School of Earth & Environmental Sciences

Chairperson: Allan Ludman
Undergraduate Advisors: Jeffrey Bird (Environmental Science and Environmental Studies), Ashaki Rouff (Geology)
Department Office: Science Building D216, 718-997-3300

Distinguished Professor: Hendrey; Professors: Coch, Hemming, Ludman, Markowitz, McHugh, Morabito, Zheng; Associate Professors: Brock, Pekar, Stewart; Assistant Professors: Bird, Blanford, Eaton, O’Mullan, Rouff, Yi; Higher Education Associate: Peter Schmidt; Research Associate and Senior College Laboratory Technician: Balestra; Department Secretary: Schultz; Professors Emeriti: Alexandrow, Brueckner, Finks, Mattson, Schreiber, Speidel, Thurber

Majors Offered: Geology (State Education Code BS: 82333; BA: 26456); Environmental Sciences with Concentration in Geology (BA: 21974; BS: 21975); Environmental Studies (BA: 21980)

The major concentrations in the School of Earth and Environmental Sciences prepare students for graduate and professional careers in the geosciences, environmental sciences, and related industrial areas, and for secondary education careers in earth science, geology, or natural sciences. Courses also provide a background in environmental sciences and studies for students of other natural and social sciences, and broaden the general background of students in all disciplines.

Awards
The School of Earth and Environmental Sciences confers the Lt. George C. Gierak Memorial Award, in memory of a former president of the Geology Club, who gave his life for his country. The Geology Club of Queens College Award is given by the club to the undergraduate geology major with the second highest scholastic average. The Queens College Economic Geology Club of the American Institute of Mining Engineers presents an award to the graduating geology major showing achievement both scholastically and in the field of economic geology. The Walter S. Newman Memorial Scholarship, donated by the family and friends of the former professor and chair of the department, is a cash award given annually to a promising student to help defray the cost of field camp.

THE MAJORS AND MINORS
The school offers a major in geology, a minor in geology, and two interdisciplinary majors — environmental sciences and environmental studies. BA and BS degrees are available in all the majors except environmental studies (BA only). Students planning to major in one of these disciplines will be assigned an advisor with whom they should consult frequently. See the box on the next page for the specific requirements for the majors and minor.

Earth Science Education Minor
Students who wish to become earth science teachers in secondary schools can do so by completing the BA requirements with a major in geology and a major in secondary education through the Secondary Education and Youth Services Department (SEYS). Students should consult with an advisor in Secondary Education and Youth Services before committing to this minor.

Academic Standards
A student may not have a course with a grade below C—credited toward his/her major requirements. A minimum grade of C— is required in any prerequisite courses for the major. A student may not repeat a course more than twice, and credit toward the degree will be given only once. A minimum average of C is required in courses numbered above 200, and in courses in other departments that are counted toward the major.

GEOLOGY COURSES*
Nonmajor Courses

GEOL 3. The Physical Environment. 3 hr.; 3 cr.
The use and misuse of the atmosphere, the oceans, surface and underground water supplies, soils, and mineral deposits. Fall, Spring

GEOL 6. The Fossil Record. 2 lcr., 1 rec. hr.; field trips; 3 cr. The study of fossils as they relate to the history and evolution of life on Earth; to geological time; to ancient environments and climates.†

GEOL 7. Dinosaurs. 3 hr.; 3 cr. The geological, biological, and evolutionary development of dinosaurs and their close relatives in the Mesozoic Era; the environments they lived in; their relationship to other reptiles and birds; their preservation as fossils and their final extinction.‡

GEOL 8. Introduction to Oceanography. 2 lcr., 1 rec. hr., field trips; 3 cr. A survey of the oceans, including their physical structure, biology, chemistry, and geology. Special emphasis is placed on the interactions of society and sea. Science majors are advised to take GEOL 216. (SCI) Fall, Spring

*MAT charges possible.
†Offered either Fall or Spring.
‡May be offered.
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REQUIREMENTS FOR THE MAJORS IN GEOLOGY
Both the BA and BS are offered in geology.

The BA in Geology (Major code 044) requires completion of GEOL 101, 102, 201, 202, 208, 210, 214, 216, 239W, 364, and 370; MATH 141 or 151, CHEM 113.4 and 113.5; PHYS 145.4 or 121.4; and a course in statistics. Students planning to attend graduate school in geology are strongly advised to take a course in Optical Mineralogy (GEOL 721) in their senior year.

