

# ENVIRONMENTAL STUDIES & SCIENCES (ENST)

## Faculty

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

**Associate Professor:** Andrew Stuhl (Chair)

**Assistant Professors:** Janet Adomako, Jessica Pouchet

**Affiliated Faculty:** Maria A. Antonaccio (Professor-Religious Studies), Claire Campbell (Professor-History), Kevin Gilmore (Associate Professor-Civil & Environmental Engineering), Duane A. Griffin (Associate Professor-Geography), Molly M. McGuire (Associate Professor-Chemistry)

**Coordinating Committee:** Janet Adomako (geography and environmental studies & sciences), Maria A. Antonaccio (environmental ethics), Claire Campbell (environmental history), Kevin Gilmore (civil and environmental engineering), Duane A. Griffin (geography), Molly M. McGuire (environmental chemistry), Matthew E. McTammany (ecology), Jessica Pouchet (environmental anthropology), Andrew Stuhl (environmental history), Peter R. Wilshusen (environmental planning and policy), Amanda Wooden (environmental politics and policy)

Environmental studies & sciences is the interdisciplinary examination of how natural sciences, policy studies, social sciences, humanities and engineering combine to inform inquiry of humanity's effects on and interrelationships with the natural world. This department educates the student to identify, analyze and respond to complex environmental issues by working with communities and experts in many fields. With a major in environmental studies, students have the latitude to create a course of study in an area of specialization and to develop a breadth of interdisciplinary and methodological knowledge in diverse environmental fields.

The department 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 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, planning, law and the humanities, although a science concentration is also possible with this choice. The B.A. in Environmental Science is designed for students who want in-depth knowledge of natural sciences as the core of their interdisciplinary environmental education. **The B.A. in Environmental Science has an obligate second B.A. major in one of the following: biology, chemistry or geology.**

Most environmental studies and environmental science 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 an integrative liberal arts degree that prepares students for a range of environmental and sustainability career paths such as: policy, planning, law, business, nonprofits, administration and education, or for graduate study in related fields.

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

ENST 201	Environmental Problems-Sustainable Futures	1
ENST 208	Environmental Biology	1
GEOL 203	Physical/Environmental Geology <sup>1</sup>	1
ENST 302	Community-Based Research Design	1
Two Integrative Elective courses (see list below) <sup>2</sup>		2
Two Thematic Depth Elective courses (see list below) <sup>3</sup>		2
One 300-level advanced seminar or practicum course (see list below)		1
ENST 411	Environmental Community Projects	1

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

<sup>2</sup> Integrative elective courses introduce major cross-disciplinary concepts and methods central to contemporary environmental studies.

<sup>3</sup> Thematic depth courses explore environmental concepts and approaches from a wider range of disciplinary perspectives from across the University.

The ENST major includes five required courses and five elective courses. The five required courses are: ENST 201, ENST 208, ENST 302, ENST 411 and GEOL 203. ENST 201, ENST 302 and ENST 411 comprise the 'spine' sequence of the major designed to introduce students to the central concepts in environmental studies, environmental research and community-based applications. ENST 208 and GEOL 203 provide students with a foundation in the natural sciences.

The five electives include two “integrative” courses, two “thematic depth” courses, and one 300-level course. Integrative elective courses introduce major concepts and methods central to contemporary environmental studies. Thematic depth courses explore environmental concepts and approaches from a wider range of disciplinary perspectives from across the University; 300-level courses include seminar or practicum offerings that emphasize advanced concepts and content reflected, for example, in research projects and field-based activities.

Students should note that ENST 100 Introduction to Environmental Studies does not count toward the major or the minor in environmental studies.

The department has identified 10 integrative themes drawing on different cross-disciplinary domains in environmental studies and areas of strength at Bucknell. Environmental studies majors are expected to work closely with their academic advisers to develop a course of study oriented around one of these integrative themes or to develop a coherent self-designed course of study. Students are encouraged to consult with any faculty member in the department for more details about the integrative themes, including the selection of elective courses that align well with each area of study.

