

# Environmental Studies (ENST)

Environmental Studies is the interdisciplinary examination of how natural sciences, policy studies, social sciences, humanities, and engineering combine to inform the consideration of humanity's effects on the natural world. This program educates the student to appreciate the complexity of environmental issues and solve them by working with citizens and experts in many fields. With a major in Environmental Studies, students have the latitude to create a course theme in an area of specialization while they simultaneously develop a breadth of interdisciplinary and methodological knowledge in the environmental fields.

Specifically, the program has two major tracks: a Bachelor of Arts in Environmental Studies and a Bachelor of Arts in Environmental Science. Each requires the interdisciplinary study of environmental issues and an understanding of the complexity of the relationship between humanity and the environment, while they allow the student to concentrate his/her studies in a field of particular interest to that student. The B.A. in Environmental Studies is designed for those who want to develop core concentrations in the social sciences, policy and law, or the humanities, although a science concentration is also possible with this choice. The B.A. in Environmental Science is designed for students who want a concentrated knowledge of science as the core of their interdisciplinary environment education. **Environmental Science is a coordinate major and can only be declared as a second major by students also majoring in biology, chemistry, or geology.**

Most Environmental Studies majors benefit from studying abroad. Field-based programs – such as School for Field Studies or School for International Training – are especially appropriate for Environmental Studies and Environmental Science students.

## Bachelor of Arts in Environmental Studies

An interdisciplinary Bachelor of Arts major in Environmental Studies is offered for the student with an abiding interest in the general environmental problems faced by humans, and with special concern for their humanistic, policy, and social sciences aspects. The B.A. in Environmental Studies is a strong, broad, liberal arts degree. It also is a preparation for one of the growing numbers of environmental careers in planning, business, non-profits, law, administration, or education.

The Bachelor of Arts in Environmental Studies major requires 10 courses distributed as follows:

ENST 201	Environmental Problems-Sustainable Futures	1
ENST 302	Environmental Research Design	1
GEOG 332	Evolution, Ecology, and Human Impact	1
or ENST 208	Environmental Biology	
GEOL 203	Physical/Environmental Geology <sup>1</sup>	1
Humanities core course (see Humanities list below) <sup>2</sup>		1
Human-environmental systems science course (see Human-Environment Systems Science list below) <sup>2</sup>		1
Three (3) environmental studies electives (see Electives list below) <sup>2</sup>		3
ENST 411	Environmental Community Projects <sup>3</sup>	1

<sup>1</sup> GEOL 250 Geology for Engineers may be substituted with permission

<sup>2</sup> Clusters of courses with a common theme have been designed from lists A, B, and C that fulfill the above requirements while focusing on an area of Environmental Studies each student finds most interesting. See the Environmental Studies website for a full listing of these themes and their courses. All B.A. majors are expected to select a theme from this list, or consult with their academic adviser to design their own theme, by the fall of the third year.

<sup>3</sup> Fulfills the Culminating Experience requirement. In this senior "clinic" course, students apply research methods and the broad perspectives gained in ENST courses in a group setting to a local environmental issue, thus culminating the major experience. Students will receive instruction in the other in-major components of the CCC (writing, speaking, and information literacy) as part of their major coursework.

## List A: Humanities Courses

ENGL 120	Literature and the Environment	1
ENGL 210	Special Topics in Creative Writing	1
ENGL 340	Seminar in Early English Literature to 1485	1
ENST 205	Green Utopias	1
ENST 206	Environmentlism and Its Discontents	1
ENST 207	American Environmental History	1
ENST 216	Preindustrial Environment	1
ENST 224	Visions of the Susquehanna	1

ENST 225	Susquehanna Country	1
ENST 227	Ecopoetics	1
ENST 236	Environmental Ethics	1
ENST 255	Environmental Injustice	1
PHIL 218	Ecology, Nature, and the Future	1
RELI 229	The Ethics of Consumption	1
RELI 230	End of Nature, Posthuman Future	1

## List B: Human-Environment Systems Science Courses

ENST/GEOG 234	Human Ecology	1
ENST/GEOG 345	Food and the Environment	1
GEOG 257	Global Environmental Change	1
GEOG 332	Evolution, Ecology, and Human Impact	1
GEOL 338	Applied Environmental Geomorphology	1

## List C: Elective Courses

Electives include all courses with the ENST course designation as well as all courses on lists A and B. In addition, the courses listed below will also satisfy this requirement.

