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 76-81 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.

### Science and Mathematics Foundation Courses

<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>
</tr>
<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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:1085/EES:1085</td>
<td>Fundamentals of Environmental Science</td>
<td>4</td>
</tr>
<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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:2512</td>
<td>Fundamental Genetics</td>
<td>4</td>
</tr>
<tr>
<td>BIOL:3172</td>
<td>Evolution</td>
<td>4</td>
</tr>
<tr>
<td>GEOG:2374/BIOL:2374</td>
<td>Biogeography</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 9 s.h. from these:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:2246</td>
<td>Entomology Lab</td>
<td>4</td>
</tr>
<tr>
<td>EES:3070</td>
<td>Marine Ecosystems and Conservation</td>
<td>3</td>
</tr>
<tr>
<td>EES:3220</td>
<td>Evolution of the Vertebrates</td>
<td>4</td>
</tr>
<tr>
<td>GEOG:2950</td>
<td>Environmental Conservation</td>
<td>4</td>
</tr>
<tr>
<td>GEOG:3315</td>
<td>Ecosystem Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3350</td>
<td>Urban Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4470</td>
<td>Ecological Climatology</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Biosciences Track: Field Study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:3095</td>
<td>Field Ecology</td>
<td>4</td>
</tr>
<tr>
<td>ENVS:3096</td>
<td>Winter Ecology</td>
<td>2</td>
</tr>
<tr>
<td>ENVS:3097</td>
<td>Introduction to Bird Study</td>
<td>2</td>
</tr>
<tr>
<td>ENVS:3230</td>
<td>Special Topics (must include field component)</td>
<td>3-4</td>
</tr>
<tr>
<td>IALL:3034</td>
<td>Topics in Ecology and Sustainability</td>
<td>2</td>
</tr>
<tr>
<td>IALL:3103</td>
<td>Aquatic Ecology</td>
<td>4</td>
</tr>
<tr>
<td>IALL:3109</td>
<td>Ecology and Systematics of Algae</td>
<td>4</td>
</tr>
<tr>
<td>IALL:3117</td>
<td>Ecology and Systematics of Diatoms</td>
<td>2,4</td>
</tr>
<tr>
<td>IALL:3123</td>
<td>Prairie Ecology I</td>
<td>2</td>
</tr>
<tr>
<td>IALL:3125</td>
<td>Prairie Ecology II</td>
<td>2</td>
</tr>
<tr>
<td>IALL:3126</td>
<td>Ornithology</td>
<td>2</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1261</td>
<td>Introduction to Botany</td>
<td>4</td>
</tr>
<tr>
<td>BIOL:2663</td>
<td>Plant Response to the Environment</td>
<td>3</td>
</tr>
<tr>
<td>BIOL:3244</td>
<td>Animal Behavior</td>
<td>3</td>
</tr>
<tr>
<td>BIOL:3676</td>
<td>Evolution Lab</td>
<td>4</td>
</tr>
<tr>
<td>BIOL:3994</td>
<td>Introduction to Research (no more than 6 s.h. of research credit may count toward the major)</td>
<td>2-3</td>
</tr>
<tr>
<td>BIOL:4999</td>
<td>Honors Research in Biology (no more than 6 s.h. of research credit may count toward the major)</td>
<td>arr.</td>
</tr>
<tr>
<td>CEE:2210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3110</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3120</td>
<td>Analytical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>EES:2200/ENVS:2200</td>
<td>Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:3080</td>
<td>Introduction to Oceanography</td>
<td>2</td>
</tr>
<tr>
<td>EES:3110/ENVS:3110</td>
<td>Chemical Evolution of the Oceans</td>
<td>3</td>
</tr>
<tr>
<td>EES:3210</td>
<td>Principles of Paleontology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>4</td>
</tr>
<tr>
<td>EES:4790</td>
<td>Applied Environmental Geology</td>
<td>3</td>
</tr>
<tr>
<td>ENVS:3230</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>GEOG:2310/EES:2310</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3310</td>
<td>Landscape Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3570</td>
<td>Light Detection and Ranging (LiDAR): Principles and Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3992</td>
<td>Undergraduate Research (arr.)</td>
<td></td>
</tr>
<tr>
<td>STAT:6513/PSQF:6243</td>
<td>Intermediate Statistical Methods</td>
<td>3</td>
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</table>