#### **Integrative Themes:**

- Environmental Change & Conservation
- Environmental History
- Environmental Policy, Politics & Governance
- Environmental Philosophy & Ethics
- Environmental Justice & Political Ecology
- Place, Nature & Community
- Environmental Planning & Sustainable Design
- Environmental Advocacy
- Critical Sustainability Studies
- Environmental Literature & Creative Writing

#### **Integrative Elective Courses**

ENST 207	American Environmental History (or ENST/HIST 213 North American Environmental History)	1
ENST/ANTH 210	Environmental Ethnography	1
ENST 211	Environmental Pollution and Control	1
ENST/GEOG 215	Environmental Planning	1
ENST 221	Hazardous Waste and Society	1
ENST 232	Identity, Inequality, and the Environment	1
ENST/GEOG 234	Human Ecology	1
ENST 236	Environmental Ethics	1
ENST/GEOG 240	Sustaining Nature	1
ENST 241	Environmental Health & Climate	1
ENST 245/POLS 291	Environmental Politics, Policy, & Justice	1
ENST 246	Environmental Activism	1
ENST 254	Environmental Humanities	1
ENST 255	Environmental Injustice and Activism	1
ENST 286	Imagining Sustainability	1

#### **Thematic Depth Elective Courses**

Thematic depth electives can be any ENST course as well as approved courses from other departments, including offerings listed under introductory courses (except ENST 100), integrative electives, and 300-level advanced seminar and practicum courses.

ENST 206	Environmentalism and Its Discontents	1
ENST 209/ANTH 202/LAMS 202	Rainforests and Eco-Politics in Latin America	1
ENST 212/UNIV 215	Stream Ecology and Restoration: The Science Behind Fly Fishing	1
ENST 214/GEOG 206/HIST 215	Mapping History: Nature, Place, and Power	1
ENST 216/CLAS 220	Preindustrial Environment	1
ENST 222	Concepts in Sustainability	1
ENST 226	Water & Power	1
ENST 227/ENCW 240	Ecopoetics	1
ENST/GEOG 235	Marine Environment	1
ENST 237	Oceans and Society	1
ENST 243	Global Environmental History	1

ENST 244	History of Ecology	1
ENST 256	The Political Ecology of Extraction	1
ENST/ENGR 262	Introduction to Energy Resources	1
ENST/CBST 263	Conservation in Africa	1
ENST 295	Topics in Environmental Studies	1
ENST 2NT	ENST Non-traditional Study	1-3
ENST 347/CEEG 447	Sustainable Cities (Bucknell in London only)	1
ANTH 260	Environmental Anthropology	1
CEEG 432	Sustainable Transportation Planning	1
ECON 231	Economics of Climate Change	1
ENCW 230	Topics: Writing Nature	1
ENCW 231	Environmental Writing	1
ENCW 233	Writing the Anthropocene	1
ENCW 241	Topics: Poetry, Mind, Nature	1
GEOG 204	Applied G.I.S. (or GEOL 230 Environmental GIS)	1
GEOG 257	Climate Change	1
GEOL 305	Introduction to Geochemistry	1
GEOL 316	Geomorphology	1
RELI 229	The Ethics of Consumption	1
RELI 230	End of Nature, Posthuman Future	1
SOCI 220	Environmental Sociology	1
UNIV 200	Integrated Perspectives Course (Climate Change/The Anthropocene/River Tales) <sup>1</sup>	1

<sup>1</sup> Students interested in these UNIV courses should consult with their ENST adviser prior to course registration. For UNIV courses, instructors and topics can vary from year to year. For a UNIV course to count as a thematic depth elective for the ENST major, it is critical that students and advisers confirm that the particular UNIV course is one of the three above.

### 300-level Advanced Seminar (S) & Practicum (P) Courses

ENST 303	Diversity in the Great Outdoors	1
ENST 305	Gender, Environment & Health	1
ENST 315	Cold Places (S)	1
ENST 319	Directed Research (P)	.5-1
ENST 320/ANTH 307/LING 320	Language & Environmental Politics (S)	1
ENST/GEOG 325	Nature, Wealth and Power (S)	1
ENST/GEOG 345	Food and the Environment (S)	1
ENST 349	Senior Thesis (P)	.5-1
ENST 350	Senior Thesis (P)	.5-1
ENST/BIOL 353	Ecosystem Ecology (S)	1
ENST 355	Advanced Topics in Environmental Policy (S)	1
ENST/IREL/POLS 356	Nationalism, Nature & the Future (S)	1
ENST/POLS/RUSS 357	Petroleum Putinism & Plutonium	1
ENST/POLS 393	International Environmental Aid (S)	1
ENST 3NT	ENST Non-traditional Study (P)	1-3
HIST 301	Environmental History (S)	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 203	Integrated Concepts in Biology Fall	
or BIOL 204	Integrated Concepts in Biology Spring	
CHEM 160	Introduction to Environmental Chemistry	
GEOL 203	Physical/Environmental Geology	
Select one of the following:		1
ENST 240	Sustaining Nature	
ENST 245	Environmental Politics, Policy, & Justice	
ENST 254	Environmental Humanities	
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 CASC (writing, speaking and information literacy) as part of their major coursework.

