Environmental Sciences, B.S.

Learning Outcomes

Environmental Sciences Program students will:
• synthesize scientific knowledge and methods across disciplines,
• comprehend and evaluate primary findings in published scientific articles,
• gain experience conducting independent research and/or reviewing scientific areas of interest, and
• effectively communicate scientific findings in written and/or oral form.

Requirements

The Bachelor of Science with a major in environmental sciences requires a minimum of 120 s.h., including 76-79 s.h. of work for the major. Students must maintain a g.p.a. of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences GE CLAS Core; some courses required for the major in environmental sciences may be used to satisfy GE CLAS Core requirements.

Bachelor of Science students majoring in environmental sciences must complete requirements in three areas: the science and mathematics foundation, the environmental sciences foundation, and one of four environmental sciences tracks. During their third year of study, students are assigned a faculty advisor who specializes in their track.

The science and mathematics foundation develops fundamental skills and comprehension in biology, chemistry, geology, mathematics, and statistics. The environmental sciences foundation includes an introductory course in environmental science and additional courses that focus on remote sensing techniques, design and use of geographic information technologies, the geomorphic and environmental processes that shape the earth's surface, and ecological factors that influence the distribution and abundance of organisms.

Each of the program's four tracks focuses on areas of specialization within environmental sciences:
- biosciences (green) track—biological systems and ecological approaches;
- chemical sciences (yellow) track—environmental systems and chemistry;
- geosciences (brown) track—earth materials and surficial geologic processes; and
- hydrosciences (blue) track—hydrogeology and hydrogeologic systems, and water chemistry.

The tracks aim to prepare scientists who can tackle problems that require particular areas of expertise, and to help students develop the skills needed for future employment or graduate study.

The B.S. with a major in environmental sciences requires the following coursework.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1411</td>
<td>Foundations of Biology</td>
<td>4</td>
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<tr>
<td>BIOL:1412</td>
<td>Diversity of Form and Function</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>EES:1050</td>
<td>Introduction to Geology</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1850</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:2021</td>
<td>Fundamentals of Chemical Measurements (must be taken by chemical sciences track students)</td>
<td>3</td>
</tr>
<tr>
<td>STAT:3510/IGPI:3510</td>
<td>Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4200/IGPI:4200</td>
<td>Statistical Methods and Computing</td>
<td>3</td>
</tr>
</tbody>
</table>

Environmental Sciences Foundation

Students must complete 16 s.h. of coursework, as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENVS:1085/EES:1085</td>
<td>Fundamentals of Environmental Science</td>
<td>4</td>
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<tr>
<td>ENVS:2010/EES:2010/GEOG:2010</td>
<td>Interdisciplinary Environmental Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ENVS:2673/BIOL:2673</td>
<td>Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ENVS:3010/EES:3010/GEOG:3003</td>
<td>Interdisciplinary Environmental Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ENVS:3020/EES:3020/GEOG:3020</td>
<td>Earth Surface Processes</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:1050</td>
<td>Foundations of GIS</td>
<td>4</td>
</tr>
</tbody>
</table>

Environmental Sciences Track Courses

Students majoring in environmental sciences must choose one of the following four tracks. Each track includes required general sciences courses, track foundation courses, field study courses, and elective courses.
Environmental Sciences, B.S.

Biosciences (Green) Track

The biosciences track provides the essential skills for entry-level positions that require a good knowledge of biotic systems and the ability to inventory biologic resources. The track’s aim is to produce scientists who are capable of tackling environmental problems in which links and interactions with life sciences are crucial and in which a substantial knowledge of biological/ecological sciences is required. The track also provides a strong foundation for graduate or professional training in disciplines such as ecology, wildlife management, and natural resource management.

Students must complete at least 33 s.h., including one field study course, as follows.

Biosciences Track: Foundation

These three courses:

- BIOL:2512 Fundamental Genetics 4
- BIOL:3172 Evolution 4
- GEOG:2374/BIOL:2374 Biogeography 3

At least 9 s.h. from these:

- ENVS:3100/EES:3100 Introduction to Applied Remote Sensing 3-4
- GEOG:2374/IGPI:2374 Introduction to Environmental Remote Sensing 3
- BIOL:2246 Entomology Lab 4
- BIOL:4373/IGPI:4373 Molecular Evolution: Genes, Genomes, and Organisms 3
- EES:3030/ENVS:3030 Conservation Paleobiology 4
- EES:3070 Marine Ecosystems and Conservation 3
- EES:3220 Evolution of the Vertebrates 3
- GEOG:2950 Environmental Conservation 3
- GEOG:3350 Urban Ecology 3

Iowa Lakeside Laboratory courses (prefix IALL) may be approved in consultation with an environmental sciences advisor.

