Environmental Science and Policy

Requirements: The ES&P major requires 14 courses. These include the following:

- Four environmental integration courses (101, 201/202, 311, 312)
- Three introductory courses in the natural sciences from different areas (BIO, CHM, GEO, PHY/EGR), two of which must include labs (see list)
- Two introductory courses in the category of social sciences, humanities and policy from different departments (see list)
- One course in statistics (see list)
- Four electives that create a coherent sequence with a clear environmental focus. No more than one elective may be at the 100 level and at least one must be at the 300 level; 100 may not be used as an elective. One semester of independent study (400) or credit toward an honor’s thesis (430D) may be substituted for one elective, but neither may count as the 300-level elective.

One course fulfilling the major requirements may be taken S/U; 201/202, 311, and 312 may not be taken S/U.

Environmental Integration Courses

All majors must complete the four environmental integration courses:

- ENV 101 Environmental Integration I: Perspectives
- ENV 201 Environmental Integration II: Collecting and Analyzing Information
- ENV 301 Environmental Integration III: Interpreting and Communicating Information
- ENV 312 Environmental Integration IV: Sustainable Solutions

Introductory Courses

Natural Sciences

All majors must take one course in three of the following four natural science areas: biological sciences, chemistry, geosciences, or physics and engineering. Two of these courses must include a laboratory or field component. BIO 180Y/ GEO 180Y is a yearlong lab course that satisfies both lab requirements for the introductory natural sciences and may be paired with any introductory natural science lecture course. BIO 155 and GEO 102 count only as lab courses. BIO 155 must accompany BIO 154. GEO 102 must accompany an introductory natural science lecture course. Students with Advanced Placement credit (4 or 5) in an area may substitute an appropriate upper-level course in consultation with an ES&P adviser and in accordance with guidelines of the home department.

Natural Science Lab or Field Courses

- BIO 155 Biodiversity, Ecology and Conservation Laboratory
- BIO 180Y Biogeochemical Cycling in the Avery Brook Watershed: A Research Course
- CHM 111 Chemistry I: General Chemistry
- CHM 118 Advanced General Chemistry
- FYS 103 Geology in the Field
- GEO 102 Exploring the Local Geologic Landscape
Natural Science Lecture Courses

BIO 154  Biodiversity, Ecology and Conservation
CHM 108  Environmental Chemistry
EGR 100  Engineering for Everyone
GEO 101  Introduction to Earth Processes and History
GEO 105  Natural Disasters: Confronting and Coping
GEO 106  Extraordinary Events in the History of Earth, Life and Climate

Social Sciences, Humanities and Policy

All majors must take two courses from the social science, humanities and policy category listed below. The courses must be from different departments. Students with Advanced Placement credit (4 or 5) in an area may substitute an appropriate upper-level course in consultation with an ES&P adviser and in accordance with guidelines of the home department.

ANT 130  Introduction to Cultural Anthropology
ANT 241  Anthropology of Development
ECO 150  Macroeconomics
ECO 201  Microeconomics
GOV 200  American Government
GOV 207  Politics of Public Policy
GOV 241  International Politics
PHI 238  Environmental Ethics
PPL 220  Public Policy Analysis
SOC 101  Introduction to Sociology
SWG 150  Introduction to the Study of Women and Gender

Statistics

Majors must take one course in statistics (ECO 220, GOV 190, MTH 201/PSY 201, MTH 219, MTH 220, SDS 220 or SOC 201). Students with Advanced Placement credit (4 or 5) in statistics may substitute an appropriate upper-level statistics course in consultation with an ES&P adviser and in accordance with guidelines of the home department.

Electives for the Environmental Focus

Majors should choose their elective courses in consultation with the major adviser to create a coherent sequence with a clear environmental focus; the focus may be specific to a discipline, topic or location. No more than one elective can be at the 100 level; at least one must be at the 300 level. Several colloquium and seminar courses have rotating themes; approval is granted for years when the focus is on environmental and sustainability topics. 100 may not be used as an elective. Electives and the environmental focus can be identified at the time the major is declared but not later than the end of the add/drop period of the first semester of junior year. Subsequent changes require approval of the major adviser. Electives can include but are not limited to the following approved list. Other relevant courses offered at Smith, within the Five College Consortium, or in study-away programs may be used to satisfy the electives requirement of the major with consultation and approval of the major adviser. One semester of independent study (400) or credit toward an honor’s thesis (430d) may be substituted for one elective, but neither may count as the 300-level elective. 400 must be taken for 3 or 4 credits to be used as an elective. Internships, study-abroad or Praxis experiences are encouraged.