## List D: Environmental Science Courses

ANBE/BIOL 314	Amphibian Biology and Conservation	1
ANBE/BIOL 382	Mass Extinctions	1
BIOL 203	Integrated Concepts in Biology Fall	1
BIOL 204	Integrated Concepts in Biology Spring	1
BIOL 266	Animal Behavior	1
BIOL 305	Vertebrate Ecology	1
BIOL 311	Climate Change Ecology	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	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 367	Plant Ecophysiology	1
BIOL 370	Primate Behavior and Ecology	1
CEEG 320	Water Resources Engineering	1
CEEG 340	Environmental Engineering	1
CEEG 421	Hydrology	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 349 & ENST 350	Senior Thesis and Senior Thesis	1-2
GEOG 204	Applied G.I.S.	1
GEOG/ENST 234	Human Ecology	1
GEOG 257	Climate Change	1
GEOL 117	Environmental Geohazards	1
GEOL 230	Environmental GIS	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 across the three areas listed below. The following courses **do not** count toward the minor in environmental studies: ENST 100, ENST 201, ENST 208, ENST 302 and ENST 411.

### 1. Select at least one of the following natural science and environmental engineering courses

BIOL 203 or BIOL 204	Integrated Concepts in Biology Fall Integrated Concepts in Biology Spring	1
ENST/GEOG 113	Human Impact on Environment	1
ENST/CHEM 160	Introduction to Environmental Chemistry	1
ENST 211	Environmental Pollution and Control	1
ENST 212/UNIV 215	Stream Ecology and Restoration: The Science Behind Fly Fishing	1
ENST 221	Hazardous Waste and Society	1
ENST/GEOG 234	Human Ecology	1
ENST/GEOG 345	Food and the Environment	1
GEOL 203	Physical/Environmental Geology	1

### 2. Select at least one of the following “integrative” courses<sup>1</sup>

ENST 207	American Environmental History	1
ENST/HIST 213	North American Environmental History	1
ENST/GEOG 215	Environmental Planning	1
ENST 232	Identity, Inequality, and the Environment	1
ENST 236	Environmental Ethics	1
ENST/GEOG 240	Sustaining Nature	1
ENST 241	Environmental Health & Climate	1
ENST 245/POLS 291	Environmental Politics, Policy, & Justice	1
ENST 246	Environmental Activism	1
ENST 254	Environmental Humanities	1
ENST 255	Environmental Injustice and Activism	1
ENST 286	Imagining Sustainability	1

<sup>1</sup> Integrative courses introduce major concepts and methods central to contemporary environmental studies.

### 3. Select three elective courses

Electives may be any ENST course as well as approved courses from other departments, including those in Lists 1 and 2 above.