For the BS in Geology (Major code 045), students must satisfy the requirements for the BA, complete MATH 152 (or equivalent), CHEM 114.4 and 114.5; PHYS 146.4 or 122.4; and have a total of at least 64 credits in courses applicable to the majors in biology, chemistry, computer science, geology, mathematics, and physics.

ENVIRONMENTAL SCIENCES

The interdisciplinary BA in Environmental Science (Geology concentration Major code 110) requires the courses listed below (students desiring greater depth in biology or biochemistry than is included in the ENSCI major are advised to declare a minor in biology or biochemistry):

1. ENSCI 100, 200, and the capstone ENSCI 373W; and completion of the following introductory science courses that are prerequisite for one or more of the Core Courses or Advanced Courses that follow: GEOL 101, CHEM 113.4 and 113.5, BIOL 165, MATH 151 (or equivalent), and PHYS 121.4 and 121.5.

2. One of the following 200-level Core Courses in addition to the ENSCI 200 listed above: GEOL 208, 216, or ENSCI 203.

3. Two of the following 300-level Advanced Courses: GEOL 318, 342, 347, 359, 370, ENSCI 383, 397, BIOL 340. (Since additional advanced courses will be added to this list in the future, students are advised to check with the Undergraduate Advisor to find out about newly approved additions.)

For the BS in Environmental Science (Geology concentration Major code 111), the student must satisfy the requirements for the BA and complete:

1. MATH 114 (or equivalent);
2. the second semester of three of the required introductory Mathematics and Science courses listed for the BA (GEOL 102, BIOL 106, CHEM 114.4 and 114.5, MATH 152 (or equivalent) or PHYS 122.4 and 122.1);
3. one additional 200-level Core Course; and
4. two additional 300-level Advanced Courses.

ENVIRONMENTAL STUDIES (MAJOR CODE 116)

The interdisciplinary major (BA) in Environmental Studies requires the following courses: ENSCI 100 and 112, URBST 252 and 372, and either ENSCI 373W or URBST 373. Additionally, students will choose six electives from the following list, at least two of which must be in the Natural Sciences. The list of acceptable electives will be expanded as new courses are developed.

Natural Sciences: BIOL 106 (prerequisite BIOL 103), CHEM 240 (prerequisite CHEM 113), ENSCI 200 (prerequisite CHEM 113), ENSCI 383, GEOL 101

Social Sciences/Humanities: ANTH 270, 302, ECON 228 (or 228W), ENGL 327, 327W, PHIL 125, PSCI 287, URBST 207, 235, 236, 241, 253, 254, 258, 373

REQUIREMENTS FOR THE MINOR IN GEOLOGY
(MINOR CODE 44)

GEOL 100 and any five courses numbered above GEOL 200.

MINOR IN ENVIRONMENTAL SCIENCE

The minor in Environmental Science satisfies a growing demand for environmental literacy and its scientific foundation. This minor helps students build a strong subject basis to supplement their major and may be popular for several diverse QC majors including economics, pre-law, pre-medicine, biology, chemistry, and urban studies. Advisement for students wishing to complete a minor in Environmental Science will be provided by SEES faculty to ensure that each minor has a specific area of focus and contributes to each student’s academic goals.

Required:
1. ENSCI 100, Our Planet in the 21st Century: An Introduction to the Environment, 3 lec., 3 lab., 4 cr.
2. ENSCI 200, Earth Systems Science, 3 lec., 3 cr. Prereq.: ENSCI 100; prereq. or coreq.: CHEM 113.4 & 1 (5 cr.)
3. Two additional courses numbered above ENSCI 200 or above GEOL 101.

MINOR IN ENVIRONMENTAL STUDIES

The interdisciplinary minor in Environmental Studies requires the following courses:

ENSCI 100, ENSCI 112, URBST 252. Students will choose three electives from the same list as provided for the major. Environmental Science majors should replace the ENSCI courses with non-ENSCI electives drawn from this list.

