

Environmental Sciences

Chair, Department of Earth and Environmental Sciences

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Undergraduate major: environmental sciences (BA, BS)

Undergraduate minor: environmental sciences

Faculty: <https://environmentalsciences.uiowa.edu/people>

Website: <https://environmentalsciences.uiowa.edu/>

The Environmental Sciences Program provides rigorous interdisciplinary training in the scientific study of the environment. It promotes an understanding of the earth as a complex network of interacting organic and inorganic systems. The program's undergraduate curricula reflect the diversity in the broad field of environmental sciences and draw upon the College of Liberal Arts and Sciences' disciplinary strengths, giving students the opportunity to develop particular areas of expertise.

Hands-on field experience is a crucial component of the program. Students are strongly encouraged to engage in research and study abroad.

The Department of Earth and Environmental Sciences is the administrative home for the Environmental Sciences Program.

Programs

Undergraduate Programs of Study

Majors

- Major in Environmental Sciences (Bachelor of Arts)
- Major in Environmental Sciences (Bachelor of Science)

Minor

- Minor in Environmental Sciences

Facilities

Depending on their choice of track and/or course selection, students majoring in environmental sciences may have the opportunity to take courses at Iowa Lakeside Laboratory, a field station located on West Lake Okoboji, in northwestern Iowa. Run cooperatively by the University of Iowa, Iowa State University, and the University of Northern Iowa, the laboratory offers courses at the undergraduate and graduate levels and provides excellent conditions for summer study in several disciplines. See Iowa Lakeside Laboratory (University College) in the catalog or visit the Lakeside Laboratory website.

Courses

Environmental Sciences Courses

ENVS:1080 Introduction to Environmental Science **3-4 s.h.**

Biological and physical character of the Earth; interaction of humans with the environment, including impacts on ecosystems, climate, natural processes, resources; alternative options, including sustainability, waste management, energy, land reform. GE: Sustainability. GE: Natural Sciences with Lab; Natural Sciences without Lab. Same as EES:1080.

ENVS:1081 Introduction to Environmental Sciences Laboratory **1 s.h.**

Laboratory component of EES:1080. Requirements: completion of 3 s.h. in EES:1080 or ENVS:1080; or 3 s.h. of transfer equivalent. GE: Natural Sciences Lab only. Same as EES:1081.

ENVS:1085 Fundamentals of Environmental Science **4 s.h.**

Interdisciplinary study of how Earth's natural systems interact, how these systems affect society, and how they respond to human activity; how environmental problems can be solved and avoided by drawing upon knowledge in disciplines as diverse as ecology, anthropology, economics, chemistry, and political science; blended instructional environment, including traditional lectures, discussions in TILE classrooms, laboratory, online learning, peer-reviewed writing exercises, and service learning. Offered fall semesters. GE: Sustainability. GE: Natural Sciences with Lab. Same as EES:1085.

ENVS:1115 The History of Oil **3 s.h.**

Historical perspective on business, science, geology, technology, politics, environment, and culture of the global oil industry; the rise of oil as the most influential international business of the last 150 years, the material foundation of economies, a major force in world politics, a shaper of daily life, and a guide to understanding Earth's deep history. Offered fall semesters. GE: Sustainability. GE: Historical Perspectives. Same as EES:1115, GEOG:1115, HIST:1115.

ENVS:2001 Second-Year Field Trip for Earth and Environmental Sciences **1 s.h.**

Opportunity for students to begin developing an appreciation of earth system and earth history scales; application of classroom learning to field-based inquiry; real-world examples of introductory course material in an outdoor classroom setting. Prerequisites: EES:1030 or EES:1050 or EES:1080 or ENVS:1080. Requirements: geoscience or environmental sciences major. Same as EES:2001.

ENVS:2010 Interdisciplinary Environmental Seminar **1 s.h.**

Discover research, explore careers, and build connections. Requirements: first- or second-year standing. Same as EES:2010, GEOG:2010.

ENVS:2020 Earth's Climate System **3 s.h.**

Overview of climate science and how we understand Earth's climate system through interconnected relationships between oceans, atmosphere, biosphere, and geosphere; introduction to climate archives, systems science, climate modeling, and mechanisms responsible for ancient and modern climate change. Recommendations: EES:1030, EES:1050, EES:1080, EES:1085, or GEOG:1020. Same as EES:2020.

