DEPARTMENT OF ENVIRONMENTAL SCIENCES

Jonathan M. Bossenbroek, Chair
Von Sigler, Associate Chair, undergraduate advisor (BIOM)
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Scott Heckathorn, undergraduate advisor (environmental sciences)
Trisha Spanbauer, honors advisor

Degrees Offered

The Department of Environmental Sciences is an interdisciplinary group of ecologists and geologists whose research and teaching interests address human impacts on the environment, earth surface processes and ecosystem science. The two main areas of focus in our department include biology: organismal/ecology and geology: surficial/environmental. We are committed to providing you with an excellent educational experience that includes real-life problem solving, and field and laboratory work.

The Department of Environmental Sciences offers degree programs for a Bachelor of Arts in environmental studies, a Bachelor of Science in environmental science, a Bachelor of Science in geology, and a Bachelor of Science in biology with a concentration in ecology and organismal biology (BIOM). http://www.utoledo.edu/nsm/envsciences/undergrad/

Mission Statement

The Mission of the Department of Environmental Sciences is to conduct research to create today's environmental solutions, teach to train tomorrow's environmental leaders, and serve to promote global environmental awareness.

General Description

The Toledo region offers potential students an ideal natural laboratory for studies in ecology, geology, and environmental sciences because it is located where unique natural habitats and landforms occur in proximity to high human population and natural resource use. Toledo is in northwestern Ohio, on the western shore of Lake Erie at the mouth of the Maumee River. The greater metropolitan area is characterized by glacial terrains, and agricultural, urban, and natural ecosystems. Local rivers, Lake Erie's productive fisheries and wetlands, the remarkable diversity of the Oak Openings savannas and woodlands, and wetland remnants of the Great Black Swamp, make the Toledo region a dynamic location for the study of environmental sciences as well as an enjoyable place to live and work.

The Department's strengths in education and research are in the areas of: Earth surface processes; aquatic, landscape, microbial, plant, soil, systems, and vertebrate ecology; and bioremediation and phytoremediation. Research in other areas of both ecology and geology is also conducted. Much of this research occurs in the Toledo region, and often in other parts of the US and the world.

Junior Year Studies at the University of Salford in England for Environmental Sciences and Biology Majors

Selected UT students in the Department of Environmental Sciences have the opportunity to spend their junior year at Salford. Participants in the program will pay their instructional and general fees to The University of Toledo. Eligibility to participate in the program is based on criteria established by the Department of Environmental Sciences. Information on the program may be obtained from the departmental exchange program advisor (W. Von Sigler) or from Dr. Brian Ashburner, Director of the UT-Salford Exchange Program. Details are available on academic issues, living accommodations, recreational opportunities and life in England on the departmental Web site at http://www.utoledo.edu/nsm/bio/salford/

Degrees offered

- BA in Environmental Studies (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/ba-environmental-studies/)
- BS in Biology with a Concentration in Ecology and Organismal Biology (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/bs-biology-concentration-ecology-organismal-biology/)
- BS in Environmental Sciences (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/bs-environmental-sciences/)
- Minor in Environmental Biology (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/environmental-biology-minor/)
- Minor in Environmental Sciences (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/minor-environmental-sciences/)
- Minor in Geology (https://catalog.utoledo.edu/undergraduate/natural-sciences-mathematics/environmental-sciences/minor-geology/)

EEES 1010 Physical Geology
[3 credit hours]
Introduction to the physical processes and composition of the Earth, including plate tectonics, internal structure, origin and classification of rocks and minerals, causes of geologic hazards such as earthquakes and volcanoes, surficial processes, water and natural resources, and geologic time. No credit if EEES2100 is taken. Natural sciences core course. Optional 1-credit lab, EEES 1020.
Term Offered: Spring, Summer, Fall
Core Natural Sciences, OT36 Natural Science