Biosciences Track: Field Study

At least 3 s.h. from these:

- ENVS:3095 Field Ecology 4
- ENVS:3096 Winter Ecology 2
- ENVS:3097 Introduction to Bird Study 2
- IALL:3034 Topics in Ecology and Sustainability 2
- IALL:3103 Aquatic Ecology 4
- IALL:3109 Ecology and Systematics of Algae 4
- IALL:3117 Ecology and Systematics of Diatoms 4
- IALL:3122 Prairie Ecology 4
- IALL:3126 Ornithology 2

Other Iowa Lakeside Laboratory courses (prefix IALL) may be approved in consultation with an environmental sciences advisor.

Biosciences Track: Electives

Biosciences track students must complete at least 6 s.h. of elective coursework; additional field study and foundation courses may be approved for elective credit:

- ENVS:3230 Special Topics 1-4
- BIOL:1261 Introduction to Botany 4
- BIOL:3244 Animal Behavior 3
- BIOL:3663 Plant Response to the Environment 3
- BIOL:3676 Evolution Lab 4
- BIOL:3994 Introduction to Research (no more than 6 s.h. of research credit may count toward the major) 2-3
- BIOL:4999 Honors Research in Biology (no more than 6 s.h. of research credit may count toward the major) arr.
- CEE:5440 Foundations of Environmental Chemistry and Microbiology 3
- CHEM:2210 Organic Chemistry I 3
- CHEM:3110 Analytical Chemistry I 3
- CHEM:3120 Analytical Chemistry II 3
- EES:2200/ENVS:2200 Historical Geology 4
- EES:3080 Introduction to Oceanography 2
- EES:3110 3
- ENVS:3110 Chemical Evolution of the Oceans 3
- EES:3210 Principles of Paleontology 3
- GEOG:2310/EES:2310 Introduction to Climatology 3
- GEOG:3310 Landscape Ecology 3
- GEOG:3320/EES:3260 Wetlands: Function, Geography, and Management 3
- GEOG:3570 Light Detection and Ranging (LiDAR): Principles and Applications 3
- STAT:6513/PSQF:6243 Intermediate Statistical Methods 4

Biosciences Track: Policy

Biosciences track students must complete one of the following courses:

- BIOL:1260 Plants and Human Affairs 3
- ECON:3625/URP:3135 Environmental and Natural Resource Economics 3
- GEOG:1070 Contemporary Environmental Issues 3
- GEOG:3340 Ecosystem Services: Human Dependence on Natural Systems 3
Chemical Sciences (Yellow) Track

The chemical sciences track provides the essential skills for entry-level positions that require a basic understanding of chemical principles and a working knowledge of basic chemical concepts as applied in the environment. The track's aim is to produce scientists who are capable of tackling environmental problems in which chemical and molecular processes play an important role. The track also provides a strong foundation for graduate or professional training in environmental chemistry.

Students must complete at least 33 s.h. of coursework, as follows.

### Chemical Sciences Track: Foundation

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHEM:2210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3120</td>
<td>Analytical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3250</td>
<td>Inorganic Chemistry</td>
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</tr>
<tr>
<td>CEE:5153</td>
<td>Fundamentals of Environmental Sampling and Analysis</td>
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</tr>
<tr>
<td>CHEM:2220</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:2410</td>
<td>Organic Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3110</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3440</td>
<td>Physical Measurements</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3530</td>
<td>Inorganic Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4430</td>
<td>Principles of Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4431</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4432</td>
<td>Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4450</td>
<td>Synthesis and Measurement</td>
<td>3</td>
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</table>

### Chemical Sciences Track: Lab and Field Study

<table>
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<tr>
<td>CHEM:3430</td>
<td>Analytical Measurements</td>
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### Chemical Sciences Track: Electives

