Environmental Science and Policy

Requirements: The ES&P major requires 14 courses. These include:
1. four environmental integration courses (ENV 101, ENV 201/202, ENV 311, ENV 312);
2. three introductory courses in the natural sciences from different areas (BIO, GEO, CHM, PHY/EGR), two of which must include labs (see list);
3. two introductory courses in the category of social sciences, humanities, and policy from different departments (see list);
4. one course in statistics (see list); and
5. 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. ENV 100 may not be used as an elective. One semester of independent study (ENV 400) or credit toward an honor's thesis (ENV 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; ENV 201/202, ENV 311, and ENV 312 may not be taken S/U.

Environmental Integration Courses
All majors must complete the four environmental integration courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV 101</td>
<td>Environmental Integration I: Perspectives</td>
</tr>
<tr>
<td>ENV 201</td>
<td>Environmental Integration II: Collecting and Analyzing Information</td>
</tr>
<tr>
<td>ENV 202</td>
<td>Environmental Integration III: Interpreting and Communicating Information</td>
</tr>
<tr>
<td>ENV 311</td>
<td>Environmental Integration IV: Sustainable Solutions</td>
</tr>
</tbody>
</table>

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 GEO lecture course. Only some sections of BIO 180y with 300-level elective. One semester of independent study (ENV 400) or credit toward an honor's thesis (ENV 430d) may be substituted for one elective, but neither may count as the 300-level elective.

Prospective majors should consult with an ES&P faculty adviser in choosing their courses. In their first semesters, students are encouraged to enroll in one of the introductory courses (see list) and an appropriate integration course (ENV 101) as well as statistics.
FYS 134  Geology in the Field
GEO 102  Exploring the Local Geologic Landscape
GEO 108  Oceanography: An Introduction to the Marine Environment
GEO 180Y Biogeochemical Cycling in the Avery Brook Watershed: A Research Course
PHY 117  Introductory Physics I
PHY 118  Introductory Physics II

Natural Science Lecture Courses

BIO 154  Biodiversity, Ecology and Conservation
CHM 108  Environmental Chemistry
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
EGR 100  Engineering for Everyone

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 from the home department.

ANT 130  Introduction to Cultural Anthropology
ANT 241  Anthropology of Development
ECO 150  Introductory 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 (e.g., ECO 220, MTH 201/PSY 201, GOV 190, MTH 219, MTH 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 from 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. ENV 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 approved list below. Other relevant courses offered at Smith, within the Five College Consortium or in study abroad 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 (ENV 400) or credit toward an honor's thesis (ENV 430d) may be substituted for one elective, but neither may count as the 300-level elective.

Natural Sciences

Biological Sciences
BIO 103  Economic Botany: Plants and Human Affairs
BIO 260  Invertebrate Diversity
BIO 264  Plant Diversity and Evolution
BIO 268  Marine Ecology
BIO 272  Vertebrate Biology
BIO 364  Plant Ecology
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
ENV 321  Governing the Commons: A Seminar in Water Resources

Environmental Concentration

ENX 301  Environmental Concentration Capstone

Geosciences

GEO 231  Invertebrate Paleontology and the History of Life
GEO 232  Sedimentary Geology
GEO 251  Geomorphology
GEO 301  Aqueous Geochemistry
GEO 309  Groundwater Geology

Physics and Engineering

EGR 312  Seminar: Atmospheric Processes
EGR 315  Ecohydrology
EGR 325  Electric Power Systems
EGR 330  Engineering and Global Development
EGR 346  Hydrosystems Engineering
EGR 388  Seminar: Photovoltaic and Fuel Cell System Design

Social Sciences, Humanities and Policy

ANT 230  Peoples and Cultures of Africa
ANT 236  Economy, Ecology and Society
ANT 241  Anthropology of Development
EAS 220  Colloquium: Environment and Society in Contemporary China
ECO 213  The World Food System
ECO 224  Environmental Economics
ECO 324  Seminar
ENG 118  Colloquia in Writing
ENG 135  Introduction to Writing Creative Nonfiction
GOV 242  International Political Economy
GOV 254  Colloquium: Politics of the Global Environment
GOV 306  Seminar in American Government
LSS 250  Studio: Landscape and Narrative
PHI 238  Environmental Ethics
PHI 304  Colloquium in Applied Ethics
SOC 232  World Population
SOC 233  Environment and Society
SOC 333  Seminar: Social Justice, the Environment and the Corporation
SWG 230  Gender, Land and Food Movement

**Special Studies**

**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 ENV 400. Credits: 1 to 4

*Instructor:TBA*

Offered Fall 2014, Spring 2015

**Honors**

Students with a strong academic background who wish to conduct independent and original work on an environmental topic are encouraged to pursue an honors project. Interested students should contact potential honors advisers by the beginning of February in the spring semester of their junior year.

Please consult the director of honors for specific requirements and application procedures.

*Director: L. David Smith*

**ENV 430D Honors Project**
Full-year course, 4 credits each semester. Offered every year.

Credits: 8

Offered Fall 2014

**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 pre-approval 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 and/or an ES&P adviser early in their academic planning.

