ENVIRONMENTAL SCIENCE

Interdepartmental Undergraduate Programs

Environmental Science provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems. The magnitude and complexity of environmental problems are creating a growing need for scientists with rigorous, interdisciplinary training in environmental science. The Environmental Science program is designed to prepare students for positions of leadership in this rapidly changing discipline. Environmental Science graduates have a solid foundation in biological and physical natural sciences and the specialized training necessary for integrated analysis of environmental systems.

Undergraduate Study

The Environmental Science undergraduate major is offered through both the College of Agriculture and Life Sciences and the College of Liberal Arts and Sciences. Environmental Science majors complete foundation courses in natural sciences and mathematics, plus a major consisting of an integrated core of Environmental Science courses and additional advanced course work in Environmental Science. Scientific rigor is stressed throughout the program, beginning with the foundation courses in the first two years of the curriculum. The upper level core courses emphasize a dynamic systems approach that provides a framework for integrating physical, chemical, and biological aspects of environmental systems. Beyond the required core, students select from a broad array of advanced courses to either develop greater breadth, or specialization in areas including, but not limited to, water resources, climate impacts and adaptation, environmental restoration and management, and geographic information systems (see https://www.ensci.iastate.edu/ for additional information on areas of specialization).

Student Learning Outcomes

Environmental Science graduates should be able to:

Environmental foundations:

- explain physical and biological components, processes and interactions within ecosystems
- explain how human activities impact the environment and how societies are affected by environmental conditions

Integrated environmental analysis:

- demonstrate a broad understanding of environmental systems and issues utilizing an interdisciplinary framework
- demonstrate proficiency in data analysis and problem-solving of relevant environmental systems/problems
- use a systems approach to conduct integrated, quantitative, and interdisciplinary analyses and modeling of environmental systems and problems

Communication:

- communicate clearly and effectively to a range of audiences using appropriate written, oral, visual, and electronic techniques
- read, listen, observe and reflect effectively

Problem solving/critical thinking:

- apply a rational and objective approach to analyzing and interpreting information
- critically evaluate arguments

College of Liberal Arts and Sciences

http://www.ensci.iastate.edu

Students seeking an Environmental Science major complete the following:

1. A foundation of approved supporting courses in science and mathematics including biology, chemistry, earth science, physics, mathematics, and statistics.

2. 33 credits of course work in the major, including a required core of 21 credits.

A combined average grade of C or higher is required in courses applied in the major.

1. Environmental Science: 33 credits

ENSCI 1100	Orientation to Environmental Science	1
ENGL 2010	Introduction to Literature	3
ENSCI 2020	Exploration of Environmental and Sustainability Issues	1
ENSCI 2030	Exploration of Environmental Science	1
ENSCI 2500	Environmental Geography	3
ENSCI 2510	Biological Processes in the Environment	3
ENSCI 3180	Introduction to Ecosystems	3
ENSCI 3190	Analysis of Environmental Systems	3
Addional ENSCI choice courses		12
Total Credits		**30**

2. Mathematics & Statistics: 6-8 credits

Choose one of the following:		3-4
MATH 1040	Introduction to Probability	
MATH 1500	Discrete Mathematics for Business and Social Sciences	
MATH 1510	Calculus for Business and Social Sciences	

MATH 1600	Survey of Calculus	
MATH 1650	Calculus I	
COMS 1060	Introduction to Web Programming	
DS 2010	Introduction to Data Science	
DS 2020	Data Acquisition and Exploratory Data Analysis	
Choose one of the following:		3-4
STAT 1010	Principles of Statistics	
STAT 1040	Introduction to Statistics	
Total Credits		**6-8**

3. Physical & Life Sciences: 21-24 credits

BIOL 2110	Principles of Biology I	3
Choose from one of the following:		5-6
CHEM 1630 & 1630L	College Chemistry and Laboratory in College Chemistry	
CHEM 1670 & 1670L	General Chemistry for Engineering Students and Laboratory in General Chemistry for Engineering	
CHEM 1770 & 1770L	General Chemistry I and Laboratory in General Chemistry I	
CHEM 2010 & 2010L	Advanced General Chemistry and Laboratory in Advanced General Chemistry	
Choose from one of the following:		3-4
CHEM 2310 & 2310L	Elementary Organic Chemistry and Laboratory in Elementary Organic Chemistry	
CHEM 3310 & 3310L	Organic Chemistry I and Laboratory in Organic Chemistry I	
BBMB 2210	Structure and Reactions in Biochemical Processes	
AGRON 2590	Organic Compounds in Plants and Soils	
Choose 3 of the following:		9
AGRON 1820	Introduction to Soil Science	
AGRON 2820	Soil Conservation and Land Use	
GEOL 1000	How the Earth Works	
or GEOL 2010	Geology for Engineers and Environmental Scientists	
BIOL 2120	Principles of Biology II	
CHEM 1780 & 1780L	General Chemistry II and Laboratory in College Chemistry II	
PHYS 1150	Physics for the Life Sciences	
or PHYS 1310	General Physics I	
or PHYS 2310	Introduction to Classical Physics I	
Total Credits		**20-22**

4. Communications: 7-10 credits

ENGL 1500	Critical Thinking and Communication	3
ENGL 2500	Written, Oral, Visual, and Electronic Composition	3
LIB 1600	Introduction to College Level Research	1
Embedded communication coursework in ENSCI 2030 and ENSCI 3120		
Total Credits		**7**

Additional communication courses required of majors in the College of Agriculture and Life Sciences

