Environmental Sciences, BA

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 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 grade-point average 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.

Students complete requirements in five areas: science and mathematics foundation; environmental sciences foundation; environmental sciences field study; environmental sciences policy courses; 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 BA in environmental sciences requires the following coursework.

Requirements	Hours
Science and Mathematics Foundation Course	27
Environmental Sciences Foundation Courses	15-16
Environmental Sciences Field Study Course	3-4
Environmental Sciences Policy Courses	6
Environmental Sciences Track Courses	12-15

Science and Mathematics Foundation

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

Course #	Title	Hours
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 coursework, as follows.

Course #	Title	Hours
All of these:		
ENVS:1085/ EES:1085	Fundamentals of Environmental Science	4
ENVS:2010/ EES:2010/ GEOG:2010	Interdisciplinary Environmental Seminar	1
ENVS:2673/ BIOL:2673	Ecology	3
ENVS:3010/ EES:3010/ GEOG:3003	Interdisciplinary Environmental Seminar	1
ENVS:3020/ EES:3020/ GEOG:3020	Earth Surface Processes	3
One of these:		
GEOG:2050	Foundations of GIS	4
GEOG:3500/ IGPI:3500	Introduction to Environmental Remote Sensing	3

Environmental Sciences Field Study

Students must complete at least 3 s.h. from the following.

Course #	Title	Hours
ENVS:3095	Field Ecology	4
ENVS:3096	Winter Ecology	2
ENVS:3097	Introduction to Bird Study	2
ENVS:3230	Special Topics (must include field component)	1-4
EES:2831	Geologic Field Methods	3
EES:4680	Field Methods in Hydrologic Science	3
GEOG:4010	Field Methods in Physical Geography	3
IALL:3103	Aquatic Ecology	4
IALL:3117	Ecology and Systematics of Diatoms	2,4
IALL:3126	Ornithology	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.

Course #	Title	Hours
ENVS:1115/ EES:1115/ GEOG:1115/ HIST:1115	The History of Oil	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:3760/ GHS:3760	Hazards and Society	3
GEOG:3780/ GHS:3780/ HIST:3240	U.S. Energy Policy in Global Context	3
GEOG:4770/ AFAM:4770/ GHS:4770	Environmental Justice	3
PBAF:2020/ URP:2020	Environment and Society: Sustainability, Policy, and Politics	3

Environmental Sciences Track Courses

Students must complete one course from each of the following four lists (at least 12 s.h.). They may not use any course to satisfy more than one requirement.

Biosciences (Green) Track

Course #	Title	Hours
One of these:		
BIOL:1261	Introduction to Botany	4
BIOL:2246	Entomology Lab	4
EES:3070	Marine Ecosystems and Conservation	3
EES:3220	Evolution of the Vertebrates	4
GEOG:2374/ BIOL:2374	Biogeography	3
GEOG:2950	Environmental Conservation	4
GEOG:3315	Ecosystem Ecology	3
GEOG:3350	Urban Ecology	3
IALL:3117	Ecology and Systematics of Diatoms	4
Other Lakeside Laboratory courses (prefix IALL) may be approved in consultation with an environmental sciences advisor		

Chemical Sciences (Yellow) Track

Course #	Title	Hours
One of these:		
BMB:3110	Biochemistry	3
CEE:4150/CBE:4420	Environmental Chemistry	3
CEE:5440	Foundations of Environmental Chemistry and Microbiology	3
CHEM:2210	Organic Chemistry I	3
CHEM:3120	Spectroscopy and Separations	3
CHEM:3250	Inorganic Chemistry	3
CHEM:4431	Chemical Thermodynamics	3
CHEM:4873	Atmospheric and Environmental Chemistry	3

Geosciences (Brown) Track

Course #	Title	Hours
One of these:		
ENVS:3110/ EES:3110	Chemical Evolution of the Oceans	3
EES:2020/ ENVS:2020	Earth's Climate System	3
EES:2200/ ENVS:2200	Historical Geology	4
EES:2310/ GEOG:2310	Introduction to Climatology	3
EES:2410	Mineralogy	4
EES:3070	Marine Ecosystems and Conservation	3
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	Paleoclimatology	3
EES:4790	Applied Environmental Geology	3

