

# ENVIRONMENTAL STUDIES (ENST)

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## **ENST 1500 Introduction to Environmental Science 3 s.h.**

Basic environmental science literacy for informed citizens as inhabitants and stewards of Earth. The use of science and the scientific method to understand, assess, and manage the environment to improve human health, conserve energy and resources, preserve nature, and sustain quality of life.

**Gen Ed:** Environmental Sustainability, Natural Science, Social and Personal Awareness.

## **ENST 1500L Introduction to Environmental Science Lab 1 s.h.**

The use of the scientific method to explore various fields in environmental science including water quality, risk assessment, biodiversity and mineral uses. This field and laboratory work supplements ENST 1500.

**Prereq. or concurrent:** ENST 1500.

## **ENST 2600 Foundations of Environmental Studies 3 s.h.**

A survey of the principles and issues of environmental studies including basic ecology, biodiversity, hazardous and solid waste management, sustainable development, energy production and conservation, environmental ethics, air, water and soil pollution.

## **ENST 2600L Foundations of Environmental Studies Laboratory 1 s.h.**

Laboratory and field investigations identified in ENST 2600. Emphasis on the scientific method, problem solving and critical thinking skills in environmental assessment techniques, active exploration of environmental concerns and their solutions. Three hours per week. Three to five Saturday field trips required in lieu of some laboratory time.

## **ENST 2650 Independent Study 1-3 s.h.**

The introductory study of problems or issues in Environmental Studies or a review of the literature relating to a specific environmental topic. May be repeated for different topics for a total of 6 s.h.

**Prereq.:** Permission of the director.

## **ENST 3700 Environmental Chemistry 4 s.h.**

Study of the fundamental chemical principles underlying common environmental problems, including water pollution, toxicology, chemical biotransformation and degradation. Chemistry of pesticides, petroleum hydrocarbons and heavy metals are also investigated. Taken with ENST 3700L.

**Prereq.:** ENST 2600 and CHEM 1515.

## **ENST 3700L Environmental Chemistry Lab 0 s.h.**

Students will investigate various analytical and instrumental techniques used in the examination of chemicals in environmental media (soil, water, biota). Includes proper handling, storage and precautions in the laboratory and the environment. Taken with ENST 3700.

## **ENST 3730 Air Quality 3 s.h.**

Sources, dispersions, consequences and abatement of air pollutants emanating from industry and transportation. Topics also include the history, legislation, standards and economics of air pollution.

**Prereq.:** CHEM 1515.

## **ENST 3750 Seminar 1 s.h.**

Guest lecturers will examine current topics in environmental issues, including current research, application of technology, management strategies to reduce environmental impact, environmental ethics, policy, etc.

**Prereq.:** ENST 2600.

## **ENST 3751 Water Quality Analysis 3 s.h.**

Introduction to physical, chemical, and biological measurements of water quality. Sample collection and laboratory analysis of natural waters, drinking water, and wastewater. Interpretation of environmental data. Two hours lecture and three hours laboratory per week. Identical to CEEN 3751.

**Prereq.:** CEEN 3736 OR ENST 2600; CHEM 1515.

## **ENST 3751L Water Quality Analysis Lab 0 s.h.**

Laboratory experience in the analysis of natural waters, drinking water and wastewater. Emphasizes procedures for the collection and interpretation of data on current environmental problems. Three hours laboratory per week. Must be taken concurrently with ENST 3751. Identical to CEEN 3751.).

**Prereq.:** Must be taken concurrently with ENST 3751 (Note: already in course description).

## **ENST 3752 Soil Quality and Analysis 3 s.h.**

Soil is an important environmental medium that must be analyzed to assess quality standards. Students develop the ability to conduct laboratory experiments and to critically analyze and interpret soil data. Furthermore, this course contributes to the background knowledge students need to assess environmental impact and risk, sustainability, health and safety.

**Prereq.:** CHEM 1515 and CHEM 1515L or equivalent.

## **ENST 3775 Research Methods for Undergraduate 1 s.h.**

This course introduces the student to the fundamental and practical aspects of conducting research. The course emphasizes the scientific method, research methodologies, literature review, writing research proposals and the presentation of research results. Students will gain valuable experience in identifying a problem, developing a research plan and summarizing results.