EEES 1020 Introductory Geology Laboratory
[1 credit hour]
Investigations of fundamental geological processes, the materials of the Earth, and geologic time. Identification of rocks and minerals. Interpretation of geologic features and processes from maps, aerial images and physical models. This lab supports the introductory geology courses EEES 1010, 1050 and 2100. Natural sciences lab core course.
Prerequisites: EEES 1010 (may be taken concurrently) with a minimum grade of D- or EEES 2100 (may be taken concurrently) with a minimum grade of D-
Term Offered: Spring, Summer, Fall
Core Natural Sciences, OT36 Natural Science

EEES 1050 Geological Hazards And The Environment
[3 credit hours]
Introduction to risk mitigation involving hazardous geological processes and materials: volcanic eruptions, earthquakes, floods, ground subsidence and collapse, radon, asbestos and others.
Term Offered: Spring, Summer, Fall
Core Natural Sciences

EEES 1130 Down To Earth: Environmental Science
[3 credit hours]
Evaluation of environmental controversies using ecology, economics and human values. Issues range from global change, overpopulation, food production, pollution, disease, endangered species, to unique habitats including rainforests and coral reefs. (not for credit in the major)[Fall, Spring]. Natural Sciences core course.
Term Offered: Spring, Summer, Fall
Core Natural Sciences, OT36 Natural Science

EEES 1140 Environmental Solutions Laboratory
[1 credit hour]
Basic scientific methods are used to conduct laboratory and field studies relevant to contemporary environmental issues.
Term Offered: Spring, Summer, Fall
Core Natural Sciences

EEES 1150 Marine Biology
[3 credit hours]
An exploration of life in the world's oceans, emphasizing how marine organisms thrive in broadly diverse environments. Topics include the major ocean habitats, and ecological relationships among associated flora/fauna.
Term Offered: Spring, Fall
Core Natural Sciences

EEES 1160 Plants And Society
[3 credit hours]
This course centers on the importance of plants to our planet. Includes an introduction to botany and discussion of plants that provide food, materials, spices, medicines, drugs and poisons. (not for major credit)
Core Natural Sciences

EEES 1170 Microbes And Society
[3 credit hours]
A survey course focused on how microbes impact everyday life including discussions of infectious disease, food safety, and bioterrorism. Natural Sciences core course.
Term Offered: Spring, Summer
Core Natural Sciences

EEES 1180 Marine Biology Coral Reef Lab
[1 credit hour]
A virtual laboratory-based exploration of the coral reef environment and the dynamics of the coral reef ecosystem. The web of life on reefs will be examined at multiple levels, including living and non-living components and specialized roles among species, with emphasis on the delicate balance of natural processes and impacts of various stressors. Online data labs will be enhanced with at-home activities including creating and manipulating a physical model of a reef ecosystem. This course fulfills the university requirement for a natural science laboratory.
Term Offered: Spring
Core Natural Sciences

EEES 2010 Introduction To Environmental Studies
[3 credit hours]
Introduction to issues currently affecting environmental quality. Fundamental scientific concepts relating to those issues and ethical, economic, legal and political considerations that affect the resolution of environmental problems.
Term Offered: Spring, Fall

EEES 2020 Introduction to the Environment: Energy and Climate
[3 credit hours]
Introduction to issues currently affecting environmental quality associated with energy production and the impacts to climate change. Fundamental scientific concepts relating to those issues and ethical, economic, legal and political considerations that affect the resolution of environmental problems.
Term Offered: Spring, Fall

EEES 2030 Introduction to the Environment Land-Use and Water
[3 credit hours]
Introduction to issues currently affecting environmental quality associated with land-use (e.g. agriculture and urbanization) and focusing on the impacts to biodiversity and aquatic systems. Fundamental scientific concepts relating to those issues and ethical, economic, legal and political considerations that affect the resolution of environmental problems.
Term Offered: Spring, Fall

EEES 2100 Fundamentals Of Geology
[4 credit hours]
Consideration of earth materials and the dynamic external and internal processes active on earth; the physical and biological history of the earth. Intended for science majors.
Term Offered: Spring, Fall

EEES 2150 Biodiversity
[4 credit hours]
Exploration of biodiversity and general biological processes and problems as they are experienced by all living organisms: genetics, reproduction, evolution, and ecology.
Term Offered: Spring, Summer, Fall
Core Natural Sciences, OT36 Natural Science