Hydrosciences (Blue) Track

Course #	Title	Hours
One of these:		
CEE:3371	Principles of Hydraulics and Hydrology	3
EES:3300	Sedimentary Geology	4
EES:3390	Integrated Watershed Analysis	3
EES:4490	Elements of Geochemistry	3
EES:4630	Hydrogeology	4
EES:4640	Contaminant Hydrogeology	3
EES:4790	Applied Environmental Geology	3
GEOG:4470	Ecological Climatology	3

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 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

BA/MAT (Science Education Subprogram)

BA students who are interested in pursuing a graduate degree in teaching may apply to the combined Bachelor of Arts/Master of Arts in Teaching with a science education subprogram 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 combined program enables students to earn a BA and MAT in five years by beginning to earn graduate credit during their fourth year of undergraduate study and by counting up to 19 s.h. of qualifying credit toward both degrees. For more information, see "BA/MAT" under Science Education in the Master of Arts in Teaching (College of Education) section of the catalog. Interested students should consult an advisor.

BA/MS in Urban and Regional Planning

The combined BA in environmental policy and planning/MS in urban and regional planning enables undergraduate students majoring in environmental policy and planning to begin work toward the MS while completing the bachelor's degree. Students admitted to the program may count 18 s.h. of credit toward both the BA and MS degree requirements. Offered by the Graduate College and the College of Liberal Arts and Sciences; see the MS 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 grade-point average (GPA) of 3.33. Additional GPA standards and requirements are set by each department or program.

Students must fulfill the following requirements:

- complete a BA with a major in environmental sciences with a GPA 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 research advisor and must be submitted to the honors coordinator; 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 they 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.

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

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.

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

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, BA

Course	Title	Hours
Academic Career		
Any Semester		
GE CLAS Core: Sustainability [a]		
	Hours	**0**
First Year		
Fall		
ENVS:1085	Fundamentals of Environmental Science [b]	4
CHEM:1110	Principles of Chemistry I [b, c]	4
EES:1050	Introduction to Geology	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3 - 4
CSI:1600	Success at Iowa	2
	Hours	**17-18**
Spring		
CHEM:1120	Principles of Chemistry II	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3 - 4
MATH:1850 or MATH:1460	Calculus I [b, d] or Calculus for the Biological Sciences	4
GE CLAS Core: Diversity and Inclusion [e]		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
GEOG:2050 or GEOG:3500	Foundations of GIS or Introduction to Environmental Remote Sensing	3 - 4
GE CLAS Core: World Languages First Level Proficiency or elective course [f]		4 - 5
	Hours	**15-17**
Spring		
BIOL:1412	Diversity of Form and Function	4
CHEM:2021 or STAT:4200 or STAT:3510	Fundamentals of Chemical Measurements or Statistical Methods and Computing or Biostatistics	3
Major: environmental sciences policy course		3
GE CLAS Core: World Languages Second Level Proficiency or elective course [f]		4 - 5
	Hours	**14-15**
Third Year		
Fall		
Major: environmental sciences policy course		3
Major: geosciences track course		3 - 4
GE CLAS Core: Historical Perspectives [e]		3
GE CLAS Core: World Languages Third Level Proficiency or elective course [f]		4 - 5
Elective course [g]		3
	Hours	**16-18**
Spring		
ENVS:2673	Ecology	3
Major: biosciences track course		3 - 4
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [f]		4 - 5
GE CLAS Core: Literary, Visual, and Performing Arts [e]		3
	Hours	**13-15**
Summer		
Major: environmental sciences field study course		3 - 4
	Hours	**3-4**
Fourth Year		
Fall		
Major: chemical sciences track course		3 - 4
GE CLAS Core: Values and Culture [e]		3
GE CLAS Core: International and Global Issues [e]		3
Elective course [g]		3
Elective course [g]		3
	Hours	**15-16**
Spring		
ENVS:3010	Interdisciplinary Environmental Seminar	1

Major: hydrosciences track course	3 - 4
GE CLAS Core: Social Sciences [e]	3
Elective course [g]	3
Elective course [g]	3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [h]	
Hours	**13-14**
Total Hours	**120-132**

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 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 or Graduation Services.