GEOL 9. Environmental Issues, GEOL 9.2, 2 hr.; 2 cr., GEOL 9.3, 3 hr.; 3 cr. The scientific background for some major environmental issues is introduced. These issues may include the availability and use of renewable and non-renewable resources; conservation, recycling, waste disposal, and pollution; and land use. Human impact on global environmental problems is examined from both scientific and social points of view. Field trips may be scheduled. (SW, SCI)

GEOL 11. Survey of Atmospheric Science, 3 hr.; 3 cr. An introduction to weather and climate for students competent in high school science. Not open to students who have taken GEOL 342. (SCI) Fall, Spring

GEOL 12. Natural Disasters, GEOL 12.2, 2 hr.; 2 cr., GEOL 12.3, 3 hr.; 3 cr. A course dealing with natural hazards and the devastation they cause. The hazards include floods, volcanic explosions, earthquakes, landslides, and asteroid impacts. (SW, SCI)
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GEOL 16. Earthquakes, Volcanoes, and Moving Continents. 3 lec. hr.; 3 cr. The great changes on the Earth's surface, how they affect us, and how we may predict or attempt to control them. The influence of plate tectonics on the environment, natural resources, and human history. (SW, SCI) Fall, Spring

GEOL 17. Earthquakes. 3 hr.; 3 cr. How, when, and where earthquakes happen. Location and measurement. Daily, weekly, monthly, yearly seismicity of the Earth. The relation of earthquakes to lithospheric plate movements; seismic hazard and mitigation; possible earthquake prediction. Great historic earthquakes and their effect on human activities.

GEOL 18. Volcanoes. 3 hr.; 3 cr. How volcanoes form, where they form, what they erupt. The relation between volcanism and major Earth movements. How volcanoes change during their lifetimes. Possible prediction of volcanic eruptions. The influence of volcanoes on human activities now and in the past.

GEOL 25. Natural Resources and the Environment. 3 hr.; 3 cr. World distribution, production, and requirements for mineral and energy resources. Use, abuse, conservation, and pollution of resources. (SW, SCI) Fall, Spring

GEOL 40. Special Topics in Geology. GEOL 40L, 1 lec. or 3 lab. hr.; 1 cr.; GEOL 40R, 1 or 2 lec., 3 lab. hr.; 2 cr.; GEOL 40T, 2 or 3 lec., 3 lab. hr.; 3 cr. Topic varies from semester to semester. Designed for nonscience students.

GEOL 55. Physical Environment of Long Island. 5 field trips; 1 cr. A field course stressing the physical geography of our local area. Study sites include urban Queens, Cawsett State Park, Fire Island National Seashore, and the Pine Barrens of central Long Island and Montauk Peninsula. Particular emphasis on the origins of land-forms and changing human/land relationships through time. Field trip fee will be required.

GEOL 64. Planetary Geology. 3 lec. hr.; 3 cr. An introduction to the surface features, composition, geological activity, and probable history of the planets, moons, and comets of the solar system, based on the results of space exploration.

GEOL 77. Weather, Climate, and Climate Change. 3 hr.; 3 cr. A basic introduction to the causes of Earth's weather and climate systems and the reasons for long-term climate change. Geologic evidence for climate change over the last 50 million years is applied to understanding what future weather and climate might become. (Not open to students who have taken GEOL 11.) (SW, SCI)

GEOL 99. Planet Earth: Resources and Hazards in the 21st Century. 1 lec.; 2 lab. hr.; 3 cr. An introduction to understanding Earth's composition and processes enables geologists to find the energy and mineral resources on which modern civilization is based, and why those processes can lead to natural disasters if not fully understood. (LPS, SCI)

Introductory Courses

GEOL 100. Introduction to Geology. 3 lec., 3 lab. hr.; 4 cr. Composition of the Earth; interior and surface processes; history of the Earth and evolution of life within the context of plate tectonics; relationships of humans and our environment. Required field trips. (Fall, Spring

GEOL 101. Physical Geology. 3 lec., 3 lab. hr.; 4 cr. A study of the Earth, including the relationship of man to his environment. Required field trips. (LPS, SW, SCI) Fall, Spring

GEOL 102. Historical Geology. 3 lec., 3 lab. hr.; 4 cr. Prereq.: GEOL 100, 101 (or passing grade in Physical Geology, NYS College Proficiency Exam). A history of the origin and development of the universe, with emphasis on the Earth. Required field trip(s). (Swift, SW, SCI)

Major Courses

ENSTD 200. Environmental Management. 3 lec. hr.; 3 cr. Prereq: ENSCI 111 or 112 or GEOL 100 or 101; prereq. or coreq.: GEOL 102 or permission of SEES. Introduction to environmental issues including ethics in environmental management, corporate responsibilities, limitations on the exploitation of natural resources, and the process of making environmental policy. Major anthropogenic environmental problems will be described, and case history examples will be presented in areas such as global warming, air and water pollution, pesticides and toxic materials, and sewage management and waste disposal.

