ENVIRONMENTAL SCIENCE & POLICY (ES&P) COURSES

ENSC 101
Introduction to Environmental Issues
Three Credits LA
Examines natural systems, adverse impacts of human activities upon these systems, and how society deals with these impacts. Topics may include ecology; biodiversity; forests and deforestation; human population growth and control; food production and world hunger; energy resources; and water and air pollution. In addition to the science of these topics, related politics, economics, and ethics are discussed. Offered each semester.

ENSC 125
Field and Lab Experience
One Credit LA
A diversity of experiences will complement and add to topics covered in ENSC 101 lecture. These will provide tangible examples of the scope of environmental science and policy, ranging from developing observation skills in the natural world, field and lab measurements and experimentation, and practical applications in utilities and other organizations.

ENSC 202
Environmental Politics and Policy
Three Credits LA
Dual listed as POSC 202
The nature, composition, and organization of parties and pressure groups; the role played by these two forces in the political process; history and programs of parties and pressure groups will be analyzed. Also the nature of contemporary voting behavior is examined.
(Does not fulfill Core/LS Natural Science requirement.)
Prerequisites: ENSC 101, POSC 110

ENSC 210
Introduction to Geology
Three Credits
This course focuses on Earth's geologic resources and how they influence man's use of the physical world. Topics include plate tectonics; earthquakes; rock and mineral formation; weathering and erosion; groundwater and surface water; stratigraphy and energy resources; glaciation and geologic history. Students make observations and measurements and translate them into meaningful data from which inferences can be drawn. Through hands-on experience, students gain skills of map reading, identification of minerals and rocks, interpretation of geologic and topographic maps.
Prerequisite: ENSC 101

ENSC 212
Introduction to Geology Laboratory
One Credit LA
Laboratory to accompany ENSC 210.
Corequisite: ENSC 210

ENSC 230
Introduction to Geographic Information Systems
Three Credits LA
This course will provide an introduction to Geographic Information Systems. A Geographic Information System is a series of tools to create, edit, maintain, and analyze maps and data about features that occur over a specific geographic area. The course will detail the terminology, concepts, and applications that are commonly used with GIS. Hands-on training will be provided in the labs for input and edit functions, ad hoc query and map production function. We will investigate various data sources, data management requirements, geoprocessing operations, and cartographic representation. A required class project will incorporate all of the skills learned during the semester from data download to map presentation.
(Does not fulfill Core/LS Natural Science requirement.)
Prerequisite: ENSC 101

ENSC 305
Environmental Economics
Three Credits LA
Dual listed as ECON 305
A policy-oriented examination of the relationship between the economy and the natural environment. Topics include the environmental consequences of economic growth and development; the labor market impacts of environmental legislation; and the economic theories of "public goods" and "social costs."
(Does not fulfill Core/LS Natural Science requirement.)
Prerequisite: ECON 103

ENSC 306
Environmental Health
Three Credits LA
This course explores the relationship between the environment and human health, and what people can do to protect and enhance their physical well-being while, at the same time, have a positive influence on the quality of the environment. The course is designed to familiarize students with the field of environmental health, the common problems encountered by people in this profession, and the basic scientific and technical reasoning used in addressing those problems. Emphasis is on providing a general understanding of how environmental factors are involved in the transmission of communicable diseases and the health hazards resulting from exposure to chemical and physical materials in our environment.
Prerequisite: BIOL 130 or BIOL 101 or ENSC 101

ENSC 308
Introduction to Occupational Safety and Health
Three Credits LA

In 1970 the federal Occupational Safety and Health Act (OSHA) was passed. Employers have been required since then to provide a safe and healthy workplace for their employees. Knowledge of these standards is important when applying for employment in science and business. This course will provide knowledge of those standards including hazard communication, laboratory safety, safety and health management, blood-borne pathogens, and personal protective equipment. Upon completion of this course, students will receive the OSHA 30-hour training certificate for General Industry.

ENSC 309

Environmental Chemistry Laboratory

One Credit LA

Dual listed as CHEM 309

This course will provide detailed coverage of water, soil and air environments. It is designed to provide the student with an understanding of the reactions, transports and effects of naturally occurring chemical systems. The major modern anthropogenic pollutants and their effects upon the environment will also be studied. Students will become acquainted with facilities such as; the on-campus River Laboratory, the new Mobile Aquatic Laboratory, the Hudson River monitoring station (HRECOS), and analytical instrumentation including: ICP, portable GCMS, handheld XRF, and HPLC. Laboratories will include synthesis and characterization of nanoparticles. Students will be introduced to the tools and knowledge necessary for biofuels facility operations. Instrumental techniques used will include UV/Visible spectrophotometry, flame and furnace atomic absorption spectrophotometry, and gas chromatography.