- ENVS:2200 Historical Geology** 4 s.h.
 Framework of earth history that is essential to understand how the earth system works; investigation of physical, biological, atmospheric, oceanographic, and chemical history of the earth to prepare for further earth and environmental science courses. Prerequisites: EES:1030 or EES:1050 or EES:1080 or ENVS:1080 or EES:1085 or ENVS:1085. Same as EES:2200.
- ENVS:2673 Ecology** 3 s.h.
 Adaptations of organisms to their physical and biological environments; organism-environment interactions; population biology; interactions between species; ecology of communities, ecosystems; human impact on ecosystems. Recommendations: a basic statistics or calculus course. Same as BIOL:2673.
- ENVS:3001 Third-Year Field Trip for Earth and Environmental Sciences** 1 s.h.
 Opportunity for students to apply their major coursework to real-world problems; field trip to visit parks, mines, and/or quarries in Missouri and Arkansas that illustrate many of the lessons learned in EES:2410 and EES:3500. Prerequisites: EES:1030 or EES:1050 or EES:1080 or ENVS:1080 or EES:2410. Requirements: geoscience or environmental sciences major, and junior standing. Same as EES:3001.
- ENVS:3010 Interdisciplinary Environmental Seminar** 1 s.h.
 Role of sciences in environmental issues and problems; progression from observation to evaluation to design of better questions and experiments. Requirements: third- or fourth-year standing. Same as EES:3010, GEOG:3003.
- ENVS:3020 Earth Surface Processes** 3 s.h.
 Basic geomorphic and environmental processes that shape the earth's surface; emphasis on erosion, transport, deposition by land mass movement (creep, landslides, earth flow), fluid agents (wind, water, ice); methods used to study these processes. Recommendations: EES:1050 or EES:1080 or ENVS:1080 or GEOG:1020 or EES:1085 or ENVS:1085. Same as EES:3020, GEOG:3020.
- ENVS:3050 Geology of Iowa** 2 s.h.
 Exploration of geologic history responsible for landscape, soil, rocks, fossils, water, and natural resources of Iowa; background of Iowa's natural history; preparation for K-12 educators to deliver earth and environmental science content in their own classrooms, utilizing natural landscapes in Iowa. Same as EES:3050.
- ENVS:3051 Geology of Iowa Field Trip** 1 s.h.
 Exploration of the geologic history responsible for landscape, soil, rocks, fossils, water, and natural resources of Iowa; field-based examples of Iowa's natural history; preparation for K-12 educators to deliver earth and environmental science content in their own classrooms utilizing the natural landscapes in Iowa. Recommendations: EES:3050. Same as EES:3051.
- ENVS:3095 Field Ecology** 4 s.h.
 Analysis and interpretation of patterns and underlying physical and biotic basis for regional and local distributions of plants and animals of eastern Iowa; field observation, sampling, and laboratory analysis; conduction of several field research projects requiring collection, statistical analysis, and interpretation of data in short reports; field-oriented course. Prerequisites: BIOL:2673. Recommendations: advanced undergraduate standing or graduate standing in ecology, environmental sciences, or geoscience.
- ENVS:3096 Winter Ecology** 2 s.h.
 How seasons occur, thermoregulation, microhabitats, what animals are active, and winter plant identification; local area fieldwork.
- ENVS:3097 Introduction to Bird Study** 2 s.h.
 Basic identification skills, bird banding, and bird ecology; Hageboeck Hall of Birds at the UI Museum of Natural History; local field study.
- ENVS:3100 Earth and Planetary Remote Sensing** 4 s.h.
 Remote sensing of the earth's surface from aircraft, satellites; aerial photograph interpretation; remote sensing systems, methods, data analysis using electromagnetic spectrum and digital processing techniques, including visible, infrared, microwave radiation; remote sensing applied to geologic and environmental problems. Prerequisites: EES:1030 or EES:1050 or EES:1080 or EES:1085. Same as EES:3100.
- ENVS:3110 Chemical Evolution of the Oceans** 3 s.h.
 Investigation of various physicochemical states oceans have assumed over the past 4 billion years of Earth history; use of isotope geochemistry as a proxy for ancient ocean conditions; focus on integrated Earth system science, paleoceanographic and paleoclimate modeling, role of chemical stratigraphy in deciphering past climate states of ocean-atmosphere system; relationship between chemical changes in ocean/atmosphere and biological systems of the Earth. Same as EES:3110.
- ENVS:3230 Special Topics** 0-4 s.h.
 Contemporary issues in environmental science.
- ENVS:4001 Fourth-Year Field Trip for Earth and Environmental Sciences** 2 s.h.
 Application of core course learning to real-world examples; students develop a broader understanding of interrelated aspects of earth and environmental sciences as truly integrated scientific endeavors; field trip to Big Bend National Park to highlight a wide range of geoscience and environmental science studies and provide students an opportunity to apply all aspects of their training to the amazing geologic landscape of southwest Texas; capstone field experience for students heading into their senior year. Prerequisites: EES:2831. Requirements: geoscience or environmental sciences major, and senior standing. Same as EES:4001.