ANTH 260	Environmental Anthropology	1
CENG 432	Sustainable Transportation Planning	1
ECON 231	Resources and the Environment	1
GEOL 117	Environmental Geohazards	1
GEOL 305	Introduction to Geochemistry	1
GEOL 316	Geomorphology	1
SOCI 220	Environmental Sociology	1

## Bachelor of Arts in Environmental Science

The B.A. in Environmental Science is only available as a second major to students who major in biology, chemistry, or geology and therefore may be thought of as a means of adding an environmental concentration to a B.A. science degree. These three disciplines form the core of Environmental Science, and consequently the first major ensures that students have sufficient depth of knowledge in a particular area of Environmental Science. Complementing the depth a student receives from the biology, chemistry, or geology major, the B.A. in Environmental Science provides breadth across the interdisciplinary field of Environmental Science. The major is not intended as – nor can it be declared as – a stand-alone course of study. No courses may be counted for both majors.

The B.A. in Environmental Science requires eight courses distributed as follows:

ENST 201	Environmental Problems-Sustainable Futures	1
Select two of the following: <sup>4</sup>		2
BIOL 208	Principles of Ecology and Evolution	
CHEM 160	Introduction to Environmental Chemistry	
GEOL 203	Physical/Environmental Geology	1
Select one of the following:		1
ENST 240	Sustainable Resource Management	
ENST 245	Environmental Policy and Politics	
RELI 226	Environmental Ethics	
Three science or engineering courses (see Environmental Science list below) <sup>5</sup>		3
ENST 411	Environmental Community Projects <sup>6</sup>	1

<sup>4</sup> from the disciplines within the environmental sciences, but outside the student's primary major

<sup>5</sup> These may not be from the same department as the student's primary major. Other courses not included in the regular catalog offerings (e.g. special topics courses) may be counted with permission.

- <sup>6</sup> Fulfills the Culminating Experience requirement. In this senior "clinic" course, students apply research methods and the broad perspectives gained in ENST courses in a group setting to a local environmental issue, thus culminating the major experience. Students will receive instruction in the other in-major components of the CCC (writing, speaking, and information literacy) as part of their major coursework.

## List D: Environmental Science Courses

BIOL 206	Organismal Biology	1
BIOL 245	Tropical Marine Biology	1
BIOL 266	Animal Behavior	1
BIOL 312	Comparative Vertebrate Anatomy <sup>7</sup>	1
BIOL 313	Mammalogy <sup>7</sup>	1
BIOL 318	Principles of Physiology <sup>7</sup>	1
BIOL 321	Behavioral Ecology	1
BIOL 334	Limnology	1
BIOL 341	Organic Evolution	1
BIOL 353	Ecosystem Ecology	1
BIOL 354	Tropical Ecology	1
BIOL 355	Social Insects	1
BIOL 357	Ornithology <sup>7</sup>	1
BIOL 358	Invertebrate Zoology <sup>7</sup>	1
BIOL 359	General Entomology <sup>7</sup>	1
BIOL 370	Primate Behavior and Ecology	1
CENG 240	Environmental Engineering	1
CENG 320	Water Resources Engineering <sup>7</sup>	1
CENG 421	Hydrology <sup>7</sup>	1
CHEG 455	Atmospheric Chemistry and Physics <sup>7</sup>	1
CHEM 360	Advanced Environmental Chemistry <sup>7</sup>	1
ENST 211	Environmental Pollution and Control	1
ENST 221	Hazardous Waste and Society	1
ENST 234	Human Ecology	1
ENST 298	Stream Restoration	1
ENST 299	Watershed Systems Science	1
ENST 349 & ENST 350	Senior Thesis and Senior Thesis	1-2
GEOG 204	Applied G.I.S.	1
GEOG 234	Human Ecology	1
GEOG 257	Global Environmental Change	1
GEOG 332	Evolution, Ecology, and Human Impact	1
GEOL 117	Environmental Geohazards	1
GEOL 230	Environmental GIS	1
GEOL 298	Stream Restoration	1
GEOL 299	Watershed Systems Science	1
GEOL 304	Crystallography-Mineralogy	1
GEOL 305	Introduction to Geochemistry	1
GEOL 316	Geomorphology	1
GEOL 317	Paleontology	1
GEOL 334	Geophysics	1
GEOL 336	Hydrogeology	1
GEOL 338	Applied Environmental Geomorphology	1