Prerequisites: CHEM 111, CHEM 115, and CHEM 202 or CHEM 215-216

Corequisite: ENSC 310

ENSC 310

Environmental Chemistry

Three Credits LA

Dual listed as CHEM 310

This course prepares students for careers in the rapidly growing environmental job market, and it is designed to provide students with an understanding of the reactions, transport, and effects of naturally occurring chemical systems. The course will include procedures of collection and analysis of soil, water and air environmental samples. The science of nanotechnology and related environmental concerns will be considered. The use of enzymes to enhance biochemical industrial processes used to obtain renewable energy resources from plant materials will be emphasized. The major anthropogenic pollutants and their effects upon the environment will also be studied. Safety procedures and regulations will be included.

Prerequisites: CHEM 111, CHEM 115, and CHEM 201 or CHEM 211

ENSC 313

Environmental Microbiology

Three Credits LA

This course is an extension of basic microbiological methods for analyzing environmentally important processes. Since many of the functions of ecosystems are governed by microorganisms, the microbiota are likely to be key indicators of environmental impacts. Topics in this course include microbial diversity, ecological parameters affecting microorganisms, population interactions, and applied aspects of microbial ecology. *Two-hour lecture, three-hour lab per week.*

Prerequisite: BIOL 312

ENSC 315

Natural History of the Hudson Valley

Three Credits LA

A field-based course providing familiarity with identity and ecology of local flora and fauna and the environments in which they exist. Species diversity of major groups of organisms, e.g., trees, birds, fish, and insects will be explored through field observations and collections. Special emphasis is placed upon three identifications using multiple features, e.g., bark, seeds, buds, fragrance, as well as foliage. Observations are conducted on campus at Fern Tor and at various natural sites in the mid-Hudson Valley. Students must be in good health, able to work outdoors for 3–4 hours under varied physical conditions, and take all necessary precautions. Students spend additional field time independent of class time.

Prerequisite: One college-level environmental science or biology course

ENSC 327

Freshwater Ecology

Three Credits LA

Dual Listed as BIOL 327

Examines the dynamics and structure of freshwater ecosystems. Physical and chemical characteristics are described, and how they affect life in these ecosystems. Interactions between producers and consumers are also studied, to understand how energy and nutrients flow through interconnected food chains. The complex and highly relevant connections between water bodies and their surrounding lands are emphasized. Lab includes field trips to interesting sites. Students learn methods and operation of equipment used by professional aquatic biologists for collecting and analyzing chemical and biological samples. Laboratory work concentrates on analyses of samples collected in the field, producing data that are summarized and evaluated.

Prerequisites: BIOL 130-131 and at least one semester of chemistry with lab.

ENSC 330

Advanced Geographic Information Systems

Three Credits LA

In this course students will build on the GIS skills developed In the Introduction to GIS (ENSC 230) course.

Students will gain an in-depth understanding of geoprocessing tools as well as exposure to additional GIS solutions. We will use both proprietary (ArcGIS) and open source (QGIS) software, learning how to integrate and make the best use of both. More emphasis will be placed on analysis using raster data including watershed modeling, viewshed analysis, and feature extraction from aerial and satellite imagery. Upon completion of this course, the student will understand how to: link together individual geo-processes into a larger model; share their analyses and maps using online tools and maps; and integrate desktop tools into a larger organizations client-server architecture. We will also explore recent trends In GIS including new data source, remote sensing, and unmanned aerial systems (drones). Course activities will include a final project that incorporate all of the skills developed during the semester.

(Does not fulfill Core/LS Natural Science requirement.)

Prerequisite: ENSC 230

ENSC 340

Epidemiology

Three Credits LA

Emphasis is placed on the principles and methods of epidemiologic investigation, appropriate summaries and displays of data, and statistical approaches to describe the health of populations. Topics includes the dynamic behavior of disease and methods to measure as well as the ability to describe the extent of

disease problems. Designs for investigating associations between risk factors and disease outcomes are also introduced. Application in the areas of health services, screening, genetics, and environmental policy are presented.

ENSC 360

Ecology: Principles & Practice

Four Credits LA

Dual listed as BIOL 360

This course involves the study of the interrelationships among organisms and with their environments. Topics include organism responses to physical and chemical conditions, population growth and regulation, intra- and interspecific competition, herbivory, predation, parasitism, mutualism, community structure, ecosystem productivity, nutrient cycling, and decomposition. *Three-hour lecture per week, three-hour fieldwork/lab per week.*

Prerequisites: BIOL 130-131; one semester of college CHEM with Lab; MATH 130. Junior or senior standing recommended

ENSC 380

Principles of Environmental Assessment

Three Credits LA

The purpose of this course is to examine the NEPA- and NYS SEQRA-based approaches to environmental impact assessment. Students will learn how to design a statistically acceptable monitoring program; how to collect samples; how to prepare and preserve samples for analyses; and how to interpret environmental data in the assessment of impacts.

