112  and Lab for BIOL 1111
BIOL 1113  General Biology 2
and BIOL 1114  and Lab for BIOL 1113

Physics Option
PHYS 1161  Physics 1
and PHYS 1162  and Lab for PHYS 1161
PHYS 1165  Physics 2
and PHYS 1166  and Lab for PHYS 1165

Chemistry Major Requirements

General Chemistry
CHEM 1211  General Chemistry 1
and CHEM 1212  and Lab for CHEM 1211  5
CHEM 1214  General Chemistry 2
and CHEM 1215  and Lab for CHEM 1214  5

Intermediate-Level Chemistry
CHEM 2311  Organic Chemistry 1
and CHEM 2312  and Lab for CHEM 2311  5
CHEM 2313  Organic Chemistry 2
and CHEM 2314  and Lab for CHEM 2313  5
CHEM 2331  Bioanalytical Chemistry
and CHEM 2332  and Lab for CHEM 2331  5
CHEM 3403  Quantum Chemistry and Spectroscopy
and CHEM 3404  and Lab for CHEM 3403  5
CHEM 3431  Physical Chemistry
and CHEM 3432  and Lab for CHEM 3431  5

NUpath Requirements
All undergraduate students are required to complete the NUpath Requirements (http://catalog.northeastern.edu/undergraduate/university-academics/nupath).

Environmental Geology Major Requirements

Earth Foundations
ENVR 1200  Dynamic Earth
and ENVR 1201  and Lab for ENVR 1200  5
ENVR 1202  History of Earth and Life
and ENVR 1203  and Interpreting Earth History  5
ENVR 2310  Earth Materials
and ENVR 2311  and Lab for ENVR 2310  5

Geomorphology
ENVR 2340  Earth Landforms and Processes
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and PHYS 1166  and Lab for PHYS 1165

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and CHEM 2314  and Lab for CHEM 2313  5
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and CHEM 2332  and Lab for CHEM 2331  5
CHEM 3403  Quantum Chemistry and Spectroscopy
and CHEM 3404  and Lab for CHEM 3403  5
CHEM 3431  Physical Chemistry
and CHEM 3432  and Lab for CHEM 3431  5

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and CHEM 2314  and Lab for CHEM 2313  5
CHEM 2331  Bioanalytical Chemistry
and CHEM 2332  and Lab for CHEM 2331  5
CHEM 3403  Quantum Chemistry and Spectroscopy
and CHEM 3404  and Lab for CHEM 3403  5
CHEM 3431  Physical Chemistry
and CHEM 3432  and Lab for CHEM 3431  5
### Advanced-Level Chemistry

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<td>CHEM 3521</td>
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<td>and CHEM 3522</td>
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### Environmental Geology/Chemistry Integrative Requirement

Choose two courses from the following:

- ENVR 3410 Environmental Geochemistry
- ENVR 5190 Soil Science

### Environmental Geology/Chemistry Major Credit Requirement

Complete 94 semester hours in the major.

### Program Requirement

128 total semester hours required.

### Plan of Study

#### Five Years, Three Co-ops in Summer 2/Fall

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<tr>
<th>Year 1</th>
<th>Fall Hours</th>
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<th>Summer 1 Hours</th>
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<td>Physics 1 or Biology 1</td>
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<td>Physics 2 or Biology 2</td>
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<td>Co-op</td>
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<td>5 Elective</td>
<td>4 Co-op</td>
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<tbody>
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<td>GEOL intermediate/advanced undergraduate elective</td>
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<td>CHEM 3403</td>
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<tr>
<td>Elective</td>
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</table>

Total Hours: 136