Natural Sciences

Biological Sciences

BIO 103  Economic Botany: Plants and Human Affairs
BIO 206  Plant Physiology
BIO 207  Plant Physiology Laboratory
BIO 260  Invertebrate Diversity
BIO 261  Invertebrate Diversity Laboratory
BIO 264  Plant Diversity and Evolution
BIO 265  Plant Diversity and Evolution Laboratory
BIO 268  Marine Ecology
BIO 269  Marine Ecology Laboratory
BIO 272  Vertebrate Biology
BIO 273  Vertebrate Biology Laboratory
BIO 364  Plant Ecology
BIO 365  Plant Ecology Laboratory
BIO 366  Biogeography
BIO 390  Seminar: Topics in Environmental Biology

Chemistry

CHM 346  Environmental Analytical Chemistry

Environmental Science and Policy

ENV 150  Modeling Our World: An Introduction to Geographic Information Systems
ENV 266  Landscapes of Northern Germany: Natural Environments and Human Influences

Environmental Concentration

ENX 301  Environmental Concentration Capstone

Geosciences

GEO 150  Modeling our World: An Introduction to Geographic Information Systems
GEO 231  Invertebrate Paleontology and the History of Life
GEO 232  Sedimentary Geology
GEO 251  Geomorphology
GEO 301  Aquatic Geochemistry
GEO 309  Groundwater Geology

Physics and Engineering

EGR 312  Seminar: Atmospheric Processes
EGR 315  Ecohydrology
EGR 325  Electric Power Systems
EGR 326  Dynamic Systems and Introduction to Control Theory
ENV 430D Honors Project
Full-year course, 4 credits each semester. Offered every year.
Credits: 8
Offered Fall 2015, Spring 2016

Study Abroad

Students may elect to take courses for the major outside Smith College by participating in an environmentally oriented, off-campus program. Relevant Smith-approved programs include but are not limited to Arava Institute for Environmental Studies, Danish Institute for Study Abroad, Duke University’s Organization for Tropical Studies, the School for Field Studies, the School for International Training, SEA Semester, the Maritime Studies Program of Williams College and Mystic Seaport, and the University of Maine Semester by the Sea. Courses from other study-away programs may also be eligible for credit with approval of the major adviser. Study-away courses will generally count as 200-level electives, but specific courses in specific programs may be authorized to count as 300-level electives with preapproval of the major adviser.

Study Abroad Adviser: Your major adviser for environmental science and policy

The Minor

Advisers: Advisers for the major also serve as advisers for the minor

The minor consists of six courses chosen with the guidance and approval of an ES&P adviser. Interested students are urged to meet with the director, coordinator or ES&P adviser early in their academic planning.

Requirements: Six courses: 101; two courses from the social science, humanities and policy category; and two electives in consultation with the minor adviser. For three of the six courses, two must be 200 level or higher; the third should normally be above the 100 level. EGR 315 and GEO 301 may be used to fulfill a natural science requirement in either of two categories (see list below). EGR 100 has several rotating themes and may count toward the minor when the focus is on energy and sustainability. ENV 100 may not be used as an elective; 201/202 and 311 may count as electives toward the minor but do not fulfill either the natural science or the social science, humanities and policy requirements. We recommend taking a course in geographic information systems (ENV 150/GEO 150) as an elective. Appropriate Smith courses not listed below, Five College courses, or courses taken at other institutions and through summer and semester-away programs may be counted toward the minor with preapproval of the adviser. Students must satisfy the prerequisites for all courses included in their minor program. No more than three of the six courses may be taken at other institutions. No more than one course may be taken S/U; 101 may not be taken S/U.