<sup>7</sup> Additional coursework beyond the introductory course may be necessary as a prerequisite

## Minor in Environmental Studies

The **minor** in Environmental Studies requires five courses distributed as follows:

ENST 245	Environmental Policy and Politics	1
or ENST 240	Sustainable Resource Management	
Select one of the following:		1
BIOL 208	Principles of Ecology and Evolution	
ENST/GEOG 234	Human Ecology	
GEOG 113	Human Impact on Environment	
GEOG 332	Evolution, Ecology, and Human Impact	
GEOL 203	Physical/Environmental Geology	
Three electives (see Electives list below)		3

## Elective Courses

Electives include all courses with the ENST course designation as well as all courses on lists A and B. In addition, the courses listed below will also satisfy this requirement.

ANTH 260	Environmental Anthropology	1
CENG 432	Sustainable Transportation Planning	1
ECON 231	Resources and the Environment	1
GEOL 117	Environmental Geohazards	1
GEOL 305	Introduction to Geochemistry	1
GEOL 316	Geomorphology	1
SOCI 220	Environmental Sociology	1

## Faculty

**Director:** Amanda Wooden

**Professor:** Ben Marsh

**Associate Professors:** Matthew E. McTammany, Peter R. Wilshusen, Amanda Wooden

**Assistant Professor:** Andrew Stuhl

**Visiting Assistant Professor:** Elisa Da Vià

**Coordinating Committee:** Maria A. Antonaccio (environmental ethics), Kevin Gilmore (civil and environmental engineering), Duane A. Griffin (geography), Ellen K. Herman (geology), Ben Marsh (geography), Molly M. McGuire (chemistry), Matthew E. McTammany (biology), Alfred K. Siewers (ecocriticism), Peter R. Wilshusen (environmental planning and policy), Amanda Wooden (politics and policy)

**Lecturer:** Brandn Green

## Courses

**ENST 100. Introduction to Environmental Studies. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

A survey of environmental issues intended for non-majors. Students will understand the cultural, political, historical, economic and ethical complexities of environmental problems and their responses. Intended for first-year students and sophomores. Does not count toward either the Environmental Studies or Environmental Science major.

**ENST 201. Environmental Problems-Sustainable Futures. 1 Credit.**

**Offered Spring Semester Only; Lecture hours:3**

Develops a working understanding of the core concepts linked to environmental studies and introduces skills such as posing researchable questions, gathering data, presenting oral arguments, and applying these skills in group projects. Intended only for students majoring or intending to major in Environmental Studies or Environmental Science.

**ENST 205. Green Utopias. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

Introduction to literary utopias and to the cultural writings of various ecological movements offering alternative concepts to the increasing destruction of nature.

**ENST 206. Environmentlism and Its Discontents. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

A survey of historical and contemporary efforts to protect nature and the backlash they have provoked.

**ENST 207. American Environmental History. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

This course examines how nature (soil, disease, water, climate, etc.) shaped American history and how Americans transformed the environment, from the colonial period to today.