<table>
<thead>
<tr>
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<th>Hours</th>
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<tr>
<td>ENVS:3110/</td>
<td>Chemical Evolution of the Oceans</td>
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<tr>
<td>EES:3110</td>
<td>Special Topics (no more than 6 s.h. may count toward the major)</td>
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<tr>
<td>BIOC:3110</td>
<td>Biochemistry</td>
<td>3</td>
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<tr>
<td>CEE:4150/CBE:4420</td>
<td>Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4158/</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>OEH:4920</td>
<td>Undergraduate Research (no more than 6 s.h. of research credit may count toward the major)</td>
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</tr>
<tr>
<td>CHEM:4760</td>
<td>Radiochemistry: Energy, Medicine, and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4873</td>
<td>Atmospheric and Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>EES:2200/</td>
<td>Introduction to Geology</td>
<td>4</td>
</tr>
<tr>
<td>ENVS:2200</td>
<td>Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:4310/</td>
<td>Introduction to Applied Remote Sensing</td>
<td>4</td>
</tr>
<tr>
<td>EES:4490</td>
<td>Elements of Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>EES:4520</td>
<td>Isotope Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2310/</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>EES:2310</td>
<td>Environmental Conservation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2950</td>
<td>Introduction to Environmental Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3500/</td>
<td></td>
<td>3</td>
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<tr>
<td>IGPI:3500</td>
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### Chemical Sciences Track: Policy

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL:1260</td>
<td>Plants and Human Affairs</td>
<td>3</td>
</tr>
<tr>
<td>ECON:3625/</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>URP:3135</td>
<td>The History and Science of Oil</td>
<td>3</td>
</tr>
<tr>
<td>EES:1115/</td>
<td></td>
<td>3</td>
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<tr>
<td>ENVS:1115/</td>
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<td>3</td>
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<td>3</td>
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<tr>
<td>HIST:1115</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GEOG:1070</td>
<td>Contemporary Environmental Issues</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2930</td>
<td>Water Resources</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3340</td>
<td>Ecosystem Services: Human Dependence on Natural Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3400</td>
<td>Iowa Environmental Policy in Practice</td>
<td>3</td>
</tr>
</tbody>
</table>
**Geosciences (Brown) Track**

The geosciences track provides the essential skills for entry-level positions that require a basic understanding of geologic principles and a working knowledge of basic geologic concepts applied in the environmental industry. The track's aim is to produce scientists who are capable of tackling environmental problems in which earth materials and surficial geologic processes are of primary importance. The track also lays a strong foundation for graduate study in environmental geology, engineering geology, and natural hazards assessment.

Students must complete at least 35 s.h. of coursework, as follows.

### Geosciences Track: General Sciences

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>These two courses:</td>
<td></td>
<td></td>
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<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1400</td>
<td>Basic Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Students are strongly encouraged to take additional coursework in physics.

### Geosciences Track: Foundation

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>These two courses:</td>
<td></td>
<td></td>
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<tr>
<td>EES:2410</td>
<td>Mineralogy</td>
<td>4</td>
</tr>
<tr>
<td>EES:3300</td>
<td>Sedimentary Geology</td>
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</table>

And 7 s.h. from these:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>EES:2200</td>
<td>Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>ENVS:2200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EES:3360</td>
<td>Soil Genesis and Geomorphology</td>
<td>3</td>
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<tr>
<td>GEOG:3360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EES:3500</td>
<td>Igneous and Metamorphic Petrology</td>
<td>4</td>
</tr>
<tr>
<td>EES:3840</td>
<td>Structural Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4790</td>
<td>Engineering Geology</td>
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### Geosciences Track: Field Study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>One of these:</td>
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</tr>
<tr>
<td>EES:2831</td>
<td>Geologic Field Methods</td>
<td>3</td>
</tr>
<tr>
<td>EES:4680</td>
<td>Field Methods in Hydrologic Science</td>
<td>3</td>
</tr>
<tr>
<td>EES:4832</td>
<td>Geologic Field Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4010</td>
<td>Field Methods in Physical Geography</td>
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</tr>
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</table>