Natural Sciences

All minors must take one course in two of the following four natural science areas:

Biological Sciences
BIO 154  Biodiversity, Ecology and Conservation
BIO 268  Marine Ecology
BIO 269  Marine Ecology Laboratory
BIO 364  Plant Ecology
BIO 365  Plant Ecology Laboratory
BIO 390  Seminar: Topics in Environmental Biology
   The Ecological Impacts of Global Change
   Coral Reef Ecology and Conservation
   Investigations in Conservation Biology

Chemistry
CHM 108  Environmental Chemistry
CHM 346  Environmental Analytical Chemistry
GEO 301  Aqueous Geochemistry

Geosciences
GEO 101  Introduction to Earth Processes and History
GEO 105  Natural Disasters: Confronting and Coping
GEO 106  Extraordinary Events in the History of Earth, Life and Climate
GEO 108  Oceanography: An Introduction to the Marine Environment
GEO 301  Aqueous Geochemistry
GEO 309  Groundwater Geology
EGR 315  Ecohydrology

Physics and Engineering
EGR 100  Engineering for Everyone
EGR 312  Seminar: Atmospheric Processes
EGR 315  Ecohydrology

Social Sciences, Humanities and Policy
All minors must take one course in the social sciences, humanities and policy category.

ANT 230  Peoples and Cultures of Africa
ANT 236  Economy, Ecology and Society
ANT 241  Anthropology of Development
ECO 224  Environmental Economics
ENV 220  Natural Resource Management and Environmental Justice
ENV 323  Climate and Energy Policy
GOV 242  International Political Economy
GOV 254  Colloquium: Politics of the Global Environment
GOV 306  Seminar in American Government
GOV 347  Seminar in International Politics and Comparative Politics
SOC 233  Environment and Society

Electives
All minors must take two elective courses. Electives may include 201/202; 311; courses listed above for the minor in the natural sciences and social sciences, humanities and policy categories; and courses listed under electives for the environmental focus for the major. Other relevant courses offered at Smith, within the Five College Consortium, or in study-away programs may be used to satisfy the electives requirement of the minor with consultation and approval of the major adviser.

ENV 100 Environment and Sustainability: Notes from the Field
This 1-credit lecture series introduces students to theory and practice in fields related to the environment and sustainability. Students gain insight into how their liberal arts education and skills in critical thinking and analysis apply to a variety of environmental issues and sustainability contexts. Speakers, including distinguished alumni, will be drawn from the five colleges, the Pioneer Valley and beyond. This course can be repeated for credit. This course ends the week before Thanksgiving. Graded S/U only. Credits: 1
Paul Wetzel
Offered Fall 2015

ENV 101 Environmental Integration I: Perspectives
We have entered a new geological epoch, the Anthropocene, characterized by the accelerating impact of human activities on the Earth's ecosystems. All over the globe, humans have transformed the environment and have sometimes created catastrophic dynamics within social-ecological systems. Scientists have studied these phenomena for decades, alerting both the general public and policy-makers of the consequences of our actions. However, despite convincing evidence of environmental degradation, humans continue to radically transform their environment. This course explores this puzzle and asks how we can remodel our social-ecological systems to build a more sustainable and resilient future. Enrollment limited to 60. [H] [N] [S] Credits: 4
Camille Washington-Ottombre
Offered Fall 2015

ENV 150 Modeling Our World: An Introduction to Geographic Information Systems
Same as GEO 150. A geographic information system (GIS) manages location-based (spatial) information and provides the tools to display and analyze it. GIS provides the capabilities to link databases and maps and to overlay, query, and visualize those databases in order to analyze and solve problems in many diverse fields. This course provides an introduction to the fundamental elements of GIS and applies the analysis of spatial data to issues in geoscience, environmental science, and public policy. Enrollment limited to 20. [N] Credits: 4
John Loveless
Offered Fall 2015

ENV 201 Environmental Integration II: Collecting and Analyzing Information
While focusing on topical environmental issues, students learn how to gather, analyze and present data using methods from the natural and social sciences. Data are drawn from multiple sources, including laboratory experiments, fieldwork, databases, archival sources, surveys and interviews. Emphasis is on quantitative analysis. Environmental topics vary in scale from the local to the global. Note: 202 must be taken concurrently. Prerequisite: one semester of statistics (may be taken concurrently). 101. Enrollment limited to 18. Q [N] [S] Credits: 4
Alexander Barron, Fall 2015
Camille Washington-Ottombre, Spring 2016
Offered Fall 2015, Spring 2016

