

ENVIRNMNTL SCI & POLICY (ESP)

ESP 1500 Introduction to Field Techniques (3)

This course introduces outdoor data collection and management skills germane to environmental assessment, including observations with text, sketch and photo, measuring the environment using equipment, navigation using a compass, map, and GPS unit, and compiling and visualizing data. The class meets outdoors on- and off-campus to build comfort and geospatial awareness in a variety of physical settings. Additional course fee. Falls.

ESP 2100 Introduction to Environmental Science and Policy I (4)

Engages in scientific approaches to physical, ecological, social, and political principles of environmental science needed to analyze and understand the relation between humans and the natural environment. Provides analytical frameworks and concepts in environmental issues, life choices, and responsibility to future generations. Lectures, discussions, and laboratory/field experiences that include field trips and data collection. Additional course fee. Falls.

ESP 2110 Introduction to Environmental Science and Policy II (4)

This course deals with the complex issues of earth surface processes and human society, including environmental health and risk, energy use, pollution, climate change and resources issues of land, food supply, waste and regulations that mitigate impacts of population on the environment. This course develops and enhances skills including technical and visual data management, analyses and interpretation. Course fee. Springs.

ESP 2305 Foundations of Environmental Policy (4)

Provides students with an introduction to domestic (US and New Hampshire) and global environmental history, issues, policies, and politics. Students learn the processes by which environmental policy is created and become familiar with common policy tools for addressing environmental issues and conflict. Explores interdisciplinary linkages between economical and environmental policies and examines the role of science and society in policy-making. Falls, Springs. (WRCO)

ESP 3000 Environmental Field Studies (3)

An off-campus field-oriented course that studies a specific ecosystem in detail. The study area varies from year-to-year with the focus shifting between marine coastal environments, freshwater lakes or rivers, forests, and alpine environments. Uses field research techniques appropriate for the study location. Additional costs for living accommodations and travel \$500. May be repeated once with a different field site. Springs and Summers.

ESP 3201 Energy and Society (4)

Investigates the different forms of energy and the natural laws that govern their use, transformation, and conservation. Examines different sources of energy available to modern societies. Discusses the development of each as a resource, extraction methods, and associate environmental and societal consequence. Additional course fee. Springs.

ESP 3310 Hydrology (4)

Combines physical hydrology concepts and theory with laboratory and field measurements, demonstrations, and observations. Provides integrated training in hydrologic sciences and hands-on experience with instruments and analytical methods such as stream gaging, indirect discharge measurements, and surveys of channel morphology. Students learn hydrologic aspects of fluvial lake, wetland and groundwater systems in interdisciplinary, biogeochemical contexts. Falls. Prerequisite(s): ESP 2110, Or GE 2001, Or MT 2000.

ESP 3325 Climate, Risk, and Adaptation (3)

Introductory course on Earth's climate; examines evidence about climate change, both past and present, and predicted future effects on environmental and societal systems. Topics include global, regional, and local approaches to climate risks, mitigation, and adaptations. Springs. (GACO) (INCO) Prerequisite(s): ESP 2110, OR BI 1120, Or MT 2000, Or MT 2110, Or GE 2001.

ESP 3326 Climate, Risk, and Adaptation (3)

Introductory course on Earth's climate; examines evidence about climate change, both past and present, and predicted future effects on environmental and societal systems. Topics include global, regional, and local approaches to climate risks, mitigation, and adaptations. Springs. (GACO) Prerequisite(s): ESP 2110 or BI 1120 or MT 2000 or MT 2110 or GE 2001 or permission of instructor

ESP 3335 Environmental Geology (4)

Covers Earth's geosystems and the geologic aspects of environmental hazards concerns like heavy methods, asbestos and radioactive elements; sea level change; acid-mine drainages and hydrofracturing earthquakes. Provides hands-on opportunities to investigate, observe and document geological aspects of Earth's environmental systems including soils and sediments; minerals, rock and land formations; various types of fossils, oceanography, and geochemical cycles. Additional course fee required. Falls. (TECO) Prerequisite(s): ESP 2110 or GE 2001.