**Requirements:** Six courses including ENV 101, two courses from the natural science category (must not be in the same area), one course from the social science, humanities and policy category, plus two electives in consultation with the minor adviser. For three of the six courses, two must be 200-level or higher, normally the third should 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. ENV 201/202 and ENV 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 Geographic Information Systems (ENV 150/GEO 150) and a course in statistics (MTH 219 or the equivalent). Appropriate Smith courses not listed below, Five College courses, or courses taken at other institutions and through summer and/or 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; ENV 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 364  Plant Ecology
- BIO 268  Marine Ecology
- BIO 390  Seminar: Topics in Environmental 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
- GOV 242  International Political Economy
- GOV 254  Colloquium: Politics of the Global Environment
Environmental Science and Policy

GOV 306 Seminar in American Government
SOC 233 Environment and Society
SOC 332 Seminar in Environmental Sociology

Electives
All minors must take two elective courses. Electives may include: ENV 201/202, ENV 311; courses listed above for minors 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-abroad 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 one-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 alumnae, are drawn from the Five Colleges, the Pioneer Valley and beyond. This course can be repeated for credit. This course will end the week before Thanksgiving. Graded S/U only. Credits: 1
Paul Wetzel
Offered Fall 2014

ENV 101 Environmental Integration I: Perspectives
This course examines how humans have changed Earth’s biosphere, atmosphere, hydrosphere and lithosphere, particularly over the last century, and the social, scientific and political challenges posed by these environmental alterations. We reflect on how differing worldviews have influenced our past actions and may determine our future trajectory. Readings and discussions examine scientific evidence, policies designed to improve the environment, and national and international responses to the environmental crises that confront humanity. Students investigate strategies for mitigating damage, conserving resources and restoring natural function of Earth systems. Enrollment limited to 60. [H][N][S] Credits: 4
Camille Washington-Ottombre
Offered Fall 2014

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 connects course activities to GIS applications in landscape architecture, urban and regional planning, archaeology, flood management, sociology, coastal studies, environmental health, oceanography, economics, disaster management, cultural anthropology, and art history. 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 will 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 will vary in scale from the local to the global. Note: ENV 202 must be taken concurrently. Prerequisite: one semester of statistics. Recommended: ENV 101. Enrollment limited to 18. Q [N][S] Credits: 4
Ninian Stem, Fall 2014
Camille Washington-Ottombre, Spring 2015
Offered Fall 2014, Spring 2015

ENV 202 Environmental Integration II: Collecting and Analyzing Information Laboratory
In this laboratory complement to ENV 201, students will use a variety of methods to gather and analyze different types of environmental data (e.g., quantitative, qualitative, spatial). Enrollment limited to 18. Q [N][S] Credits: 1
Ninian Stem, Fall 2014
Camille Washington-Ottombre, Spring 2015
Offered Fall 2014, Spring 2015

ENV 266 Landscapes of Northern Germany: Natural Environments and Human Influences
The course will include lectures, field trips to locations in Northern Germany, and seminars with student presentations and discussion. The lectures cover a general introduction into different landscape types of Northern Germany, their geology, characteristic plant and animal life, and their development through time. The effects of humans on landscape development will be highlighted for the last 6,000 years. Possibilities and constraints of sustainable development based on the natural resources of the region will be discussed. Different landscapes of Northern Germany will be visited over five days of field trips, to get a good overview of the landscape types present. (E) [N][S] Credits: 4
Kai Jensen
Offered Spring 2015

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 will 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. ENV 101 and ENV 201/202 are strongly recommended. Enrollment limited to 25. [N][S] Credits: 4
Susan Sayre
Offered Fall 2014

ENV 312 Environmental Integration IV: Sustainable Solutions
This course engages the class in a semester-long design and/or analysis project. Students will 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. The specific projects will vary from year to year. Students will gain direct experience with the range and complexity of activities required to address a real-world environmental project. Student work will be assessed via progress reports (written and oral), reflective essays, and a final report. Prerequisites: ENV 101, Statistics, ENV 201/202, ENV 311. ENV 311 may be taken concurrently. Enrollment limited to 16. [N][S] Credits: 4
L. David Smith, Fall 2014
Ninian Stem, Spring 2015
Offered Fall 2014, Spring 2015
ENV 321 Governing the Commons: A Seminar in Water Resources
This course investigates the management of water as a common pool resource. As concerns over water scarcity and quality increase, this course asks how we can manage this precious and endangered resource in an equitable and efficient way. We first explore common mental models of water as a public and private good, then move forward towards envisioning water related issues not only as a problem of natural resources but also as a collective action situation. Students will investigate a water issue of their choice, study the collective action settings and institutions that govern the resource, and propose alternative management schemes. Enrollment limited to 15. (N) (S) Credits: 4
Camille Washington-Ottombre
Offered Fall 2014

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: 1–4
Instructor: TBA
Offered Fall 2014, Spring 2015

Cross-Listed Courses
ECO 220 Introduction to Statistics and Econometrics
PHI 238 Environmental Ethics
SOC 201 Evaluating Information
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