EEES 2160 Biodiversity Laboratory
[1 credit hour]
Laboratory exercises designed to complement the material covered in EEES 2150.
Corequisites: EEES 2150
Term Offered: Spring, Fall
Core Natural Sciences

EEES 2200 Climate Change
[3 credit hours]
An overview of the understanding of climate change and role of human activities, including atmospheric processes, greenhouse effect, carbon cycling, physical evidence, impacts, and proposed global actions in response.
Term Offered: Spring, Summer, Fall

EEES 2230 Earth History: Historical Geology and Paleontology - WAC
[4 credit hours]
The morphology and paleoecology of fossil taxa, significant strata, and tectonic events important to the interpretation of paleoenvironments and Earth history are stressed. Field trip(s) required.
Prerequisites: EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-
Term Offered: Spring

EEES 2400 Oceanography And Water Resources
[3 credit hours]
An exploration of the geological, physical, chemical and biological nature of the oceans. Emphasis on the origin and evolution of ocean basins, plate tectonics, properties of seawater, and physical processes of circulation, especially as related to climate, the hydrologic cycle, and life in the oceans.
Term Offered: Spring, Fall

EEES 2500 Computer Applications In Environmental Sciences
[1 credit hour]
Desktop computers used by scientists: word processing, spreadsheets, databases, GPS, processing GPS files, contour and mapping software.
Term Offered: Spring, Fall

EEES 2510 Advanced Computer Applications
[2 credit hours]
Collecting and analyzing spatial data, digital elevation models, mathematical modeling of natural processes and introduction to matrix operations in Excel.
Prerequisites: EEES 2500 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 2600 Techniques for Environmental Sciences
[3 credit hours]
A “hands-on” active-learning lab-based course exploring a range of commonly-used analytical techniques used in environmental sciences, as well many other fields. The techniques covered include: nutrient analysis, gas exchange, growth analysis, electrophoresis, immuno-detection techniques such as ELISA, and metabolite analysis.
Prerequisites: EEES 2150 with a minimum grade of C- and EEES 2500 with a minimum grade of C- and CHEM 1230 with a minimum grade of C-
Term Offered: Spring

EEES 2760 Field Methods Lab
[3 credit hours]
Field exercises relevant to data collection, data analysis, and use of standard field methods and equipment in local ecosystems around Toledo. Field trips will focus on developing testable hypotheses, collecting data to answer those hypotheses using standard methods and equipment, analyzing data, and writing and presenting results in a scientific format.
Prerequisites: EEES 2150 with a minimum grade of C- or EEES 2100 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 2980 Special Topics
[1-4 credit hours]
A lower division undergraduate course covering some aspect of environmental sciences not covered in the formal course offerings of the department. Students may repeat the course for different topics.
Term Offered: Spring, Fall

EEES 2990 Independent Study
[1-4 credit hours]
Student selects an appropriate approved subject for individualized study and prepares a report or gives equivalent evidence of mastery of the selected subject.
Term Offered: Spring, Summer, Fall

EEES 3000 Geology Of National Parks
[3 credit hours]
Study of regional geology of the U.S., focusing on national parks and monuments with the aim of furthering the student's geological knowledge and encouraging visitation as a tourist.
Prerequisites: EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-
Term Offered: Fall

EEES 3050 General Ecology
[3 credit hours]
The structure, function and regulation of populations, communities and ecosystems, emphasizing human activities and their ecological consequences.
Prerequisites: EEES 2150 with a minimum grade of C- or BIOL 2150 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 3060 General Ecology Laboratory
[1 credit hour]
Laboratory and field exercises demonstrating ecological principles.
Corequisites: EEES 3050
Term Offered: Fall