Biosciences Track: Policy

Biosciences track students must complete 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:3340</td>
<td>Ecosystem Services</td>
<td>3</td>
</tr>
</tbody>
</table>
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>
</tr>
</thead>
<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>
<td>3</td>
</tr>
</tbody>
</table>

And 9 s.h. from this list (at least 3 s.h. must be lab hours):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE:4150/CBE:4420</td>
<td>Environmental Chemistry</td>
<td>3</td>
</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>
</tr>
</tbody>
</table>

**Chemical Sciences Track: Lab and Field Study**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:3430</td>
<td>Analytical Measurements</td>
<td>3</td>
</tr>
</tbody>
</table>

**Chemical Sciences Track: Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG:4770/AFAM:4770/GHS:4770</td>
<td>Environmental Justice</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...
Environmental Sciences, B.S.

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 38 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>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>EES:2410</td>
<td>Mineralogy</td>
<td>4</td>
</tr>
<tr>
<td>EES:3300</td>
<td>Sedimentary Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>4</td>
</tr>
</tbody>
</table>

And at least 6 s.h. from these:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES:2200</td>
<td>Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:3360</td>
<td>Soil Genesis and Geomorphology</td>
<td>3</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:4790</td>
<td>Applied Environmental Geology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Geosciences Track: Field Study**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<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>GEOG:4010</td>
<td>Field Methods in Physical Geography</td>
<td>3</td>
</tr>
</tbody>
</table>

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

**Geosciences Track: Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE:4158/ OEH:4920</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>EES:1290</td>
<td>Energy and the Environment</td>
<td>3</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>
</tr>
<tr>
<td>EES:3190</td>
<td>Directed Study (no more than 6 s.h. may count toward the major)</td>
<td>arr.</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 37 s.h. of coursework, as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<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></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:4640</td>
<td>Contaminant Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4720</td>
<td>Paleoclimatology</td>
<td>3</td>
</tr>
<tr>
<td>EES:4820</td>
<td>Tectonics and Basin Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENV:3110/ EES:3110</td>
<td>Chemical Evolution of the Oceans</td>
<td>3</td>
</tr>
<tr>
<td>ENV:3230</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>GEOG:2310/ EES:2310</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2950</td>
<td>Environmental Conservation</td>
<td>4</td>
</tr>
<tr>
<td>GEOG:3500/ IGPI:3500</td>
<td>Introduction to Environmental Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3570</td>
<td>Light Detection and Ranging (LiDAR): Principles and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

**Geosciences Track: Policy**

<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:3340</td>
<td>Ecosystem Services</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:3760</td>
<td>Hazards and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4770</td>
<td>Environmental Justice</td>
<td>3</td>
</tr>
</tbody>
</table>

**Geosciences Track: Policy**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE:4158/ OEH:4920</td>
<td>Solid and Hazardous Wastes</td>
<td>3</td>
</tr>
<tr>
<td>EES:1290</td>
<td>Energy and the Environment</td>
<td>3</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>
</tr>
<tr>
<td>EES:3190</td>
<td>Directed Study (no more than 6 s.h. may count toward the major)</td>
<td>arr.</td>
</tr>
</tbody>
</table>
## Hydrosciences Track: General Sciences

<table>
<thead>
<tr>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1511</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1512</td>
<td>College Physics II</td>
<td>4</td>
</tr>
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These three courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1511</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1512</td>
<td>College Physics II</td>
<td>4</td>
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## Hydrosciences Track: Foundation

<table>
<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>4</td>
</tr>
<tr>
<td>EES:4790</td>
<td>Applied Environmental Geology</td>
<td>3</td>
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</table>

And 6 s.h. from these:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<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:4640</td>
<td>Contaminant Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>ENVS:3110/EES:3110</td>
<td>Chemical Evolution of the Oceans</td>
<td>3</td>
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</table>