### Geosciences Track: Electives

Geosciences track students must complete at least 6 s.h. of elective coursework chosen from the following list; additional field study or foundation courses may be approved for elective credit:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:3100</td>
<td>Introduction to Applied Remote Sensing</td>
<td>4</td>
</tr>
<tr>
<td>EES:3310</td>
<td>Chemical Evolution of the Oceans</td>
<td>3</td>
</tr>
<tr>
<td>ENVS:3320</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>CEE:4158/</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>OEH:4920</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EES:1290</td>
<td>Energy and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>EES:1400</td>
<td>Natural Disasters</td>
<td>3</td>
</tr>
<tr>
<td>EES:3030/</td>
<td>Conservation Paleobiology</td>
<td>4</td>
</tr>
<tr>
<td>ENVS:3030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EES:3070</td>
<td>Marine Ecosystems and Conservation</td>
<td>3</td>
</tr>
<tr>
<td>EES:3080</td>
<td>Introduction to Oceanography</td>
<td>2</td>
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<tr>
<td>EES:3190</td>
<td>Directed Study (no more than 6 s.h. may count toward the major)</td>
<td>arr.</td>
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<tr>
<td>EES:3350</td>
<td>Active Tectonics</td>
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<tr>
<td>EES:3380/CEE:3328</td>
<td>Fluvial Geomorphology</td>
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</tr>
<tr>
<td>EES:3390</td>
<td>Integrated Watershed Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EES:3770</td>
<td>Global Stratigraphy</td>
<td>3</td>
</tr>
<tr>
<td>EES:4490</td>
<td>Elements of Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>EES:4520</td>
<td>Isotope Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4720</td>
<td>Glacial and Pleistocene Geology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4800</td>
<td>Solid Earth Geophysics</td>
<td>3</td>
</tr>
<tr>
<td>EES:4820</td>
<td>Tectonics and Basin Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2310/</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>EES:2310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG:2950</td>
<td>Environmental Conservation</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3570</td>
<td>Light Detection and Ranging (LiDAR): Principles and Applications</td>
<td>3</td>
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### Geosciences Track: Policy

Geosciences track students must complete at least one of the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENVS:1115/</td>
<td>The History and Science of Oil</td>
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<td>EES:1115/</td>
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<tr>
<td>GEOG:1115/</td>
<td></td>
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<tr>
<td>HIST:1115</td>
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<td></td>
</tr>
<tr>
<td>BIOL:1260</td>
<td>Plants and Human Affairs</td>
<td>3</td>
</tr>
<tr>
<td>ECON:3625/</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
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<tr>
<td>URP:3135</td>
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<tr>
<td>GEOG:1070</td>
<td>Contemporary Environmental Issues</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3340</td>
<td>Ecosystem Services: Human Dependence on Natural Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
Hydrosciences (Blue) Track

The hydrosciences track provides the essential skills for entry-level positions that require a basic understanding of geologic principles and a working knowledge of hydrogeology and hydrogeochemistry. The track's aim is to produce scientists who are capable of tackling environmental problems that emphasize hydrogeologic systems and for which substantial knowledge of hydrogeology and water chemistry are essential. The track also lays a strong foundation for graduate education in hydrogeology, hydrology, geochemistry, and aqueous chemistry.

Students must complete at least 36 s.h. of coursework, as follows.

### Hydrosciences Track: General Sciences

<table>
<thead>
<tr>
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<th>Hours</th>
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<tbody>
<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
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<tr>
<td>PHYS:1511</td>
<td>College Physics I</td>
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</tr>
<tr>
<td>PHYS:1512</td>
<td>College Physics II</td>
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</table>

### Hydrosciences Track: Foundation

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4790</td>
<td>Engineering Geology</td>
<td>3</td>
</tr>
</tbody>
</table>

And 6 s.h. from these:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:3110/ EES:3110</td>
<td>Chemical Evolution of the Oceans</td>
<td>3</td>
</tr>
<tr>
<td>EES:3380/CEE:3328</td>
<td>Fluvial Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>EES:3390</td>
<td>Integrated Watershed Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EES:4490</td>
<td>Elements of Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>EES:4800</td>
<td>Solid Earth Geophysics</td>
<td>3</td>
</tr>
</tbody>
</table>

### Hydrosciences Track: Field Study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES:4680</td>
<td>Field Methods in Hydrologic Science</td>
<td>3</td>
</tr>
</tbody>
</table>

### Hydrosciences Track: Electives

Hydrosciences track students must complete at least 6 s.h. of elective coursework chosen from the following list; additional field study and foundation courses may be approved for elective credit:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:3100/ EES:3100</td>
<td>Introduction to Applied Remote Sensing</td>
<td>4</td>
</tr>
</tbody>
</table>

### Hydrosciences Track: Policy

Hydrosciences track students must complete at least one of the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1260</td>
<td>Plants and Human Affairs</td>
<td>3</td>
</tr>
<tr>
<td>ECON:3625/ URP:3135</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:1070</td>
<td>Contemporary Environmental Issues</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2930</td>
<td>Water Resources</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3340</td>
<td>Ecosystem Services: Human Dependence on Natural Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3400</td>
<td>Iowa Environmental Policy in Practice</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG:4750/ URP:4750</td>
<td>Environmental Impact Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4770/ GHS:4770</td>
<td>Environmental Justice</td>
<td>3</td>
</tr>
</tbody>
</table>
**Teacher Licensure**

Students interested in teaching in elementary and/or secondary schools should seek admission to the Teacher Education Program (TEP) in the College of Education.