GEOL 201. Earth Materials I. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. The first course in a two-semester study of Earth materials. Minerals: structures, chemistry, and classification. Igneous rocks and their metamorphic equivalents. Field trip(s).


GEOL 208. Surficial Processes and Products. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. An Earth systems approach to geology, climate, and biological factors influencing the development of terrestrial and coastal sediments; evolution of landscapes emphasizing interactions between humans and geologic processes. Field trip(s).

GEOL 210. Water Resources and Conservation. 3 lec. hr.; 3 cr. Prereq.: GEOL 100 and 101 or ENSTD 200 or ENSCI 111 or 112; prereq. or coreq.: GEOL 102 or permission of the instructor. Water use, problems of water supply, water resource management, water quality (present and potential pollution problems and solutions), and water conflicts around the world. Topics will be
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explored through a study of the historical context, the physical process, environmental risks, and future issues.

GEOL 213, 213W. Sedimentation and Stratigraphy. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. The study of sediments and the stratigraphy of sedimentary rocks utilizing physical, chemical, and biological methods. Field trip(s).

GEOL 214. Earth's Internal Processes. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. Earth processes and structures generated by the Earth's internal heat; convection, plate tectonics, folds, and faults. Field trip(s).

GEOL 216. Oceans and Atmosphere. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 101 or ENSCI 200, and MATH 141; prereq. or coreq.: GEOL 102. Evolution and dynamics of the oceans and the atmosphere; ocean-atmosphere interactions; fundamental climate and sea-level changes; human impact on the oceans and atmosphere.

GEOL 237. Origins of Uses of Earth Materials. 2 lec., 1 rec., 2 lab. hr.; 4 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. Recognition of common rock-forming minerals, rock fabric variation, and the implications with respect to origin of various combinations provides the framework for examining the physical and chemical properties of Earth materials. These properties in turn have been of value and use to society. How? Why? When? Where? Changes over time as modified and controlled by availability, accessibility, and aesthetics is a key component, with special emphasis on experiments and exercises that illustrate various points.

GEOL 239W. Evolution of Ecosystems. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101; prereq. or coreq.: GEOL 102. Paleontological evidence for the development of the biosphere through geologic time; reconstruction of food webs, population dynamics, ecological succession, natural selection, functional morphology, and the response to environmental change. Field trip(s).

GEOL 318. Soils in the Environment. 3 lec., 3 lab. hr.; 4 cr. Prereq.: GEOL 201 or 208, or permission of instructor. The processes and behavior of soils in natural and managed environments. This course will address the physical, chemical, and biological properties and processes of soils in the context of their roles in the environment. Topics include the function of soils in supporting plant growth, maintaining environmental quality, and their role in global biogeochemical cycling. Students will learn how soils develop and how management practices affect soil quality, ecosystem productivity, and environmental sustainability. The lab section of the course will provide hands-on experience in fundamental soil physical, chemical, and biological analyses, field trips, and recitation.

GEOL 335. Petrography and Petrology. 4 lec., 3 lab. hr.; 5 cr. Prereq.: GEOL 232 or permission of the department. The description, analysis, and identification of igneous, sedimentary, and metamorphic rocks; rock-forming processes are studied in the laboratory using suites of rocks, and in the field. Topics include hand specimen and microscopic petrography and igneous, sedimentary, and metamorphic petrology.

GEOL 339. Paleontology. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 102 or permission of the department. The nature and significance of extinct animals and plants; their ecology, morphology, and geologic history.

GEOL 342. Introduction to Meteorology. 2 lec., 3 lab. hr.; 3 cr. Prereq.: MATH 141 and PHYS 121 (lecture and lab). An introductory study of meteorology for science majors.