ENV 202 Environmental Integration II: Collecting and Analyzing Information Laboratory
In this laboratory complement to 201, students use a variety of methods to gather and analyze different types of environmental data (quantitative, qualitative, spatial). Enrollment limited to 18. Q [N] [S] Credits: 1
Alexander Barron, Fall 2015
Camille Washington-Ottombre, Spring 2016
Offered Fall 2015, Spring 2016

ENV 220 Natural Resource Management and Environmental Justice
This course examines the connections between natural resource management and environmental justice in the U.S. and the Global South. We study the benefits and limits of traditional top-down approaches to the management of forests, land, fisheries, biodiversity, underground resources, water, food, and genomes in different parts of the world. By discussing case studies of environmental justice issues from mountaintop removal mining and hydraulic fracturing in West Virginia to the impact of biofuels and GMOs on local populations in Mexico, students question and rethink the management of natural resources. Enrollment limit of 20. [N] [S] Credits: 4
Camille Washington-Ottombre
Offered Fall 2015
ENV 266 Landscapes of Northern Germany: Natural Environments and Human Influences
This course is part of the Smith study abroad program in Hamburg, Germany, and limited to students enrolled in the study abroad program. The course includes lectures, field trips to locations in northern Germany, and seminars with student presentations and discussion. The lectures cover a general introduction to different landscape types of northern Germany: their geology, characteristic plant and animal life, and development through time; and focus on the effects of humans on landscape development for the last 6,000 years. Discussions explore possibilities and constraints of sustainable development based on the natural resources of the region. Visits to different landscapes of northern Germany over five days of field trips provide a good overview of the landscape types present.

Credits: 4
Kai Jensen
Offered Spring 2016

ENV 311 Environmental Integration III: Interpreting and Communicating Information
This course focuses on the interpretation and communication of environmental issues and solutions from multi- and interdisciplinary perspectives. Using contemporary environmental topics as a foundation, this course introduces students to written, oral, visual and quantitative communication for a variety of audiences and intents. Students develop the ability to interpret environmental information from multiple sources, to synthesize that information for their own understanding, and to communicate that knowledge in ways appropriate to the particular objective and audience. A series of projects enable students to communicate an environmental issue of their own choosing to a diversity of audiences. 101 and 201/202 are strongly recommended. Enrollment limited to 25.

Credits: 4
Leslie King
Offered Fall 2015

ENV 312 Environmental Integration IV: Sustainable Solutions
This course engages the class in a semester-long design or analysis project. Students work in ad hoc teams using a variety of skills and knowledge to address a current issue or question related to environmental sustainability for our local community (specific projects vary from year to year). Students gain direct experience with the range and complexity of activities required to address a real-world environmental problem. Student work is assessed via progress reports, an oral presentation and a final written report. Prerequisites: 101, a statistics course, 201/202 and 311 (311 may be taken concurrently). Enrollment limited to 16.

Credits: 4
L. David Smith, Fall 2015
Alexander Barron, Spring 2016
Offered Fall 2015, Spring 2016

ENV 323 Climate and Energy Policy
This course examines climate change and energy policy from several perspectives including scientific, economic, equity, political and practical considerations. We examine sources and trends of greenhouse gas emissions and climate impacts and then focus on a specific sector (e.g., electric power) to consider existing policies, market structures and the spectrum of approaches to reduce emissions. Students work in small groups on projects in an active policy area and prepare a briefing and paper. Prerequisite: ENV 101, 201/202 or permission of the instructor. (E)

Credits: 4
Alexander Barron
Offered Spring 2016

ENV 400 Special Studies
Admission by permission of the instructor. Special Studies are open to qualified juniors and seniors and, in appropriate cases, to sophomores. Students are encouraged to contact the instructor in advance of the semester they intend to take this course. Credits: 1 to 4

Instructor: TBA
Offered Fall 2015, Spring 2016

Cross-Listed Courses
- ECO 220 Introduction to Statistics and Econometrics
- PHI 238 Environmental Ethics
- SOC 201 Statistics for Sociology
- GOV 241 International Politics
- ECO 150 Introductory Microeconomics
- PSY 201 Statistical Methods for Undergraduate Research
- BIO 155 Biodiversity, Ecology and Conservation Laboratory
- MTH 220 Introduction to Probability and Statistics