## Hydrosciences Track: Field Study

<table>
<thead>
<tr>
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<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>EES:4680</td>
<td>Field Methods in Hydrologic Science</td>
<td>3</td>
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## 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>CEE:3371</td>
<td>Principles of Hydraulics and Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CEE:4150/CBE:4420</td>
<td>Environmental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CEE:5440</td>
<td>Foundations of Environmental Chemistry and Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>EES:2200/ENVS:2200</td>
<td>Historical Geology</td>
<td>4</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>
</tr>
<tr>
<td>EES:3190</td>
<td>Directed Study (no more than 6 s.h. may count toward the major)</td>
<td>arr.</td>
</tr>
<tr>
<td>EES:3300</td>
<td>Sedimentary Geology</td>
<td>4</td>
</tr>
<tr>
<td>EES:3360/GEOG:3360</td>
<td>Soil Genesis and Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>ENVS:3230</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>GEOG:2310/EES:2310</td>
<td>Introduction to Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:2950</td>
<td>Environmental Conservation</td>
<td>4</td>
</tr>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG:3570</td>
<td>Light Detection and Ranging (LiDAR): Principles and Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4470</td>
<td>Ecological Climatology</td>
<td>3</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</td>
<td>3</td>
</tr>
<tr>
<td>GEOG:4770/AFAM: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 quality 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 Apply 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.

## Combined Programs

### B.S./M.S. in Urban and Regional Planning

The combined B.S. in environmental policy and planning/M.S. in urban and regional planning enables undergraduate students majoring in environmental policy and planning to begin work toward the M.S. while completing the bachelor's degree. Students admitted to the program may count 18 s.h. of credit toward both the B.S. and M.S. degree requirements. Offered by the Graduate College and the College of Liberal Arts and Sciences; see the M.S. in urban and regional planning in the Catalog.

## 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.

The College of Liberal Arts and Sciences requires that students who earn honors in the major maintain a minimum University of Iowa cumulative g.p.a. of 3.33. Additional grade-point average standards and requirements are set by each department or program.

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 GEG: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.

**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.
ENGL:1200 or RHET:1030 The Interpretation of Literature 3 - 4
GE CLAS Core: Diversity and Inclusion 3

Hours 14-15

Second Year
Fall
ENVS:2010 Interdisciplinary Environmental Seminar 1
ENVS:3020 Earth Surface Processes 3
BIOL:1411 Foundations of Biology 4
GE CLAS Core: World Languages First Level 4 - 5
Proficiency or elective course
GE CLAS Core: Values and Culture 3

Hours 15-16

Spring
Biol:1412 Diversity of Form and Function 4
GEOG:1050 Foundations of GIS 4
GE CLAS Core: World Languages Second Level 4 - 5
Proficiency or elective course
GE CLAS Core: Social Sciences 3

Hours 15-16

Summer
Major: biosciences field study course 4

Hours 4

Third Year
Fall
STAT:4200 or CHEM:2021 or STAT:3510 Statistical Methods and Computing or Fundamentals of Chemical Measurements or Biostatistics 3
BIOL:2512 Fundamental Genetics 4
Major: biosciences policy course 3
GE CLAS Core: World Languages Second Level 4 - 5
Proficiency or elective course

Hours 14-15

Spring
ENVS:2673 Ecology 3
BIOL:3172 Evolution 4
GE CLAS Core: World Languages Fourth Level 4 - 5
Proficiency or elective course
GE CLAS Core: Historical Perspectives 3

Hours 14-15

Fourth Year
Fall
GEOG:2374 Biogeography 3
Major: biosciences elective course 3
Major: biosciences "select 9 s.h." foundation course 3
Major: biosciences "select 9 s.h." foundation course 3
GE CLAS Core: Literary, Visual, and Performing Arts 3

Hours 15

Spring
ENVS:3010 Interdisciplinary Environmental Seminar 1
Major: biosciences elective course 3
Major: biosciences "select 9 s.h." foundation course 3

GE CLAS Core: International and Global Issues 3
Elective course 3
Elective course 1 - 3

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

Hours 14-16

Total Hours 122-130

a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.
b Fulfills a major requirement and may fulfill a GE requirement.
c Enrollment in chemistry courses requires completion of a placement exam.
d Enrollment in math courses requires completion of a placement exam.
e 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.
f 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.
g Refer to the General Catalog for course options.
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.
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 or Graduation Services.