To qualify for licensure in secondary teaching, students in the TEP complete a degree in education as well as a related College of Liberal Arts and Sciences degree. See Teacher Education Program Application and Admission on the College of Education website for details on requirements and deadlines for applying to the College of Education and about TEP choices of majors leading to licensure.

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**Honors**

**Honors in the Major**

Students have the opportunity to graduate with honors in the major. Honors study provides students with opportunities to engage in independent research under the guidance of a faculty sponsor chosen from affiliated faculty of the Environmental Sciences Program. The program draws faculty members from the Departments of Anthropology, Biology, Chemistry, Civil and Environmental Engineering, Earth and Environmental Sciences, and Geographical and Sustainability Sciences. Honors students learn how to write the results of their research in the format of a scientific paper, and they have the experience of formally presenting their research as either a short seminar or a poster.

Students must fulfill the following requirements:

- complete a B.S. with a major in environmental sciences with a g.p.a. of at least 3.33 in all work for the major;
- submit a research proposal to the honors director within two months of the beginning of the semester in which the research is initiated;
- complete a minimum of 6 s.h. of honors research taken over two semesters in BIOL:4999 Honors Research in Biology, CHEM:3994 Undergraduate Research, EES:3190 Directed Study, or GEOG:3992 Undergraduate Research, depending on the departmental affiliation of the faculty sponsor;
- prepare a thesis presenting the research in the format of a scientific paper with abstract, introduction, methods, results, discussion, and conclusions; the thesis must include a title page and an abstract formatted according to the specifications of the honors program and must be submitted to the honors director at least one week before the honors program deadline for submission; and
- present either a short seminar or a poster about the research at a professional meeting and/or at the University of Iowa.

Beginning in their sophomore or junior year, students should identify potential faculty sponsors by conducting a web-based survey of the research interests of the program’s affiliated faculty. The student should contact potential sponsors to determine who would be willing to sponsor an honors student and what research projects the student might undertake. Students who choose a sponsor whose faculty appointment is not in the College of Liberal Arts and Sciences (CLAS) must choose a cosponsor who has a faculty appointment in CLAS.

After the student has identified a sponsor and the two have agreed on a project, the sponsor guides the student in the preparation of a research proposal that identifies the background, goals, methods, and significance of the research project. The proposal serves as the foundation of the honors thesis, which the student prepares under the sponsor’s supervision upon completion of the research. Once the thesis is nearing completion or is completed, the student presents a short seminar or a poster detailing the purpose of the research.

For examples of honors projects in environmental sciences, see Honors Projects on the Environmental Sciences Program website.

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**University of Iowa Honors Program**

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the University’s honors program.

Membership in the UI Honors Program is not required to earn honors in the environmental sciences major.

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**Academic Plans**

**Four-Year Graduation Plan**

The Four-Year Graduation Plan is not available for the environmental sciences major. Students work with their advisors on individual graduation plans.

**Sample Plans of Study**

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

**Environmental Sciences, B.S.**

- **Biosciences (Green) Track** [p. 6]
- **Chemical Sciences (Yellow) Track** [p. 7]
- **Geosciences (Brown) Track** [p. 8]
- **Hydrosciences (Blue) Track** [p. 9]

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**Biosciences (Green) Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVS:1085</td>
<td>Fundamentals of Environmental Science a</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I a, b</td>
<td>4</td>
</tr>
<tr>
<td>EES:1050</td>
<td>Introduction to Geology</td>
<td>4</td>
</tr>
<tr>
<td>ENGL:1200</td>
<td>The Interpretation of Literature or Rhetoric</td>
<td>3 - 4</td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td>17-18</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVS:2010</td>
<td>Interdisciplinary Environmental Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric or The Interpretation of Literature</td>
<td>3 - 4</td>
</tr>
<tr>
<td>or ENGL:1200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH:1850</td>
<td>Calculus I a, c</td>
<td>4</td>
</tr>
</tbody>
</table>
Environmental Sciences, B.S.