EEES 3100 Surficial Processes
[3 credit hours]
Description and study of the earth's surface features from the point of view of their origin, including landforms created by glaciers, rivers, the wind, along coasts, tectonics and erosional/depositional processes. Field trip required.
Prerequisites: (EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-) and EEES 1020 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 3210 Mineralogy and Petrology
[4 credit hours]
Mineralogy: Occurrence, characteristics and crystal chemistry, identification and geologic environments of formation of common minerals. Igneous and Metamorphic Petrology: Igneous and metamorphic rock characteristics, origins, classification and interpretation of conditions of formation. Laboratory: Using megascopically observable physical properties to identify and classify common minerals and infer crystal chemistry. Megascopic identification and classification of igneous and metamorphic rocks, identification of mineral associations and interpretation of conditions of formation.
Prerequisites: (EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-) and CHEM 1230 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 3220 Sedimentary Petrology and Stratigraphy
[3 credit hours]
Megascopic description of sediments and sedimentary rocks, including their characteristics, classification and diagenesis; introduction to depositional processes and environments of sediments, and stratigraphic relationships of sedimentary rocks.
Prerequisites: EEES 2100 with a minimum grade of C- or EEES 1010 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 3250 Engineering Geology
[3 credit hours]
An introduction to the application of geologic principles to engineering practices through a series of readings, laboratory exercises and practical problems. First the fundamentals of geology are presented including: plate tectonics and the resulting distributions of geologic materials and phenomena; mineral, rock and soil characterization; geologic structures; and construction and use of geologic maps. The remainder of the course investigates specific geologic processes and applications to engineering practices.
Prerequisites: MATH 1750 with a minimum grade of C- or MATH 1830 with a minimum grade of C- or MATH 1850 with a minimum grade of C- or MATH 2450 with a minimum grade of C-
Term Offered: Fall

EEES 3310 Earth Structures and Mapping
[3 credit hours]
Rock deformation and its expression on maps; applying geometrical and trigonometric principles to solve problems involving dipping strata; stereonet applications, interpreting geological maps, constructing cross sections, geological GIS applications.
Prerequisites: EEES 2100 with a minimum grade of C- or EEES 1010 with a minimum grade of C-
Term Offered: Fall

EEES 3600 Oceanography
[3 credit hours]
An exploration of the geological, physical, chemical and biological nature of the oceans. Emphasis on the origin and evolution of ocean basins, plate tectonics, properties of seawater, and physical processes of circulation, especially as related to climate, the hydrologic cycle, and life in the oceans.
Prerequisites: EEES 2100 with a minimum grade of C- or EEES 1010 with a minimum grade of C- and MATH 1210 with a minimum grade of C- or MATH 1320 with a minimum grade of C- or MATH 1340 with a minimum grade of C-
Term Offered: Spring

EEES 3800 Botany
[4 credit hours]
A detailed introduction for science majors to general plant biology, via lecture and laboratory. Topics include plant structure, function, evolution, diversity, agriculture and other non-food uses, and ecology.
Prerequisites: EEES 2150 with a minimum grade of D- and BIOL 2170 with a minimum grade of D-
Term Offered: Spring

EEES 3810 Science of Gardening
[3 credit hours]
This course explores the science underlying gardening, and it is designed to foster understanding of basic scientific knowledge and the scientific process, as well as the practical application of science. The course focuses on how plants are affected by their biotic and abiotic environment, especially light, water, temperature, nutrients,soil, and enemies and partners.
Prerequisites: EEES 2150 with a minimum grade of C-

EEES 3900 Literature And Communications In The Environmental Sciences
[3 credit hours]
Survey and analysis of environmental issues featuring guest experts from a variety of environment-related occupations, readings from the environmental literature and student reports.
Prerequisites: ENGL 1110 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4100 Glacial Geology
[3 credit hours]
To understand glaciers and glacial landscapes. Topics include mass balance, ice flow, hydrology, erosion, deposition, landforms, glacial lakes and development of the Ohio glacial landscape. Field trip is mandatory.
Prerequisites: EEES 3100 with a minimum grade of C-
Term Offered: Spring

EEES 4150 Evolution
[3 credit hours]
The modern theory of evolution is presented within a general framework of biological and geological evidence focusing on the fossil record, early biomolecules, protein synthesis, genetics, phylogeny and vertebrate evolution.
Prerequisites: (EEES 2150 with a minimum grade of C- or BIOL 2150 with a minimum grade of C-) and CHEM 1230 with a minimum grade of C-
Term Offered: Spring, Summer, Fall