**ENST 208. Environmental Biology. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

Introduction to ecology and evolutionary biology, organism interactions with environment, biodiversity, energy flow, nutrient cycling, and human influences on living systems and biological processes. Open to seniors by permission only. Not open to students who have taken BIOL 208.

**ENST 211. Environmental Pollution and Control. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:2**

Introduction for non-engineering students to the major areas of environmental engineering. Topics include environmental chemistry, biology and ecology, water and air pollution and treatment, solid and hazardous wastes, sustainability, and global climate issues. Not open to students in the College of Engineering.

**ENST 215. Environmental Planning. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

Explores the main approaches to planning theory and their environmental applications. Considers how environmental planning can promote the socio-ecological health and sustainability of democratic communities. Crosslisted as GEOG 215.

**ENST 216. Preindustrial Environment. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:3**

An introduction to the environmental history of the Near East, Mediterranean Basin, and Europe from the Neolithic Period to the Industrial Revolution through three thematic lenses: how the natural environment shaped the patterns of human life, how ideologies towards nature shifted over time, and how human activities and ideologies reshaped the landscape. Crosslisted as CLAS 220.

**ENST 221. Hazardous Waste and Society. 1 Credit.****Offered Spring Semester Only; Lecture hours:3,Other:3**

Hazardous waste regulation, risk assessment and toxicology, overview of treatment technologies and site investigation, environmental audits, facilities siting and public participation, pollution prevention. Not open to students in the College of Engineering.

**ENST 222. Concepts in Sustainability. 1 Credit.****Offered Alternating Fall Semester; Lecture hours:3,Other:2**

This course explores the definitions and concepts of economic, social and environmental sustainability and utilizes the tools to evaluate sustainability metrics including life cycle assessment, systems thinking, and economic analysis. Not open to engineering students.

**ENST 224. Visions of the Susquehanna. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course examines literature of the Susquehanna Valley. Crosslisted as ENGL 224. Prerequisite: permission of the instructor.

**ENST 225. Susquehanna Country. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:2,Other:3**

Interdisciplinary studies in environment, philosophy, literature and communities of the Susquehanna region. Crosslisted as ENGL 225 and HUMN 290.

**ENST 226. Water Politics and Policies. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

Examines the evolution and philosophical foundations of water use as well as the politics surrounding current issues in water use.

**ENST 227. Ecopoetics. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

An exploration of poetry as site-specific ecological practice. Intended for students interested in both Creative Writing and Environmental Studies. Prerequisite: ENGL 204 or permission of the instructor. Crosslisted as ENGL 229.

**ENST 228. The Loire. A Cultural Heritage or a "Wild" River of the Anthropocene. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

In class lectures and on-site discovery of the river aboard traditional boats will be used to establish a good understanding of the links between a-biotic and biotic dynamics and human activities; an understanding of the importance and the necessity of the river management, especially on rivers like the Loire (wild aspects, hydrology, etc.); increase awareness of the diversity of uses in the Loire Valley and their impact on natural processes and biodiversity (pollution, habitats, destruction, etc.) Must be enrolled in the Bucknell en France program. Prerequisite: permission of the instructor.

**ENST 230. Introduction to Ecological Design. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

The application of basic ecological principles to the design of buildings, landscapes, communities, and cities. Emphasis is placed on real situations in the local environment.

**ENST 234. Human Ecology. 1 Credit.****Offered Alternating Spring Semester; Lecture hours:3**

A general science course in human ecology, to demonstrate the ways humans continue to adapt to their environment through biological, cultural, scientific, symbolic, political, and technical means. Crosslisted as GEOG 234.

**ENST 236. Environmental Ethics. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

A survey of the major theories of environmental ethics, with particular attention to the challenge of developing an ethic commensurate with increasing human power. Crosslisted as RELI 226.

**ENST 240. Sustainable Resource Management. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

Focuses on problem-oriented policy analysis of domestic and international environmental issues including ecosystem management, endangered species, protected areas, and community-based conservation.