GE CLAS Core: Values and Culture \(^d\) 3

Hours 15-16

Second Year

Fall
ENVS:3020 Earth Surface Processes 3
BIOL:1411 Foundations of Biology 4
GE CLAS Core: World Languages First Level Proficiency or elective course \(^e\) 4 - 5
GE CLAS Core: Historical Perspectives \(^d\) 3

Hours 14-15

Spring
BIOL:1412 Diversity of Form and Function 4
GEOG:1050 Foundations of GIS 4
GE CLAS Core: World Languages Second Level Proficiency or elective course \(^e\) 4 - 5
GE CLAS Core: Social Sciences \(^d\) 3

Hours 14-15

Summer
Major: biosciences field study course 4

Hours 4

Third Year

Fall
ENVS:2673 Ecology 3
BIOL:2512 Fundamental Genetics 4
Major: biosciences track policy course \(^f\) 3
GE CLAS Core: World Languages Second Level Proficiency or elective course \(^e\) 4 - 5

Hours 14-15

Spring
GE CLAS Core: World Languages Fourth Level Proficiency or elective course \(^e\) 4 - 5
BIOL:3172 Evolution 4
CHEM:2021 Fundamentals of Chemical Measurements or Biostatistics or Statistical Methods and Computing 3
GE CLAS Core: Diversity and Inclusion \(^d\) 3

Hours 14-15

Fourth Year

Fall
GEOG:2374 Biogeography 3
Major: environmental biosciences foundation elective course 3
Major: environmental biosciences foundation elective course \(^f\) 3
Major: environmental biosciences elective course \(^f\) 3
GE CLAS Core: Literary, Visual, and Performing Arts \(^d\) 3

Hours 14-15

Spring
ENVS:3010 Interdisciplinary Environmental Seminar 1
Major: environmental biosciences foundation elective course \(^f\) 3
Major: environmental biosciences elective course \(^f\) 3
GE CLAS Core: International and Global Issues \(^d\) 3
Elective course \(^g\) 3

Elective course \(^g\) 1 - 3

Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)

Hours 14-16
Total Hours 122-130

Chemical Sciences (Yellow) Track

Course Title Hours
First Year
Fall
RHET:1030 or ENGL:1200 Rhetoric or The Interpretation of Literature 3 - 4
ENVS:1085 Fundamentals of Environmental Science \(^a\) 4
CHEM:1110 Principles of Chemistry I \(^a, b\) 4
EES:1050 Introduction to Geology 4
CSI:1600 Success at Iowa 2

Hours 17-18

Spring
ENGL:1200 or RHET:1030 The Interpretation of Literature or Rhetoric 3 - 4
CHEM:1120 Principles of Chemistry II 4
ENVS:2010 Interdisciplinary Environmental Seminar 1
MATH:1850 Calculus I \(^a, c\) 4
GE CLAS Core: Values and Culture \(^d\) 3

Hours 15-16

Second Year
Fall
GE CLAS Core: World Languages First Level Proficiency or elective course \(^e\) 4 - 5
BIOL:1411 Foundations of Biology 4
CHEM:2021 Fundamentals of Chemical Measurements \(^f\) 3
CHEM:2210 Organic Chemistry I 3

Hours 14-15

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\(a\) Fulfills a major requirement and may fulfill a GE requirement.
\(b\) Enrollment in chemistry courses requires completion of a placement exam.
\(c\) Enrollment in math courses requires completion of a placement exam.
\(d\) GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.
\(e\) Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.
\(f\) Refer to the General Catalog for course options.
\(g\) Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.
\(h\) Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor. For more information visit http://commencement.uiowa.edu/. If applicable search for “Early and Late Participation” to find this page (e.g. walk in graduation ceremony in May, degree conferal in August).
Spring
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e 
BIOL:1412 Diversity of Form and Function 4  
Major: environmental chemical sciences track foundation “select 9 s.h.” course e  
GE CLAS Core: Diversity and Inclusion d 3  
GE CLAS Core: Historical Perspectives d 3  
GE CLAS Core: International and Global Issues d 3  
GE CLAS Core: Literacy, Visual, and Performing Arts d 3  
GE CLAS Core: Values and Culture d 3  
GE CLAS Core: World Languages Second Level 4 - 5  
GE CLAS Core: World Languages First Level 4 - 5  
GE CLAS Core: World Languages Third Level 4 - 5  
GE CLAS Core: World Languages Fourth Level 4 - 5  
Foundation “select 9 s.h.” course e

Fall
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e  
ENVS:3020 Earth Surface Processes 3  
Major: environmental chemical sciences track foundation “select 9 s.h.” course e  
Major: environmental chemical sciences elective course 3  
Elective course 1 - 3  
GE CLAS Core: World Languages Second Level 4 - 5  
GE CLAS Core: World Languages First Level 4 - 5  
GE CLAS Core: World Languages Third Level 4 - 5  
GE CLAS Core: World Languages Fourth Level 4 - 5  
Foundation “select 9 s.h.” course e