EEES 4160 Environmental Data Management
[3 credit hours]
An introductory course in data management for environmental science seniors covering the basics of data management practices and the use of Excel and R for data preparation, evaluation, analysis, visualization, and interpretation. Prerequisite: EEES 2500 or approval of instructor.
Prerequisites: EEES 2500 with a minimum grade of C-
Term Offered: Fall

EEES 4200 Quaternary Geology
[3 credit hours]
To provide understanding of such cyclical events as climate change, sea level fluctuations, vegetation change and ice sheet paleogeography during the Quaternary Period and to explore future changes for planet Earth. Field trip is mandatory.
Prerequisites: EEES 3100 with a minimum grade of C-
Term Offered: Spring

EEES 4220 Environmental Geochemistry
[3 credit hours]
Chemical reactions of environmental concern. Water and soil chemistry related to contaminant fate and mobility. Computer software used.
Term Offered: Spring

EEES 4240 Soil Science
[3 credit hours]
Basic principles of soil formation, physics, and chemistry with emphasis on their influence on fluid and chemical migration and preservation of soil quality from geological, agricultural and environmental perspectives.
Prerequisites: CHEM 1230 with a minimum grade of C- or CHEM 1090 with a minimum grade of C-
Term Offered: Spring

EEES 4250 Soil Ecology
[3 credit hours]
Underlying concepts and theory of modern soil ecology will be reviewed including the biogeochemical cycles and ecological functions of soil, and the effects of human activities. (Spring, alternate years, odd)
Prerequisites: EEES 3050 with a minimum grade of C- or EEES 4240 with a minimum grade of C-
Term Offered: Fall

EEES 4260 Soil Ecology Laboratory
[1 credit hour]
Laboratory exercises designed to complement the material covered in the lecture.
Term Offered: Fall

EEES 4300 Field Botany
[3 credit hours]
Introduction to the principles and methodology of plant taxonomy with particular attention to the native plant species.
Prerequisites: EEES 2150 with a minimum grade of D- or BIOL 2150 with a minimum grade of D-

EEES 4330 Vertebrate Ecology And Systematics
[4 credit hours]
Ecology, systematics and conservation of the vertebrates, with special emphasis on forms native to North America.
Prerequisites: EEES 2150 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4350 Ecology and Conservation of Reptiles and Amphibians
[3 credit hours]
The ecology, diversity, evolution, and conservation of amphibians and reptiles. Lectures will discuss natural history, trait diversity, evolutionary context, and ecological implications of amphibians and reptiles. Hands-on activities include taxonomy and identification of local species, survey and field methods, and discussions of scientific literature. Throughout this course, the biology of amphibians and reptiles will be emphasized in the context of conservation.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring

EEES 4355 Ecology and Conservation of Reptiles and Amphibians Lab
[1 credit hour]
Laboratory and field exercises relevant to the conservation and biology of reptiles and amphibians. This course includes field trips, data collection, and analysis of data and samples. Field trips will focus on standard methods of catching, handling, and marking reptiles and amphibians, along with field techniques relevant to studying the ecology and conservation of reptiles and amphibians.
Term Offered: Spring

EEES 4410 Hydrogeology
[3 credit hours]
Fundamentals of groundwater/earth interactions are introduced concentrating on physical aspects of groundwater flow with applications to the field of water resources and contaminant investigations.
This course is designed as the fundamental course in groundwater for students who plan to use hydrogeology in their careers, e.g., environmental geologists, civil and environmental engineers, environmental specialists and scientists, and petroleum geologists.
Prerequisites: MATH 1750 with a minimum grade of C- or MATH 1830 with a minimum grade of C- or MATH 1850 with a minimum grade of C- or MATH 2450 with a minimum grade of C-
Term Offered: Spring