Choose 1 of the following:		3
SPCM 2120	Fundamentals of Public Speaking	
AGEDS 3110	Presentation and Sales Strategies for Agricultural Audiences	
COMST 2140	Professional Communication	
Total Credits		**3**

5. General Education: 15-21 credits

Additional general education requirements in the College of Agriculture and Life Sciences

Humanities	3
Social Science	3
Ethics	3
International Perspectives course from university approved list	3
U.S. Cultures and Communities course from university approved list	3
Total Credits	**15**

additional general education requirements in the College of Liberal Arts and Sciences

Arts and Humanities courses from college approved list	12
Social Science courses from college approved list	9
(Select courses to include 3 cr. of International Perspectives and 3 cr. of U.S. Cultures and Communities)	
Students must have completed 3 years of a single world language in high school or take 4-8 credits of World Languages at the university level	
LAS 2030 Professional Career Preparation	1
Total Credits	**22**

Electives (28-35 credits)

As majors in the College of Liberal Arts and Sciences, Environmental Science students must meet College of Liberal Arts and Sciences (https://catalog.iastate.edu/collegeofliberalartsandsciences/#lascollegerequirementstext) and University-wide requirements (https://catalog.iastate.edu/collegescurricula/) for graduation in addition to those stated above for the major.

LAS majors require a minimum of 120 credits, including a minimum of 45 credits at the 3000/4000 level. You must also complete the LAS world language requirement and career proficiency requirement.

Bachelor of Science B.S. (LAS)

Freshman

Fall	Credits	Spring	Credits
ENGL 1500	3	ENSCI 2030	1
ENSCI 1100[1]	1	BIOL 2110	3
ENSCI 2010	2	BIOL 2110L (or elective)	1
ENSCI 2020	1	CHEM 1780	3
CHEM 1770	4	CHEM 1780L	1
CHEM 1770L	1	Mathematics, Programming, or Data Science choice	3-4
STAT 1010 or 1040	3-4	Arts and Humanities choice[2]	3
LIB 1600	1		
	16-17		**15-16**

Sophomore

Fall	Credits	Spring	Credits
ENSCI 2500[1]	3	ENSCI 2510	3
Social science choice[2]	3	Organic chemistry choice[3]	3
ENGL 2500	3	Physical or Life Science choice[3]	3
Physical or Life Science choice[3]	3	Arts and humanities choice[2]	3
Elective	1-2	Social science choice[2]	3
LAS 2030	1	Summer: Consider field experience such as an intership or field station courses.	
	14-15		**15**

Junior

Fall	Credits	Spring	Credits
ENSCI 3120		ENSCI 3180	3
Environmental science choice[1]	3	ENSCI 3190	3
Arts and humanities choice[3]	3	Arts and humanities choice[2]	3
Elective	3	Elective	3
Elective	1-2	Elective	3
		Summer: Consider field experience such as an intership or field station courses.	
	10-11		**15**

Senior

Fall	Credits	Spring	Credits
Environmental science choice[1]	3	Environmental science choice[1]	3
Social science choice[2]	3	Environmental science choice[1]	3
Electives	9	Electives	9
	15		**15**

Students in all ISU majors must complete a 3 credits in U.S. Cultures and Communities and a 3 credits in International Perspectives. Check the Environmental Science website (http://www.ensci.iastate.edu) for a list of approved courses.

Minimum of 120 credits required , including a minimum of 45 credits at the 300/400 level.

1. Students complete at least 32 credits in Environmental Science including ENSCI 1100, ENGL 2010, ENSCI 2500, ENSCI 3120, ENSCI 3180, ENSCI 3190 and 12 additional credits of approved ENSCI coursework.
2. Students complete at least 12 credits in arts and humanities and 9 credits in social science from approved lists. These credits can also be used to meet the U.S. Cultures and Communities and International Perspectives requirements.
3. Students choose one course from the following Physical or Life Science related courses: AGRON 1820, AGRON 2820, BIOL 2120, CHEM 1780 & CHEM 1780L, GEOL 1000, GEOL 2010, MTEOR 2060, PHYS 1150, PHYS 1310, PHYS 2310. Students choose from one of the following Organic Chemistry options: CHEM 2310 & CHEM 2310L, CHEM 3310 & CHEM 3310L, BBMB 2210, or AGRON 2590.

Graduate Study

Contact information for the graduate program:

Lynette Edsall

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515-294-1191

https://enscigrad.iastate.edu/

The Environmental Science graduate program offers an interdepartmental curriculum leading to M.S. and Ph.D. degrees with a major in Environmental Science. Faculty from the colleges of Agriculture and Life Sciences, Engineering, and Liberal Arts and Sciences cooperate to offer courses and research opportunities covering a broad array of environmental topics. Cooperating departments include Agricultural and Biosystems Engineering; Agronomy; Animal Science; Civil, Construction and Environmental Engineering; Ecology, Evolution and Organismal Biology; and Earth, Atmosphere, and Climate.

Applicants should have completed an undergraduate or master's degree in one of the biological, chemical, physical, or engineering sciences or should have equivalent preparation.

The Environmental Science Graduate Program emphasizes fundamental concepts and research, which at the same time address major

environmental issues. The curriculum is designed to provide the interdisciplinary approach needed in environmental science education and research. In addition to work in their chosen area of specialization, students are afforded a broad exposure to the biological, chemical and physical aspects of environmental systems and the specialized training necessary for integrated analysis of these systems.

Information on application procedures, curriculum requirements, and faculty research areas is available on the Environmental Science Graduate Program website (https://enscigrad.iastate.edu/).