**ENST 243. Global Environmental History. 1 Credit.****Offered Occasionally; Lecture hours:3**

Explores how global forces, including population growth, commercialization, and fossil fuel revolutions, transformed nature and culture across the planet in the 20th century.

**ENST 244. History of Ecology. 1 Credit.****Offered Occasionally; Lecture hours:3**

Explores the development of ecology as a science, with attention to the political ramifications of ecological ideas and their enrollment in environmental management.

**ENST 245. Environmental Policy and Politics. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

An introduction to understanding the role of political institutions, stakeholders and policy processes (in the U.S. and internationally) in addressing environmental problems. Crosslisted as POLS 291.

**ENST 246. Environmental Activism. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

This course explores the geographies and practice of environmental activism. Drawing from national and international examples, we examine diverse means and methods of environmental protest.

**ENST 254. Environmental Humanities. 1 Credit.****Lecture hours:3**

Explores humanistic perspectives on the environment--from history, ethics, literature, religion, and the arts--including how these perspectives complement or unsettle knowledge about nature from the sciences.

**ENST 255. Environmental Injustice. 1 Credit.****Offered Alternating Spring Semester; Lecture hours:3**

Utilizing the literature of moral, social, and political philosophy, we will analyze how variations in our definition of justice dictate distinct public policies toward nature.

**ENST 256. Political Ecology of Mining. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

Using a political ecology framework, we explore development contradictions associated with mining in India and the United States to meet global energy and mineral demand.

**ENST 258. Feeding the Global City. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:3; Repeatable**

This Bucknell in London course will explore the contemporary transformation of European food systems from a social, political, and ecological perspective.

**ENST 260. Environmental Law. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

This course will examine the statutes, regulations and common law pertaining to risk and pollution abatement. We will both analyze current law and propose changes to better address the environmental problems involved.

**ENST 262. Introduction to Energy Resources. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:4**

Introduction for non-engineers to energy concepts including First and Second Laws of Thermodynamics; examination of energy demand; technologies for meeting demand, effects on the environment. Not open to students who have taken ENGR 200, MECH 213, CHEG 200, PHYS 147, PHYS 211, PHYS 211E, PHYS 212, PHYS 212E, PHYS 221, PHYS 222, PHYS 235. Crosslisted as ENGR 262.

**ENST 291. Bucknell on the Susquehanna Watershed SCI/Natural History. 1 Credit.****Offered Fall Semester Only; Lecture hours:4,Other:4**

The study of watershed processes and regional natural history of the Susquehanna River. Prerequisite: permission of the instructor.

**ENST 292. Bucknell on the Susquehanna Land Use Planning and Social Processes. 1 Credit.****Offered Fall Semester Only; Lecture hours:4,Other:4**

The study of land use planning and social processes involved with watershed management of the Susquehanna River valley region. Prerequisite: permission of the instructor.

**ENST 293. Bucknell on the Susquehanna Human Dimensions and Environmental History. 1 Credit.****Offered Fall Semester Only; Lecture hours:4**

The history of human settlement and culture in the Susquehanna River valley and its relationship to resources and the environment. Prerequisite: permission of the instructor.

**ENST 295. Topics in Environmental Studies. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3; Repeatable**

Selected issues in environmental studies.

**ENST 298. Stream Restoration. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:3,Other:4; Repeatable**

Scientific principles to integrate physical and biological approaches to stream restoration in watershed management. Team-taught field course highlights developing restoration plan for Bucknell's Miller Run. Crosslisted as GEOL 298.

**ENST 299. Watershed Systems Science. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:3,Other:4; Repeatable**

Watersheds regulate water flow and ecosystem health on our landscape. Team-taught field course integrating physical, chemical, and biological processes in watersheds, using the Susquehanna and tributaries. Crosslisted as GEOL 299.

**ENST 2NT. ENST Non-traditional Study. 1-3 Credits.****Offered Fall, Spring, Summer; Lecture hours:Varies**

Non-traditional study in Environmental Science. Prerequisite: permission of the instructor.