Third Year
Fall
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e  
ENVS:3020 Earth Surface Processes 3  
Major: environmental chemical sciences track foundation “select 9 s.h.” course e  
Major: environmental chemical sciences elective course 3  
Elective course 1 - 3  
GE CLAS Core: World Languages Second Level 4 - 5  
GE CLAS Core: World Languages First Level 4 - 5  
GE CLAS Core: World Languages Third Level 4 - 5  
GE CLAS Core: World Languages Fourth Level 4 - 5  
Foundation “select 9 s.h.” course e

Fourth Year
Fall
ENVS:2673 Ecology 3  
Major: environmental chemical sciences track foundation “select 9 s.h.” course e  
Major: environmental chemical sciences elective course 3  
GE CLAS Core: Historical Perspectives d 3  
GE CLAS Core: Social Sciences d 3  
GE CLAS Core: Literacy, Visual, and Performing Arts d 3  
GE CLAS Core: Diversity and Inclusion d 3  
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)  

Spring
ENVS:3010 Interdisciplinary Environmental Seminar 1  
CHEM:3430 Analytical Measurements 3  
GEOG:1050 Foundations of GIS 4  
Major: environmental chemical sciences elective course 3  
GE CLAS Core: Literary, Visual, and Performing Arts d 3  
GE CLAS Core: Diversity and Inclusion d 3  
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)  

GEOSCIENCES (BROWN) TRACK 

Course Title Hours

First Year

Fall
RHET:1030 or ENGL:1200 Rhetoric or The Interpretation of Literature 3 - 4
ENVS:1085 Fundamentals of Environmental Science a 4
CHEM:1110 Principles of Chemistry I a, b 4
EES:1050 Introduction to Geology 4
CSI:1600 Success at Iowa 2

Spring
ENGL:1200 or RHET:1030 The Interpretation of Literature or Rhetoric 3 - 4
CHEM:1120 Principles of Chemistry II 4
ENVS:2010 Interdisciplinary Environmental Seminar 1
MATH:1850 Calculus I a, c 4
GE CLAS Core: World Languages Second Level 4 - 5
GE CLAS Core: World Languages First Level 4 - 5
GE CLAS Core: World Languages Third Level 4 - 5
GE CLAS Core: World Languages Fourth Level 4 - 5
Foundation “select 9 s.h.” course e

Second Year

Fall
GE CLAS Core: World Languages Second Level 4 - 5
Proficiency or elective course e  
BIOL:1411 Foundations of Biology 4
MATH:1860 Calculus II 4
EES:2410 Mineralogy 4

Spring
GE CLAS Core: World Languages Second Level 4 - 5
Proficiency or elective course e  
BIOL:1412 Diversity of Form and Function 4
GEOG:1050 Foundations of GIS 4
GE CLAS Core: Historical Perspectives d 3  
GE CLAS Core: International and Global Issues d 3  
GE CLAS Core: Values and Culture d 3  
GE CLAS Core: World Languages Second Level 4 - 5
GE CLAS Core: World Languages First Level 4 - 5
GE CLAS Core: World Languages Third Level 4 - 5
GE CLAS Core: World Languages Fourth Level 4 - 5
Foundation “select 9 s.h.” course e

Summer
Major: geosciences track field study course f 3 - 4

Hours 119-127
Third Year

Fall
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e  
ENVS:3020 Earth Surface Processes 3  
PHYS:1400 Basic Physics 4  
EES:3300 Sedimentary Geology 4  
Hours 15-16

Spring
GE CLAS Core: World Languages Fourth Level 4 - 5  
Proficiency or elective course e  
STAT:4200 Statistical Methods and Computing 3  
or CHEM:2021 or STAT:3510 Fundamentals of Chemical Measurements or Biostatistics  
Major: environmental geosciences foundation "select 7 s.h." course g  
GE CLAS Core: Diversity and Inclusion d  
Hours 13-15

Fourth Year

Fall
ENVS:2673 Ecology 3  
Major: environmental geosciences foundation "select 7 s.h." course g  
Major: environmental geosciences elective h  
GE CLAS Core: Literary, Visual, and Performing Arts 3  
Hours 12-13

Spring
ENVS:3010 Interdisciplinary Environmental Seminar 1  
Major: geosciences track policy course h  
Major: environmental geosciences elective h  
GE CLAS Core: International and Global Issues d  
GE CLAS Core: Social Sciences d  
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) i  
Hours 13  
Total Hours 119-128

Hydrosciences (Blue) Track

First Year

Fall
ENGL:1200 or RHET:1030 The Interpretation of Literature or Rhetoric 3 - 4  
ENVS:1085 Fundamentals of Environmental Science a  
CHEM:1110 Principles of Chemistry I a, b  
EES:1050 Introduction to Geology 4  
CSI:1600 Success at Iowa 2  
Hours 17-18