This course must be taken prior to engaging in undergraduate research.

**Prereq.:** junior or senior standing.

## **ENST 3780 Environmental Research 1-4 s.h.**

A research project that involves problem identification, hypothesis formation, experimentation, data analysis and interpretation. The research may be either basic or applied.

**Prereq.:** Junior standing in ENST and permission of the director.

## **ENST 3781 Environmental Sampling Methods 3 s.h.**

Sampling design, including number and types of samples and procedures for taking representative samples of air, water, soil and contents of storage and shipping containers. Two hours of lecture, three hours of laboratory.

**Prereq.:** ENST 2600 and STAT 2601 or equivalent.

## **ENST 3784 Research Experience in Environmental Science 4 s.h.**

This capstone course will give student the experience in the planning and execution of a research project. Graduate schools and research establishments consider an undergraduate student research experience as extremely valuable. Research provides students with an opportunity to work with faculty and graduate students on more advance research topics. Research furthers our knowledge of basic environmental science and helps us find solutions to environmental problems. The process improves student skills in gathering data, brainstorming ideas, evaluating data, and discussing the results to others through written and oral presentations. Environmental research can be focused on fieldwork, computer simulation, or laboratory analysis.

**Prereq.:** Senior standing, Environmental Science major, ENST 3751 or ENST 3752.

## **ENST 3790 Internship/Cooperative 1-4 s.h.**

Students work under the direction of a faculty supervisor in a governmental agency or in the private sector as environmental specialists. An activities log and summary report are required. The course may be repeated.

**Prereq.:** Junior standing in ENST and permission of the director.

## **ENST 4822 Water Pollution Control 3 s.h.**

Sources and prevention methods of water pollution, human activities and natural conditions that influence water quality, protection methods and regulations of water quality, contamination and remediation of groundwater. 3.s.h.

**Prereq.:** GEOL 1505 or ENST 2600.

## **ENST 4840 Topics 1-3 s.h.**

Independent study of special topics not included in available courses.

Students do extensive reading in, and write a formal report on, a specific area of Environmental Studies.

**Prereq.:** Junior standing or consent of instructor.

**ENST 5800 Environmental Impact Assessment 3 s.h.**

Analysis of the potential environmental effects resulting from the construction of buildings, highways, parking lots, mines, reservoirs, and waste disposal facilities. Standard procedures are taught for evaluating and reporting the environmental impact of these activities.

**Prereq.:** ENST 5860 and senior standing.

**ENST 5810 Environmental Safety 3 s.h.**

The proper use of environmental monitoring instruments and personal protective gear. Participation in a series of realistic, hands-on simulation exercises that address a variety of waste clean-up situations. Topics include chemical and physical hazards of chemical compounds and toxicology and adverse effects of chemical exposure. Class meets three hours per week. Successful completion of the course earns OSHA Hazwoper 40 hour training certificate.

**Prereq.:** ENST 2600, equivalent experience or permission of instructor.

**ENST 5820 Sustainability, Climate Change, and Society 3 s.h.**

This course explores environmental, economic, and social aspects of sustainable development, with an emphasis on economy and society. Through topics such as water, food, and climate change, we examine the role of humans and institutions in sustainable development and possibilities for reconfiguring relationships between our institutions and the natural world.

**Prereq.:** junior, senior or graduate level standing.

**ENST 5830 Toxicology and Risk Assessment 3 s.h.**

A study of environmental toxicology of chemicals, primarily anthropogenic pollutants, and their effect on humans and ecosystems. Includes transportation of pollutants in the environment, biochemical reactions, toxicity testing methods, and dose-response assessment. Continues with an introduction in the process of estimating risk and the perception of those risks including how risk is used to set environmental standards.

**Prereq.:** ENST 1516 and 9 sh >3700 in ENST, CHEM, BIOL, GEOL or CEEN, junior, senior or graduate standing.

**Gen Ed:** Capstone.

**ENST 5860 Environmental Regulations 3 s.h.**

An examination of federal and state regulations that relate to cleanup of abandoned waste sites, management of waste from current waste generators, development of new hazardous products and chemicals, safety and health issues, and control of pollution into air and water.