Chemical Sciences (Yellow) Track

Course Title Hours
Academic Career

Any Semester
GE CLAS Core: Sustainability

First Year
Fall
ENVS:1085 Fundamentals of Environmental Science 4
CHEM:1110 Principles of Chemistry I 4
EES:1050 Introduction to Geology 4
ENGL:1200 or RHET:1030 The Interpretation of Literature 3 - 4
CS1:1600 Success at Iowa 2

Hours 0

Spring
CHEM:1120 Principles of Chemistry II 4
MATH:1850 Calculus I 4
ENGL:1200 or RHET:1030 The Interpretation of Literature or Rhetoric 3 - 4

Hours 17-18
GE CLAS Core: Diversity and Inclusion e

| Hours | 14-15 |

**Second Year**  
**Fall**
- ENVS:2010  Interdisciplinary Environmental Seminar  
- BIOL:1411  Foundations of Biology  
- CHEM:2021  Fundamentals of Chemical Measurements
- CHEM:2210  Organic Chemistry I
- GE CLAS Core: World Languages First Level

| Hours | 15-16 |

| **Spring**  
| BIOL:1412  Diversity of Form and Function |

| Hours | 14-15 |

| **Third Year**  
| ENVS:3020  Earth Surface Processes |

| Hours | 15-17 |

| **Fourth Year**  
| GEOG:1050  Foundations of GIS |

| Hours | 16 |

| **First Year**  
| ENVS:1085  Fundamentals of Environmental Science b |
| CHEM:1110  Principles of Chemistry I b, c |
| EES:1050  Introduction to Geology |
| RHET:1030  Rhetoric or ENGL:1200  The Interpretation of Literature |
| CSI:1600  Success at Iowa |

| Hours | 17-18 |

| **Spring**  
| CHEM:1120  Principles of Chemistry II |

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a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.
b Fulfills a major requirement and may fulfill a GE requirement.
c Enrollment in chemistry courses requires completion of a placement exam.
d Enrollment in math courses requires completion of a placement exam.
e 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.
f This course is required for the statistics requirement in the major for all chemical sciences track students.
g 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.
h The department recommends taking CHEM:2220.
i Refer to the General Catalog for course options.
j The department recommends taking CHEM:3110.
k 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.
l This course must be a lab course. See the General Catalog for options.
m 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 or Graduation Services.

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**Geosciences (Brown) Track**

<table>
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<th>Title</th>
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<tbody>
<tr>
<td>ENVS:1085</td>
<td>Fundamentals of Environmental Science</td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I</td>
</tr>
<tr>
<td>EES:1050</td>
<td>Introduction to Geology</td>
</tr>
<tr>
<td>RHET:1030 or ENGL:1200</td>
<td>Rhetoric or The Interpretation of Literature</td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II</td>
</tr>
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Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)
Environmental Sciences, B.S.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH:1850</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030 or ENGL:1200</td>
<td>Rhetoric or The Interpretation of Literature</td>
<td>3 - 4</td>
</tr>
<tr>
<td>GE CLAS Core: Diversity and Inclusion</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Second Year**

**Fall**
- ENVS:2010 Interdisciplinary Environmental Seminar 1
- EES:2410 Mineralogy 4
- BIOL:1411 Foundations of Biology 4
- MATH:1860 Calculus II 4
- GE CLAS Core: World Languages First Level Proficiency or elective course 4 - 5

**Spring**
- BIOL:1412 Diversity of Form and Function 4
- GEOS:1050 Foundations of GIS 4
- GE CLAS Core: World Languages Second Level Proficiency or elective course 4 - 5
- GE CLAS Core: Values and Culture 3

**Summer**
- Major: geosciences field study course 3

**Third Year**

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

**Spring**
- ENVS:2673 Ecology 3
- CHEM:2021 or STAT:4200 or STAT:3510 Fundamentals of Chemical Measurements or Statistical Methods and Computing or Biostatistics 3
- Major: geosciences foundation course 3 - 4
- GE CLAS Core: World Languages Fourth Level Proficiency or elective course 4 - 5
- GE CLAS Core: Historical Perspectives 3