EEES 4450 Hazardous Waste Management
[3 credit hours]
Environmental regulations concerning hazardous waste, characteristics of hazardous waste and disposal technologies, toxicology, characteristics of organic chemicals and heavy metals, biodegradation, soil science, groundwater contamination, risk assessment, site investigation.
Prerequisites: CHEM 1230 with a minimum grade of C- or CHEM 1090 with a minimum grade of C-
Term Offered: Fall

EEES 4480 GIS Applications in ENSC
[3 credit hours]
An applications course focused on using GIS techniques and applications in environmental problems and research.
Term Offered: Fall

EEES 4490 Remote Sensing of The Environment
[4 credit hours]
Introduction to theory, methods and techniques used to gather and analyze remote sensor data. Topics range from low altitude air photo interpretation through satellite image acquisition.
Prerequisites: GEPL 2010 with a minimum grade of C- or EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-
Term Offered: Fall

EEES 4510 Environmental Microbiology
[3 credit hours]
The diversity of microbial life and activities, the functioning of microbial ecosystems in energy and carbon flow and remediation of polluted environments, and the detection and control of pathogens.
Prerequisites: (EEES 2150 with a minimum grade of C- and CHEM 1230 with a minimum grade of C-)
Term Offered: Fall

EEES 4520 Bioremediation
[3 credit hours]
The environmental fate and transport of contaminants; their transformation and biodegradation by plants and microorganisms; bioremediation strategies, including solid phase, slurry phase, and vapor-phase treatments, and natural attenuation.
Prerequisites: (EEES 2150 with a minimum grade of C- and CHEM 1230 with a minimum grade of C-)

EEES 4540 Microbial Ecology
[2 credit hours]
Students will learn the underlying processes that drive microbial population structure and function in the context of the environment and public health, and become familiar with classical and current methodology used in microbial community analysis.
Prerequisites: EEES 2150 with a minimum grade of C- or BIOL 2170 with a minimum grade of C-
Term Offered: Fall

EEES 4550 Methods Of Microbial Investigation
[3 credit hours]
Student will learn the classical and current methodologies (biochemical and molecular) used in microbial community analysis while developing an understanding of experimental design sample handling and data analysis.
Prerequisites: EEES 4540 with a minimum grade of C-

EEES 4610 Solid Earth Geophysics
[3 credit hours]
Survey of theory, field applications, interpretation principles of solid earth and exploration geophysics. Two hours lecture, three hours methods laboratory.
Prerequisites: (EEES 1010 with a minimum grade of C- or EEES 2010 with a minimum grade of C-) and (MATH 1750 with a minimum grade of C- or MATH 1830 with a minimum grade of C- or MATH 1850 with a minimum grade of C- or MATH 2450 with a minimum grade of C-)
Term Offered: Spring

EEES 4630 Numerical Methods In Geophysics
[3 credit hours]
Numerical filters and matrix operations used to process potential field data and wave forms, isolating anomalies and signals of interest; derivative maps, upward and downward continuation; current interpretation software. Term project.
Prerequisites: EEES 4610 with a minimum grade of C-
Term Offered: Spring

EEES 4650 Geology Field Course
[1-4 credit hours]
Intensive field studies in various areas of geologic interest. Studies may involve various geologic field methods and descriptive techniques. Course may be repeated multiple times. Fall and Spring.
Prerequisites: EEES 1010 with a minimum grade of C- or EEES 2100 with a minimum grade of C-

EEES 4730 Aquatic Ecology
[3 credit hours]
The biology of populations, communities and ecosystems with emphasis on aquatic environments. Includes the application of principles and theory from aquatic ecology to help understand and solve management problems in aquatic systems.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4740 Aquatic Ecology Laboratory
[1 credit hour]
Laboratory exercises on the biology of aquatic populations, communities and ecosystems.
Corequisites: EEES 4730
Term Offered: Spring, Fall