**Prereq.:** ENST 2600 or equivalent.

**ENST 6900 Advanced Environmental Studies 3 s.h.**

A study of the principles and issues of environmental science, health, technology, and affairs. Topics will include contaminant chemistry; terrestrial and aquatic ecology; risks to human health; waste management; conservation; and sustainable development, energy, and pollution. Local, regional, and global issues will be studied.

**ENST 6901 Sources of Contamination 3 s.h.**

A study of the sources and fate and transport of air, water, and soil contaminants that have potential to adversely affect human health and the environment. Topics will include measurement of environmental parameters, data collection and reporting, interpretation of results, compliance issues, and economic implications.

**ENST 6905 Teaching Methods in Geology and Environmental Science 2 s.h.**

A required course for all Department of Geological and Environmental Sciences graduate teaching assistants. This course will provide guidance and instruction in teaching introductory laboratories in the department.

**ENST 6910 Environmental Management Systems Standards (ISO 14001) 1 s.h.**

Introduction to establishing a program to set internal industrial standards to identify, measure, and control the environmental impact of their activities, products, and services, including environmental policy, communication, legal requirements, training, documentation, and emergency preparedness.

**ENST 6920 Environmental Compliance 3 s.h.**

Regulatory compliance concerning operations of environmental and health and safety departments. RCRA permitting (NPDES and air emissions), landfilling, Right to Know, waste generation, storage, shipping (manifests and placarding), disposal of wastes, MSDS, OSHA regulations, safe work practices, hiring consultants (technical and legal), writing requests for proposals, and documenting and report writing.

**Prereq.:** ENST 5860, ENST 6900, or equivalent.

**ENST 6921 Industry/Institutional Management for the Environmental Professional 3 s.h.**

A comprehensive background in management principles and operations relating to the environmental professions. Topics include budgeting, staffing, scheduling, leadership, and quality assurance/control. The student will learn to write, evaluate, and implement technical and cost proposals for contracts and grants, scopes of work, operations plans, sampling and analysis plans, health and safety plans, job descriptions, resumes, statements of qualifications, mission statements, meeting agendas (for professionals and the general public), and other written and oral communications (reports, memoranda, memoranda of understanding, policy briefs, press releases, fact sheets, requests for information).

**Prereq.:** ENST 6900 or equivalent.

**ENST 6930 Risk Management 3 s.h.**

Using the principles of risk assessment, the student will learn to manage existing environmental risks in the workplace. Topics will include workplace health hazards; product liability; toxic tort claims; cleaning strategies for risk reduction such as brownfield redevelopment, voluntary action programs, alternative, and regulatory actions. Economic importance, resource allocation, technical feasibility, and public opinion will be discussed.

**Prereq.:** ENST 6900 and ENST 5830 or equivalent.

**ENST 6931 Ecological Risk Assessment 3 s.h.**

The student will examine environmental risks to nonhuman populations. Topics will include the study of measurements of adverse effects due to one or more stressors by examining population communities and ecosystems. Also, the class will study the following issues: threatened and endangered species, wetlands, endocrine disruption, multiple stressors, sediment and soil toxicity, conservative screening versus site-specific studies, and natural resource damage claims.

**Prereq.:** ENST 6900 and ENST 5830 or equivalent.

**ENST 6990 Thesis 1-6 s.h.**

Hours arranged. Applicable to master's degree in environmental studies. Research selected and supervised by departmental advisor and approved by graduate faculty of environmental studies program and graduate dean. May be repeated.

**ENST 6995 Introduction to Environmental Science Research 2 s.h.**

This course introduces the student to the fundamental and practical aspects of research, especially as they apply to environmental sciences. The course emphasizes research methodologies and ethics, how to review the literature, how to write a research proposal, and how research results are presented. The course will include presentations of the faculty research interests.

**Prereq.:** graduate standing or permission of instructor.

**ENST 6999 Special Topics in Environmental Science 1-3 s.h.**

Environmental science topics selected by faculty from fields of current research interest or of special emphasis. May be repeated with a different topic up to a total of six semester hours.

**Prereq.:** Permission of director.