GEOL 347. Principles of Hydrology. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101, CHEM 113.1, CHEM 113.4, and PHYS 121. A survey of surface water and groundwater hydrology, including discussion of water quality, pollution, and water resource management.

GEOL 349. Environmental Geology. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 100 or 101, or permission of the instructor. Geological processes affecting the quality of the environment. Analysis of geologic problems affecting the quality of the environment.

GEOL 356. Principles of Oceanography. 2 hr., lec., 3 lab. hr., field trips; 3 cr. Physical, chemical, biological, and geologic oceanography for science majors. Open to science or mathematics majors of upper-class standing, or by permission of instructor.

GEOL 361. Geology in the Field. 9 hr. fieldwork; 3 cr. Prereq. or coreq.: GEOL 202, 213 and 214, or permission of the instructor. The application of geologic principles to the study of rocks, geologic structures, and landforms in the New York metropolitan area. Introduction to geologic mapping and four-dimensional interpretation of regional geologic history. Offered in the spring semester or summer.

GEOL 364. Comparative Planetary Geology. 2 lec., 3 lab. hr.; 3 cr. Prereq.: GEOL 102 or permission of the department. A detailed study of the surface features, tectonics, volcanism, petrology, and aeolian, glacial, and sedimentary processes of the planets and moons of the solar system. The laboratory work will use geologic maps and spacecraft imaging of the planetary bodies. (Students who have taken GEOL 64 may not take GEOL 364 without approval of the department.)

GEOL 370. Biogeochmistry. 3 lec.; 3 cr. Prereq.: ENSCI 200, or GEOL 101 and CHEM 113.4 and CHEM 113.1. Biogeochemical processes affecting Earth's environmental systems with emphasis on mechanisms for distribution and transport of elements and compounds in and between the atmosphere, biosphere, hydrosphere, and lithosphere.
GEOL 373. Geological Reasoning.  3 hr.; 3 cr. A senior-level course for geologic education majors. Various topics pertaining to the history and philosophy of geology and techniques of problem-solving in the earth sciences will be covered through discussions and individual research projects.

GEOL 382. Seminar.  2 hr.; 2 cr. each seminar. Prereq.: Permission of the department. Advanced topics in geology. Offered primarily for seniors.

GEOL 383. Special Topics in Geology.  2 lec.; 3 lab hr.; 3 cr. Prereq.: Permission of the department. The topic varies from semester to semester. May be repeated for credit provided the topic is different.

GEOL 391, 392, 393. Special Problems. GEOL 391, 1 lec. hr.; 1 cr.; GEOL 392, 2 lec. hr.; 2 cr.; GEOL 393, 3 lec. hr.; 3 cr. Prereq.: Permission of the department. The student works on a research problem under the supervision of a member of the faculty. May be repeated for a maximum of 9 credits. Fall, Spring.

ENVIRONMENTAL SCIENCE COURSES

Introductory Courses

ENSCI 99. A Practical Guide to Environmental Choices.  1 lec. hr.; 2 lab. hr.; 3 cr. A guide for evaluating the consequences of everyday choices about our environment, and environmental issues, on local to global scales including air and water quality, food safety and energy resources. (SW, SCI)

ENSCI 100. Our Planet in the 21st Century: Challenges to Humanity.  3 lec.; 3 lab hr.; 4 cr. Focuses on two major themes of increasing concern to society: global climate change and environment and human health. Theme I, Global Climate Change introduces students to basic concepts in mathematics and physics and the implications of climate change to society using selected examples from the Intergovernmental Panel of Climate Change (IPCC) report. Theme II, Environment and Human Health introduces students to the basic concepts in chemistry and biology used in the study of anthropogenic pollutants and naturally occurring poisons, and to policy changes aimed at reducing human exposure to pollutants in developed and developing countries. (IPS, SW, SCI)

ENSCI 111. Introduction to the Environment.  3 lec.; 1 rec.; 3 lab. hr.; 4 cr. The ecosystem: humans in the scheme of natural things, the impact of human activities on health and the environment; institutions and the environment; cultural, ethical, literary, and artistic responses to the environment. Required field trip(s).