Spring
RHET:1030 or ENGL:1200 Rhetoric or The Interpretation of Literature 3 - 4  
ENVS:2010 Interdisciplinary Environmental Seminar 1  
CHEM:1120 Principles of Chemistry II 4  
MATH:1850 Calculus I a, b, c  
GE CLAS Core: Values and Culture d  
Hours 15-16

Second Year

Fall
GE CLAS Core: World Languages First Level 4 - 5  
Proficiency or elective course e  
BIOL:1411 Foundations of Biology 4  
MATH:1860 Calculus II 4  
GE CLAS Core: Historical Perspectives d  
Hours 14-15

Spring
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e  
BIOL:1412 Diversity of Form and Function 4  
PHYS:1511 College Physics I 4  
Major: hydrosciences track elective course f  
Hours 15-17

Summer
ENVS:4680 Field Methods in Hydrologic Science g  
Hours 3

Third Year

Fall
GE CLAS Core: World Languages Second Level 4 - 5  
Proficiency or elective course e  
PHYS:1512 College Physics II 4  
EES:4790 Engineering Geology 3  
ENVS:3020 Earth Surface Processes 3  
Hours 14-15

Spring
GE CLAS Core: World Languages Fourth Level 4 - 5  
Proficiency or elective course e  
EES:4630 Hydrogeology 3  
CHEM:2021 or STAT:3510 or STAT:4200 Fundamentals of Chemical Measurements or Biostatistics or Statistical Methods and Computing 3  
Hours 3

a Fulfills a major requirement and may fulfill a GE requirement.
b Enrollment in chemistry courses requires completion of a placement exam.
c Enrollment in math courses requires completion of a placement exam.
d GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.
e Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.
f It is recommended that students take EES:2831 whenever possible.
g Choose from EES:3360, EES:3500, EES:3840, EES:4630, EES:4790.
h Refer to the General Catalog for course options.
i Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor. For more information visit http:// commencement.uiowa.edu/. If applicable search for “Early and Late Participation” to find this page (e.g. walk in graduation ceremony in May, degree conferred in August).
GE CLAS Core: International and Global Issues\textsuperscript{d} 3
Elective course\textsuperscript{h} 1 - 3

\textbf{Hours} 14-17

\textbf{Fourth Year}

\textbf{Fall}
Major: hydrosciences "select 6 s.h." foundation electives course\textsuperscript{i} 3
Major: hydrosciences track elective course\textsuperscript{f} 3 - 4
ENVS:2673 Ecology 3
GEOG:1050 Foundations of GIS 4
GE CLAS Core: Literary, Visual, and Performing Arts 3

\textbf{Hours} 16-17

\textbf{Spring}
Major: hydrosciences "select 6 s.h." foundation electives course\textsuperscript{i} 3
Major: hydrosciences track policy course\textsuperscript{f} 3
ENVS:3010 Interdisciplinary Environmental Seminar 1
GE CLAS Core: Social Sciences\textsuperscript{d} 3
GE CLAS Core: Diversity and Inclusion\textsuperscript{d} 3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)\textsuperscript{j}

\textbf{Hours} 13

\textbf{Total Hours} 122-132

\textbf{a} Fulfills a major requirement and may fulfill a GE requirement.
\textbf{b} Enrollment in chemistry courses requires completion of a placement exam.
\textbf{c} Enrollment in math courses requires completion of a placement exam.
\textbf{d} GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.
\textbf{e} Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.
\textbf{f} Refer to the General Catalog for course options.
\textbf{g} This course is offered every other summer. Check MyUI for course availability since offerings are subject to change.
\textbf{h} Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.
\textbf{i} Choose from EES:3110, EES:3380, EES:3390, EES:4490, EES:4800.
\textbf{j} Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor. For more information visit http://commencement.uiowa.edu/. If applicable search for “Early and Late Participation” to find this page (e.g. walk in graduation ceremony in May, degree conferral in August).

\textbf{Career Advancement}

Graduates are prepared for careers in conservation, environmental assessment, hazardous waste management, park inspection and compliance, or pollution control and monitoring.

The undergraduate degree program also prepares students for graduate study in disciplines such as biology, chemistry, ecosystem sciences, environmental engineering, environmental law, environmental science, environmental sustainability, geoscience, hydrologic sciences, natural resource management, remote sensing and landscape modeling, renewable energy, and urban and regional planning.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.