Prerequisites: ENSC 101, BIOL 360, MATH 130, and one semester of college chemistry lab

ENSC 398-399

Internship

Three Credits each

The internship is designed to be a pre-professional work-related experience at an off-campus location. Generally taken in the junior or senior year, placements may be obtained within scientific, governmental, or advocacy organizations or with private consulting firms and environmental laboratories. The student intern will be supervised by an on-site professional and by the Environmental Science & Policy internship coordinator. Internships must be approved by the Program Director and the Office of Career Services prior to their commencement.

ENSC 401-402

Special Topics in Environmental Science I–II

One-Three Credits LA

These courses provide an upper-level experience for Environmental Science & Policy majors, and deal with specialized areas such as environmental management and regulation, the politics of environmental control, environmental planning, etc. The instructor determines the one topic that will be explored during the semester. The topic will be announced before registration. Hours per week vary with credits.

Prerequisites: ENSC 101 and possibly others

ENSC 404

Environmental Toxicology

Four Credits LA

This course will introduce students to the methods involved in measuring toxic effects of chemical and/or physical agents on living organisms. Students will become familiar with toxicant detection in environmental samples; the effects of toxicants on test organisms; risk associated with different exposure levels; and the relationships between toxicant levels and the regulatory criteria for those toxicants. Basic metabolic, physiological, and pharmacological concepts will be used to explain the fate of toxicants in the body, with emphasis on transformation, carcinogenesis, and mutagenesis. *Three-hour lecture, three-hour laboratory per week.*

Prerequisites: BIOL 130-131 and CHEM I 111, CHEM II 115 - Lab, CHEM 112, CHEM 116 - Lab

ENSC 415

Environmental Science & Policy Seminar

One Credit LA

This discussion-based course serves as a forum for students from the Science and Policy concentrations to discuss their perspectives with each other and with faculty. The instructor will choose a theme to guide readings and discussions. Students and the materials they choose will be the primary sources of information. Learning will occur largely through questioning, reasoning, synthesis, and discussion, rather than simply by absorbing information.

Prerequisite: Junior standing in Environmental Science & Policy

ENSC 420

Environmental Planning

Three Credits LA

Dual Listed as POSC 420

This course will cover the constitutional principles, values, and socioeconomic impacts affecting planning; basic planning, land-use, and development practices such as environmental impact statements, master plans, citizen participation; and issues facing environmentally sound planning today.

(Does not fulfill Core/LS Natural Science requirement.)

Prerequisites: ENSC 101 and POSC 240, or permission of the instructor

ENSC 425

Environmental Law

Three Credits LA

An overview of current environmental law issues, including impact review, air and water quality, solid and hazardous waste, and toxic substances. Emphasis on federal and state statutory and regulatory requirements, and case-law interpretation.

(Does not fulfill Core/LS Natural Science requirement.)

Prerequisite: ENSC 101

ENSC 426

Seminar in Environmental Investigation and Remediation

Three Credits LA

Contamination of environmental media (soil, water, soil gas, etc.) may result from a variety of human activities and represents a threat to the usability of property, the vitality of ecosystems, and the health of humans. This course will explore the complimentary topics of environmental investigations and

contaminant responses (e.g., “remediation”). The course objectives are for students to become familiar with the spectrum of investigative techniques for each media, to appreciate the limitations of contaminant delineation, and to gain a basic understanding of a broad range of remedial actions (both their potential and their limitations). This course will utilize data from actual regulated sites, which provide greater details on various classroom discussion topics, offering students the opportunity to more fully comprehend the challenges of decision-making in an imperfect world. Students will be responsible to work both independently and in groups during the semester.

ENSC 440-441

Research I–II

Three Credits each LA

Students conduct research in Environmental Science or Policy under the direction of a faculty member. Students make individual arrangements with a faculty member to plan and conduct the study. At the end of her/his work, a written report and a public seminar are presented by the student, which may include presentation at a scientific conference.

Prerequisite: Permission of the Chair of Environmental Science & Policy

ENSC 477

Environmental Science and Human Values

Three Credits LA

This is the capping course in Environmental Science & Policy. The course examines the moral implications of human attitudes regarding other species and the environment. This course explores the historical roots and current world views that have generated the present state of widespread environmental degradation. The interrelationship of ecology, economics, sociology, and ethics will also be studied.

Prerequisite: Senior standing