ESP 3340 Introduction to Ecological Economics (3)

Science of sustainability. Implementing sustainable practices must consider what is ethical, practical, efficient, and logical, and economics is a key component. Topics include: ecosystem services, resource management, supply and demand, market failures, economic growth and human well-being, policy instruments, resource allocation efficiencies, pricing and valuation of non-market goods, and ecological economics case studies. Fall of even years.

ESP 3401 Life in the Universe (3)

Are we alone in the universe? Astrobiologists use their understanding of diverse concepts in biology, earth science, physics, chemistry, engineering, and technology to search for answers to this question. The science of astrobiology is an integrated study centered on the search for life in the universe. Builds on our understanding of earth and life systems to investigate the habitability of other worlds. Students participate in inquiry based activities and discussions to investigate the limitations of life, the habitability of other planets, and model robotic explorations in other worlds. Culminates with student designed space missions.

ESP 3510 Advanced Field Techniques (1-4)

This intensive field methods course prepares individuals for entry-level field technician and research jobs with federal, state and private consulting agencies. The course is taught through industry partnerships and emphasizes hands-on training in survey and assessment techniques. Students develop proficiency in skills including site assessments, independent decision-making, surveying, field data collection and mapping. Repeatable up to 8 credits. Pass/No Pass. Falls and Summers.

ESP 3550 Environment and Health (3)

Highlights the connection between Healthy Places and Healthy People. Humans interact with the environment constantly. These interactions affect our quality of life and the surrounding environment. Students explore how human-altered environments can influence human health and disease. Discusses the natural environment, and the social and building environment. Falls and Springs. (WECO)

Prerequisite(s): Sophomore standing.

ESP 3600 Special Topics in Environmental Policy (3)

An in-depth study of a particular environmental science oriented topic or contemporary issue. Since topics vary, the course may be repeated with permission of the instructor. Additional course fee required.

Prerequisite(s): Environmental Science and Policy majors.

ESP 3700 Medical Geology (4)

Medical geology is a new field combining geologic phenomena and human health, covering problems caused by natural deposits containing radioactive minerals, heavy metals, disease-causing dust, and dangerous gases. This course trains students to recognize characteristics, symptoms and environmental settings leading to arsenic, mercury, and lead poisoning; soil nutrient deficiencies; hazardous aerosol emissions and radioactivity; plus health benefits of geologic materials. Falls. (WECO)

ESP 3800 Food Systems: Social, Economic and Environmental Impacts of Modern Agriculture (4)

Modern industrial agriculture has made food cheap and abundant for some, but at what cost? How we feed ourselves, individually and collectively shapes the health of people, economies, communities, ecosystems and our planet. This course uses social, ecological, economic and human health contexts to examine externalized costs and ecological sustainability of industrial agriculture and envision future food systems. Springs Even. (DICO) (WECO)

Prerequisite(s): ESP 2100 or ESP 2110 or SU 2111 or CLM 1000.

ESP 3900 Oceanography (3)

Oceanography is the study of the physical, chemical, biological and geological nature of oceans. In this interdisciplinary course, students take a deep-dive into the ocean realm, from rapidly changing conditions near the surface to the barely explored conditions of the abyss. We examine how the ocean moves, influences Earth's air, water and lands, and supports diverse ecosystems and lifeforms. Falls Even. (GACO)

Prerequisite(s): MA 1800

ESP 4200 Natural Hazards: Science and Policy (4)

Upper-level lecture with lab course dealing with regional to global scale environmental geology, including hazards and risk assessment. Students learn inter-relationships between population growth, development, and environmental risk which occur from urbanization in coastal areas, in earthquake and landslide zones, along the flanks of active and dormant volcanoes, and flood and wildfire prone regions. Additional course fee required. Fall of odd years.

Prerequisite(s): upper-level Environmental Science and Policy majors.

ESP 4305 Land Conservation Techniques (4)

Conserving land is a common technique for protecting natural resources and critical habitats, providing recreational opportunities and maintaining forested and open land. This course explores diverse reasons for land conservation and various techniques and methods for land conservation and management of conserved areas. Field trips to conserved sites, meetings with land managers, and case studies provide first hand examples. Additional course fee is required. Fall of odd years.