EEES 4750 Conservation Biology
[3 credit hours]
The application of principles of ecology, biogeography, genetics, economics, philosophy and other disciplines to the study and maintenance of biological diversity in temperate, subtropical and tropical systems.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4755 Conservation Biology Lab
[1 credit hour]
Laboratory and field exercises relevant to the conservation biology of populations, communities and ecosystems. This course includes field trips, sample analyses and computer-based approaches to biodiversity inventories and reserve design.
Prerequisites: EEES 4750 (may be taken concurrently) with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4760 Landscape Ecology
[3 credit hours]
A general introduction to the theory and practice of landscape ecology, including landcape-analysis, pattern-process relationship, and potential management applications at multiple spatial and temporal scales.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4790 Ecology Field Trip
[2-4 credit hours]
Field study of globally significant ecosystem(s), including analysis of structural and functional relationship within and between ecosystems. Opportunities for individual student projects. Prerequisite: EEES 3050 or equivalent.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring, Summer

EEES 4850 Dimensions of Sustainability
[3 credit hours]
Dimensions of Sustainability investigates the interactions of human activities with the natural function of the physical and biological systems of Earth. Readings and discussions will evaluate individual issues associated with sustainability, and the ethical responsibility to future generations for stewardship of the global ecosystem and human social structure.
Term Offered: Spring, Fall

EEES 4910 Directed Research
[1-5 credit hours]
Research under guidance of faculty member. An acceptable thesis is required for credit toward major.
Term Offered: Spring, Summer, Fall

EEES 4920 Senior Geology Seminar
[2 credit hours]
Survey of geology at a senior level using readings, class discussions and some lectures. The final exam will be one of the assessment measures for the Geology Program.
Term Offered: Spring

EEES 4940 Internship
[1 credit hour]
The student identifies and communicates with a community professional to earn a short-term, volunteer or paid position that will provide practical experience relevant to the student's plan of study. Student must enroll during the term service is performed.
Term Offered: Spring, Summer, Fall

EEES 4960 Senior Seminar
[1 credit hour]
The intent of the course is to provide senior students with an opportunity to identify relevant positions, create appropriate resumes/CVs and cover letters, and develop necessary interview skills as they plan for their professional careers. Prerequisite: senior standing in ENST, ENSC, GEOL, or BIOL, requiring permission of instructor.
Term Offered: Spring, Fall

EEES 4970 Senior Environmental Capstone
[3 credit hours]
A project-based capstone course focused on integration, synthesis and applications of course work students have taken in their program of study. Departmental majors with different academic backgrounds work in small teams to complete a practical, interdisciplinary project for a client culminating in a scope of work, team-presentation and project report. Clients might include a conservation organization, governmental agency, private industry, school, or other.
Prerequisites: EEES 3050 with a minimum grade of C-
Term Offered: Spring, Fall

EEES 4980 Special Topics: Advanced Undergraduate
[1-4 credit hours]
An advanced undergraduate course covering some aspect of the environmental sciences not covered in the formal upper- division undergraduate curriculum. Students may repeat the course for different topics.
Term Offered: Spring, Summer, Fall

EEES 4990 Independent Study: Advanced Undergraduate
[1-4 credit hours]
Student selects an appropriate approved subject for individualized study and prepares a report or gives equivalent evidence of mastery of the selected subject.
Term Offered: Spring, Summer, Fall

Departmental Honors

Qualified sophomores, juniors and seniors working on degree programs within the department of environmental sciences may be invited to work for one of the following citations, consistent with their degree program: "honors in biology," "honors in environmental sciences," "honors in environmental studies" or "honors in geology."

a. **Admission:** The departmental Honors Program is open to all department majors and may be taken concurrently with College Honors. Admission to the departmental Honors Program is based on academic achievement. Normally, students invited to participate will have achieved a 3.3 or better overall GPA by the end of the sophomore year.
b. **Requirements**: A student must satisfactorily complete from three to six credits of EEES 4910 and graduate with a minimum overall GPA of 3.3 in order to receive the honors citation. Candidates must prepare a written thesis based on their research and present an oral report at an open forum. Candidates also will provide two unbound copies of the approved thesis to the department for binding, one each for the research Advisor and department. This program provides an opportunity for the exceptional student to work closely with a faculty Advisor on an independent research topic. This research experience often leads to publication and is an excellent preparation for graduate studies.