Environmental Sciences, B.A.

Requirements

The Bachelor of Arts with a major in environmental sciences requires a minimum of 120 s.h., including a minimum of 63 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 General Education Program; some courses required for the major in environmental sciences may be used to satisfy General Education Program requirements.

Bachelor of Arts students majoring in environmental sciences complete requirements in four areas: the science and mathematics foundation, the environmental sciences foundation, environmental sciences field study, and environmental sciences track courses.

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 the geomorphic and environmental processes that shape the Earth’s surface, the ecological factors that influence the distribution and abundance of organisms, and a choice of one course that deals with remote sensing techniques or with the use of geographic information technologies. The environmental sciences field study gives students hands-on experience with methods of analysis and interpretation of natural systems/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.

Students select one course from each of the four tracks in order to develop breadth of understanding and skill in these areas.

The B.A. in environmental sciences requires the following course work.

| Science and Mathematics Foundation Courses | 27 |
| Environmental Sciences Foundation Courses | 15-16 |
| Environmental Sciences Field Study Course | 3-4 |
| Environmental Sciences Policy Courses | 6-7 |
| Environmental Sciences Track Courses | 12-15 |
| Total Hours | 63-69 |

Science and Mathematics Foundation

Students must complete at least 27 s.h. of course work, as follows.

All of these:
- BIOL:1411 Foundations of Biology 4
- BIOL:1412 Diversity of Form and Function 4
- CHEM:1110 Principles of Chemistry I 4
- CHEM:1120 Principles of Chemistry II 4
- EES:1050 Introduction to Geology 4

One of these:
- MATH:1460 Calculus for the Biological Sciences 4
- MATH:1850 Calculus I 4

One of these:
- CHEM:2021 Fundamentals of Chemical Measurements 3
- STAT:3510/IGPI:3510 Biostatistics 3
- STAT:4200/IGPI:4200 Statistical Methods and Computing 3

Environmental Sciences Foundation

Students must complete at least 15 s.h. of course work, as follows.

All of these:
- ENVS:1085/EES:1085 Fundamentals of Environmental Science 4
- ENVS:2673/BIOL:2673 Ecology 3
- ENVS:3000 Environmental Sciences Seminar (taken twice for a total of 2 s.h.) 2
- ENVS:3020/EES:3020/GEOG:3020 Earth Surface Processes 3

One of these:
- ENVS:3100/EES:3100 Introduction to Applied Remote Sensing 4
- GEOG:1050 Foundations of GIS 3
- GEOG:3500 Introduction to Environmental Remote Sensing 3

Environmental Sciences Field Study

Students must complete at least one course (at least 3 s.h.) from the following.

- ENVS:3095 Field Ecology 4
- CEE:4103 Water Quality 3
- EES:2831 Geologic Field Methods 3
- EES:4680 Field Methods in Hydrologic Science 3
- GEOG:4010 Field Methods in Physical Geography 3
Environmental Sciences, B.A.

IALL:3103 Aquatic Ecology 4
IALL:3117 Ecology and Systematics of Diatoms 4
IALL:3126 Ornithology 4
IALL:3163 Conservation Biology 4

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

Environmental Sciences Policy

Students must complete at least 6 s.h. from the following list.

ANTH:4130/ RELS:4730 Religion and Environmental Ethics 3
BIOL:1260 Plants and Human Affairs 3
ECON:3625/ URP:3135 Environmental and Natural Resource Economics 3
GEOG:1070 Contemporary Environmental Issues 3
GEOG:2910 The Global Economy 3
GEOG:2930 Water Resources 3
GEOG:3750 Environmental Quality: Science, Technology, and Policy 3
GEOG:3760/ GHS:3760 Hazards and Society 3
GEOG:4750/ URP:4750 Environmental Impact Analysis 4
GEOG:4770 Environmental Justice 3

Environmental Sciences Track Courses

Students must complete one course from each of the following four lists (at least 12 s.h.).

Biosciences (Green) Track

BIOL:1261 Introduction to Botany 4
EES:3070 Marine Ecosystems and Conservation 3
EES:3220 Evolution of the Vertebrates 3
EES:4440 Phylogenetics and Biodiversity 3
EES:4700/ ENVS:4700 Evolution of Ecosystems 3
GEOG:2374/ BIOL:2374 Biogeography 3
GEOG:2950 Environmental Conservation 3
GEOG:3350 Urban Ecology 3
IALL:3117 Ecology and Systematics of Diatoms 4

Chemical Sciences (Yellow) Track

BIOC:3110 Biochemistry 3
CHEM:2210 Organic Chemistry I 3
CHEM:3120 Analytical Chemistry II 3
CHEM:3250 Inorganic Chemistry 3
CHEM:4431 Physical Chemistry I 3
CHEM:4873 Atmospheric and Environmental Chemistry

Geosciences (Brown) Track

ENVS:3110/ EES:3110 Chemical Evolution of the Oceans 3
EES:2310/ GEOG:2310 Introduction to Climatology 3
EES:2410 Mineralogy 4
EES:3300 Sedimentary Geology 4
EES:3360/ GEOG:3360 Soil Genesis and Geomorphology 3
EES:3380/CEE:3328 Fluvial Geomorphology 3
EES:3390 Integrated Watershed Analysis 3
EES:3500 Igneous and Metamorphic Petrology 4
EES:3840 Structural Geology 4
EES:4490 Elements of Geochemistry 3
EES:4520 Isotope Geochemistry 3
EES:4720 Glacial and Pleistocene Geology 3
EES:4790 Engineering Geology 3
EES:4800 Solid Earth Geophysics 3