Prerequisite(s): junior or senior status.

ESP 4310 Advanced Conservation Ecology (3)

Provides students an in-depth understanding of ecological principles at the foundation of environmental problems and conservation actions. Blends qualitative and quantitative assessment of environmental integrity of landscape, ecosystem, community species, and genetic levels. Students discuss peer-reviewed literature and use Excel formula, GIS, and online tools to achieve learning outcomes. Fall of even years.

Prerequisite(s): ESP 2100 and BI 3240.

ESP 4325 Decision Making in Environmental Management (4)

Managing our environmental resources for multiple objectives creates challenges for practitioners and researchers in today's complex world. This course presents decision making approaches used in addressing environmental issues, resource management, and land use. Students learn decision making steps and processes. Case studies will demonstrate real world application of course material. Springs Odd.

Prerequisite(s): ESP 2110.

ESP 4405 Environmental Outreach and Communication (4)

Communicating about environmental science is an important skill that helps link environmental science to policy. Introduces environmental science communication concepts, explores its historical and theoretical aspects, and develops communication and outreach skills through a variety of activities and projects. Fall of even years.

Prerequisite(s): junior or senior status.

ESP 4441 Climate Change (3)

This interdisciplinary course introduces the physical science of our climate system, the contributing processes, and the basic mechanisms governing how climate responds to drivers of change. Students will explore the interactions between the atmosphere, hydrosphere, biosphere, and lithosphere, driven by the Sun's energy over various timescales. We will also look critically at the methods used to reconstruct past climates. Springs.

Prerequisite(s): MT 2000 or ESP 3325 or ESP 3330 or ESP 3335.

ESP 4550 Environmental Science and Policy Seminar (4)

This seminar integrates prior learning in environmental science and environmental policy to engage students in experiential learning around challenges and perspectives of interdisciplinary teamwork. Students conduct group research on significant environmental issues, often in collaboration with a local partner. The course builds student confidence in, and practice with, skills acquired during their program of study. Springs. (WRCO)

Prerequisite(s): Junior or Senior status.

ESP 4555 Environmental Science and Policy Seminar (4)

This seminar integrates prior learning in environmental science and environmental policy to engage students in experiential learning around challenges and perspectives of interdisciplinary teamwork. Students conduct group research on significant environmental issues, often in collaboration with a local partner. The course builds student confidence in and practice with skills acquired during their program of study. Springs.

ESP 4630 Environmental Science and Policy Internship (1-6)

Under the supervision of a faculty sponsor, Department Chair and supervising agency representative, students engage in a work program to apply, in a practical manner, knowledge gained in major and minor coursework. The internship addresses a department goal of being involved in a community-based or service learning project through a state, federal or local environmental organization. Students must obtain a faculty sponsor and submit a detailed written proposal prior to undertaking the internship. Students must also submit a written report to their faculty sponsor when the internship is complete. Final approval of the internship comes from the Department Chair. Repeatable for a maximum of 6 credits.

Prerequisite(s): Environmental Science and Policy majors and permission of the Department Chair.

ESP 4910 Independent Study (1-4)

Offers students the opportunity to gain an in-depth understanding of an environmental science or policy topic that is not covered extensively in other courses. Working with guidance from a faculty member with relevant expertise, students select a specialized topic in environmental science and/or policy for exploration and prepare an in-depth research paper or project pertaining to that topic. Scheduled conferences with the faculty members are required and a possible presentation to a class or seminar group is suggested. Permission of the student's advisor, the supervising faculty member and the Department Chair is required.

ESP 4915 Undergraduate Research (1-4)

Provides opportunity for students to conduct authentic science/social science environmental research in collaboration with 1 or more PSU faculty member. Expected outcomes include publication and outreach of work. The number of credits corresponds to the level of effort and scope of work at 60 hours per credit. Repeatable for a maximum of 8 credits.

Pass/No Pass. Falls and Springs.

Prerequisite(s): permission of the instructor and ESP Department Chair.