**ENST 302. Environmental Research Design. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:1**

Students will learn quantitative and qualitative research methods related to environmental studies including research design, data collection, and analysis. Prerequisite: junior or senior status. Preference to Environmental Studies majors, others by permission of the instructor.

**ENST 315. Cold Places. 1 Credit.****Offered Occasionally; Lecture hours:3**

A seminar exploring the nature and culture of cold places-glaciers, mountain tops, Antarctica, and the Arctic-through art, film, literature, science, and popular media.

**ENST 319. Directed Research. .5-1 Credits.****Offered Both Fall and Spring; Lecture hours:Varies; Repeatable**

Supervised research or thesis work on environmental issues. Prerequisite: permission of the instructor.

**ENST 325. Nature, Wealth and Power. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

A seminar in political ecology that explores the historical, social political and economic dimensions of environmental change in developing regions. First-year students and sophomores by permission only. Prerequisite: permission of the instructor. Crosslisted as GEOG 325.

**ENST 341. Seminar on Ecocriticism and Ecossemiotics. 1 Credit.****Offered Alternate Fall or Spring; Lecture hours:3**

This seminar will focus on research and discussion of ecocritical and ecossemiotic approaches to literature. Prerequisite: permission of the instructor. Crosslisted as ENGL 341.

**ENST 345. Food and the Environment. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

Nothing from the environment is more important than food production, nothing affects the environment more; we'll study both environmental and social circumstances. Laboratory science course. Crosslisted as GEOG 345.

**ENST 347. Sustainable Cities. 1 Credit.****Offered Fall Semester Only; Lecture hours:3,Other:2**

This team-taught course introduces students to the core concepts of sustainability and how they have been applied to promote sustainability in London, the UK, and Europe. This course is part of the Bucknell in London core course. Prerequisite: permission of the instructor. Crosslisted as CENG 447.

**ENST 349. Senior Thesis. .5-1 Credits.****Offered Both Fall and Spring; Lecture hours:Varies; Repeatable**

Independent thesis work under adviser's supervision. Prerequisite: permission of the instructor.

**ENST 350. Senior Thesis. .5-1 Credits.**

**Offered Both Fall and Spring; Lecture hours:Varies; Repeatable**

Independent thesis work under adviser's supervision. Prerequisite: permission of the instructor.

**ENST 355. Advanced Topics in Environmental Policy. 1 Credit.**

**Offered Fall Semester Only; Lecture hours:3**

Advanced seminar on environmental policy. Focus varies by semester. Consult class schedule for current topic. Prerequisite: permission of the instructor. Crosslisted as POLS 393.

**ENST 356. Nationalism, Conflict & Nature. 1 Credit.**

**Offered Occasionally; Lecture hours:3**

This course explores the ways in which nature is politicized in nationalist discourse, and the role of nationalized nature ideas in social movements and environmental conflicts. May be crosslisted as POLS 356 or IREL 356. Prerequisite: POLS 205.

**ENST 393. International Environmental Aid. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

This advanced seminar on international environmental politics focuses on applied examination of international and bilateral aid for solving environmental problems. It explores discussion topics including: theories of international environmental relations and development, roles of international organizations and non-governmental actors, and environmental problem-solving case studies. Prerequisite: permission of the instructor. Crosslisted as POLS 393.

**ENST 3NT. ENST Non-traditional Study. 1-3 Credits.**

**Offered Fall, Spring, Summer; Lecture hours:Varies**

Non-traditional study in Environmental Science. Prerequisite: permission of the instructor.

**ENST 411. Environmental Community Projects. 1 Credit.**

**Offered Either Fall or Spring; Lecture hours:3**

Community-based "clinic" course on environmental problems or projects for local stakeholders, based on integrative, interdisciplinary research and design. Preference to senior ENST and GEOG majors. Crosslisted as GEOG 420.