Hydrosciences (Blue) Track

ENVS:3110/ EES:3110 Chemical Evolution of the Oceans 3
CEE:2150/ GHS:2150 Natural Environmental Systems 3
CEE:3371 Principles of Hydraulics and Hydrology 3
CEE:4103 Water Quality 3
EES:3300 Sedimentary Geology 4
EES:3390 Integrated Watershed Analysis 3
EES:4490 Elements of Geochemistry 3
EES:4630 Hydrogeology 3
EES:4790 Engineering Geology 3
GEOG:3320/ EES:3260 Wetlands: Function, Geography, and Management 3

B.A. with Teacher Licensure

Majors interested in earning licensure to teach in elementary and/or secondary schools must complete the College of Education's Teacher Education Program (TEP) in addition to the requirements for the major and all requirements for graduation. The TEP requires several College of Education courses and student teaching. Contact the Office of Student Services for details.

Students must satisfy all degree requirements and complete Teacher Education Program licensure before degree conferral.

Students with a strong interest in science teaching may complete a science education major. Students choose one of five emphases—biology, chemistry, earth science, physics, or all-science—and earn a Bachelor of Science degree. They may
apply for admission to the Teacher Education Program. See Bachelor of Science in Science Education in the Teaching and Learning (College of Education) section of the Catalog.

**Joint B.A./M.A.T. with Science Education Subprogram**

B.A. students who are interested in pursuing a graduate degree in teaching may apply to the joint Bachelor of Arts/ Master of Arts in Teaching program offered by the College of Liberal Arts and Sciences and the College of Education. Designed for undergraduates majoring in biology, chemistry, environmental sciences, or physics, the joint program enables students to earn a B.A. and M.A.T. in five years by beginning to earn graduate credit during their fourth year of undergraduate study and by counting up to 18 s.h. of qualifying credit toward both degrees. For more information, see “Joint B.A./M.A.T. with Science Education Subprogram” under Science Education in Master of Arts in Teaching (College of Education) section of the Catalog. Interested students should consult an advisor.

**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.A. 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 at 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 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.

**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.

**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 Plan of Study**

**Environmental Sciences (B.A.)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong> Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVS:1085</td>
<td>Fundamentals of Environmental Science (major)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (major)</td>
<td>4</td>
</tr>
<tr>
<td>EES:1050</td>
<td>Introduction to Geology (major)</td>
<td>4</td>
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<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric or other General Education course)</td>
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<td>CSI:1600</td>
<td>Success at Iowa</td>
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<tr>
<td></td>
<td><strong>Hours</strong></td>
<td><strong>18</strong></td>
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<tr>
<td><strong>Spring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVS:3000</td>
<td>Environmental Sciences Seminar (major)</td>
<td>1</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (major)</td>
<td>4</td>
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<tr>
<td>ENGL:1200</td>
<td>The Interpretation of Literature (GE: Interpretation of Literature)</td>
<td>3</td>
</tr>
<tr>
<td>MATH:1460 or MATH:1850 (major) or Calculus I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>GE: Diversity and Inclusion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Hours</strong></td>
<td><strong>15</strong></td>
</tr>
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</table>
Second Year

**Fall**

ENVS:3020  Earth Surface Processes (major)  3
BIOL:1411  Foundations of Biology (major)  4
GEOG:1050 or GEOG:3500  Foundations of GIS (major) or Introduction to Environmental Remote Sensing  3
GE: World Languages or elective course  2
Elective course  3

Hours  15-17

**Spring**

BIOL:1412  Diversity of Form and Function (major)  4
STAT:3510 or STAT:4200  Biostatistics (major) or Statistical Methods and Computing  3
Major: environmental sciences policy course  3
GE: World Languages or elective course  3-5
Elective course  2

Hours  15-17

**Third Year**

**Fall**

ENVS:2673  Ecology (major)  3
Major: environmental sciences policy course  3
GE: Historical Perspectives  3
GE: World Languages or elective course  3-5
Elective course  3

Hours  15-17

**Spring**

Major: biosciences track course  3-4
GE: Literary, Visual, and Performing Arts  3
GE: World Languages or elective course  3-5
Elective course  3
Elective course  3

Hours  15-18

**Summer**

Major: environmental sciences field study course  3-4

Hours  3-4

**Fourth Year**

**Fall**

Major: chemical sciences track course  3-4
Major: geosciences track course  3-4
GE: International and Global Issues  3
Elective course  3
Elective course  3

Hours  15-17

**Spring**

ENVS:3000  Environmental Sciences Seminar (major)  1
Major: hydrosciences track course  3-4
GE: Social Sciences  3
GE: Values and Culture  3
Elective course  3
Elective course  2

Hours  15-16

Total Hours  126-139

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1 General Education (GE) 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. For more information, view the General Education Program.

2 Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

3 Students may use their elective courses to complete a double major, minors, or certificates.

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**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.