**Fourth Year**

**Fall**
- EES:4630 Hydrogeology 4
- Major: geosciences foundation course 3 - 4
- Major: geosciences elective course 3
- GE CLAS Core: Literary, Visual, and Performing Arts 3

**Spring**
- ENVS:3010 Interdisciplinary Environmental Seminar 1
- Major: geosciences policy course 3

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**Hydrosciences (Blue) Track**

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

**Any Semester**
- GE CLAS Core: Sustainability 3

---

**First Year**

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

**Spring**
- CHEM:1120 Principles of Chemistry II 4
- MATH:1850 Calculus I 4

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**Total Hours**
- 123-131

---

- a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.
- b Fulfills a major requirement and may fulfill a GE requirement.
- c Enrollment in chemistry courses requires completion of a placement exam.
- d Enrollment in math courses requires completion of a placement exam.
- e 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.
- f 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.
- g It is recommended that students take EES:2831 whenever possible.
- h Choose from EES:2200, EES:3360, EES:3500, EES:3840, EES:4790.
- i Refer to the General Catalog for course options.
- 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 or Graduation Services.
Environmental Sciences, B.S.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
<th>Notes</th>
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<tbody>
<tr>
<td>RHET:1030 or ENGL:1200</td>
<td>Rhetoric or The Interpretation of Literature</td>
<td>3 - 4</td>
<td></td>
</tr>
<tr>
<td>GE CLAS Core: Diversity and Inclusion</td>
<td></td>
<td>3</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENVS:2010</td>
<td>Interdisciplinary Environmental Seminar</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>BIOL:1411</td>
<td>Foundations of Biology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MATH:1860</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GE CLAS Core: World Languages First Level Proficiency or elective course</td>
<td>4 - 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GE CLAS Core: Historical Perspectives</td>
<td>3</td>
<td></td>
</tr>
</tbody>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1412</td>
<td>Diversity of Form and Function</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:1511</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td>Major: hydrosciences elective course</td>
<td>3 - 4</td>
<td></td>
</tr>
<tr>
<td>GE CLAS Core: World Languages Second Level Proficiency or elective course</td>
<td>4 - 5</td>
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**Third Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>EES:4630</td>
<td>Hydrogeology</td>
<td>4</td>
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<tr>
<td></td>
<td>EES:4790</td>
<td>Applied Environmental Geology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS:1512</td>
<td>College Physics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GE CLAS Core: World Languages Second Level Proficiency or elective course</td>
<td>4 - 5</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS:2673</td>
<td>Ecology</td>
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<tr>
<td>STAT:3510 or STAT:4200 or CHEM:2021</td>
<td>Biostatistics or Statistical Methods and Computing or Fundamentals of Chemical Measurements</td>
<td>3</td>
</tr>
<tr>
<td>GE CLAS Core: World Languages Fourth Level Proficiency or elective course</td>
<td>4 - 5</td>
<td></td>
</tr>
<tr>
<td>GE CLAS Core: International and Global Issues</td>
<td>3</td>
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<tr>
<td>Elective course</td>
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**Summer**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>EES:4680</td>
<td>Field Methods in Hydrologic Science</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENVS:3020</td>
<td>Earth Surface Processes</td>
<td>3</td>
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<tr>
<td></td>
<td>GEOG:1050</td>
<td>Foundations of GIS</td>
<td>4</td>
</tr>
<tr>
<td>Major: hydrosciences elective course</td>
<td>3 - 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major: hydrosciences &quot;select 6 s.h.&quot; foundation course</td>
<td>3</td>
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<tr>
<td>GE CLAS Core: Literary, Visual, and Performing Arts</td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENVS:3010</td>
<td>Interdisciplinary Environmental Seminar</td>
<td>1</td>
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</table>

**Degree Application**

- 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 or Graduation Services.

- a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.
- b Fulfills a major requirement and may fulfill a GE requirement.
- c Enrollment in chemistry courses requires completion of a placement exam.
- d Enrollment in math courses requires completion of a placement exam.
- e 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.
- f 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.
- g Refer to the General Catalog for course options.
- 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.
- i This course is offered every other summer. Check MyUI for course availability since offerings are subject to change.
- k 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 or Graduation Services.