ENSCI 112. Our Changing Planet.  3 lec. hr.; 3 cr. An introduction to Earth system science and global environmental change; the historical and geological processes of change in the lithosphere, atmosphere, hydrosphere, and biosphere; humans as a force for change. (SW, SCI)

Core Courses

ENSCI 200. Earth System Science.  3 lec. hr.; 3 cr. Prereq.: ENSCI 100 or GEOL 101; coreq.: CHEM 113 (lecture and lab). A historical perspective of processes and interactions among the lithosphere, atmosphere, hydrosphere, and biosphere with humans as a force for change; knowledge of how the Earth system responds to changes in these forcings to mitigate the predicted effects for human civilization.

ENSCI 203. Environmental Microbiology.  3 lec. hr.; 3 cr. Prereq.: BIOL 105, GEOL 101, ENSCI 100, and 200 or permission of instructor. CHEM 113 (lecture and lab) highly recommended. A basic understanding and appreciation of microbial processes that may be applicable to students interested in geology, ecology, and environmental science. It covers the fundamental aspects of microbial biology and ecology with a particular emphasis on the roles of microorganisms in sustaining the web of life and earth systems. Specific areas of focus include microbial energetics and yield, enzymes and growth, cell structure and physiology, metabolic and genetic regulation, microbial/environmental interactions, and biogeochemical cycles. The study of microbial diversity and activity will be tightly coupled to the concept of Earth as a dynamic system.

Capstone Course

ENSCI 373W. Environmental Problem-Solving.  3 lec. hr.; 3 cr. Prereq.: Open to environmental science and environmental studies seniors or to environmental science or environmental studies majors by permission. A simulation of actual environmental problems and case histories that utilize interactive, self-directed investigations by student teams; oral and written presentations in mock environmental hearings are required.

Advanced Courses

ENSCI 380. Field Environmental Hydrology.  3 wk.; 3 cr. Prereq.: ENSCI 111 or GEOL 100 or 101, or permission of the instructor. Application of the latest techniques for sampling, monitoring, and evaluating groundwater and surface-water systems. Particular consideration will be given to drainage basin analysis, aquifer testing, selected geophysical techniques, and hydrological software application. Offered in the summer. Requires one-week residence in field camp or dormitories.

ENSCI 383. Special Topics in Environmental Science.  3 lec. hr.; 3 cr. Prereq.: Permission of the department. The topic varies from semester to semester. May be repeated for credit provided the topic is different.

ENSCI 384. Special Topics in Environmental Science.  2 lec.; 3 lab hr.; 3 cr. Prereq.: Permission of the department. The topic varies from semester to semester. May be repeated for credit provided the topic is different.
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ENSCI 391, 392, 393. Special Problems in Environmental Science. ENSCI 391, 1 lec. hr.; 1 cr.; ENSCI 392, 2 lec. hr.; 2 cr.; ENSCI 393, 3 lec. hr.; 3 cr. Prereq: Permission of the department. The student works on a research problem under the supervision of a member of the faculty. May be repeated for a maximum of 9 credits.

ENSCI 395, 396, 397. Internship in Environmental Science. Prereq: Advanced standing and permission of the department. ENSCI 395, 45 hr. placement; 1 cr. ENSCI 396, 90 hr. placement; 2 cr. ENSCI 397, 135 hr. placement; 3 cr. The student completes a 15-week internship directly related to the environmental sciences at a private company, government agency, or non-profit institution under the supervision of a SEES faculty member. Credits are based on the number of weekly internship hours.

ENVIRONMENTAL STUDIES COURSES

ENSTD 383. Special Topics in Environmental Studies. 3 lec. hr.; 3 cr. Prereq: Permission of the department. The topic varies from semester to semester. May be repeated for credit provided the topic is different.

ENSTD 384. Special Topics in Environmental Studies. 2 lec., 3 lab. hr.; 3 cr. Prereq: Permission of the department. The topic varies from semester to semester. May be repeated for credit provided the topic is different.

ENSTD 391, 392, 393. Special Problems in Environmental Studies. ENSTD 391, 1 lec. hr.; 1 cr.; ENSTD 392, 2 lec. hr.; 2 cr.; ENSTD 393, 3 lec. hr.; 3 cr. Prereq: Permission of the department. The student works on a research problem under the supervision of a member of the faculty.