ANTH 260	Environmental Anthropology	1
CEEG 432	Sustainable Transportation Planning	1
ECON 231	Economics of Climate Change	1
ENCW 230	Topics: Writing Nature	1
ENCW 231	Environmental Writing	1
ENCW 233	Writing the Anthropocene	1
ENCW 241	Topics: Poetry, Mind, Nature	1
ENST 206	Environmentalism and Its Discontents	1
ENST 209/LAMS 202/ANTH 202	Rainforests and Eco-Politics in Latin America	1
ENST 214/HIST 215/GEOG 206	Mapping History: Nature, Place, and Power	1
ENST 216/CLAS 220	Preindustrial Environment	1
ENST 222	Concepts in Sustainability	1
ENST 226	Water & Power	1
ENST 227	Ecopoetics	1
ENST/GEOG 235	Marine Environment	1
ENST 243	Global Environmental History	1
ENST 244	History of Ecology	1
ENST 256	The Political Ecology of Extraction	1
ENST/ENGR 262	Introduction to Energy Resources	1
ENST/CBST 263	Conservation in Africa	1
ENST 295	Topics in Environmental Studies	1
ENST 2NT	ENST Non-traditional Study	1-3
ENST 315	Cold Places	1
ENST 319	Directed Research	.5-1
ENST 320/ANTH 307/LING 320	Language & Environmental Politics	1
ENST/GEOG 325	Nature, Wealth and Power	1
ENST 347/CEEG 447	Sustainable Cities	1
ENST 349	Senior Thesis	.5-1
ENST 350	Senior Thesis	.5-1
ENST/BIOL 353	Ecosystem Ecology	1
ENST 355	Advanced Topics in Environmental Policy	1
ENST/IREL/POLS 356	Nationalism, Nature & the Future	1
ENST/POLS 393	International Environmental Aid	1
ENST 3NT	ENST Non-traditional Study	1-3
GEOG 204	Applied G.I.S.	1
GEOG 257	Climate Change	1
GEOL 305	Introduction to Geochemistry	1
GEOL 316	Geomorphology	1
HIST 301	Environmental History	1
RELI 229	The Ethics of Consumption	1
RELI 230	End of Nature, Posthuman Future	1
UNIV 200	Integrated Perspectives Course (Climate Change)	1

College of Arts & Sciences

Departmental Learning Objectives

### Students completing the Bachelor of Arts degree in Environmental Studies will be able to:

Understand fundamental physical and biological principles that govern natural processes. (4, 6)

Understand fundamental concepts from the social sciences and the humanities underlying environmental thought and governance. (3, 4)

Integrate and apply perspectives from across the natural sciences, social sciences and the humanities in the context of complex environmental problems. (2, 3, 5)

Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences. (7, 8, 9)

Design and conduct independent research that contributes to environmental thought and/or problem solving. (4, 6)

### **Students completing the Bachelor of Arts degree in Environmental Science will be able to:**

Demonstrate an in-depth understanding of one of the subdisciplines within environmental science (*i.e.* biology, chemistry or geology). (1, 4, 6)

Collect and interpret scientific data in both field and laboratory settings. (6)

Integrate information from across the scientific disciplines and apply these concepts to complex environmental problems. (2)

Identify the complex relationships between scientific approaches to environmental issues and political, social, economic and ethical perspectives on the environment. (3, 4, 5)

Communicate scientific information to both professional and lay audiences. (7, 8, 9)

### **Non-majors in Environmental Studies will be able to:**

Demonstrate an understanding of current environmental challenges.

**Numbers in parentheses reflect related Educational Goals** of Bucknell University.

## **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 113. Human Impact on Environment. 1 Credit.**

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

Causes and effects of major environmental changes induced by humans, challenges to our future well-being, and opportunities for future sustainability. Prerequisite: open to first-year students only. Crosslisted as GEOG 113.

**ENST 125. Environmental Sustainability Through the London Lens. 1 Credit.**

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

This course will help students to understand their personal connection to the environment through the analysis of environmental systems and cultural narratives that shape our relationship with the environment using London as our classroom. Numerous field trips to sights in and around London will be an important feature.

**ENST 160. Introduction to Environmental Chemistry. 1 Credit.**

**Offered Occasionally; Lecture hours:3, Lab:3**

One semester terminal course in chemistry. Introduction to the basic chemistry principles that govern natural processes and anthropogenic effects on the environment. Satisfies laboratory science requirement for Bachelor of Arts students not majoring in science or engineering. Not open to students who have taken CHEM 105 or any 200-level CHEM. Crosslisted as CHEM 160.

**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 ENST introduces skills such as posing researchable questions, gathering data, presenting oral arguments, applying these skills in group projects. For 1st 2nd yr. students majoring/intending to major in ENST or ENSC. Jr Sr by permission.

**ENST 204. Global Political Ecology of Food. 1 Credit.**

**Offered Occasionally; Lecture hours:3**

This course examines the political-economic and ecological dimensions of contemporary transformations in the global food system.

**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. Environmentalism 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 Spring 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 Either Fall or Spring; Lecture hours:3,Lab:3**

Introduction to ecology and evolutionary biology, organism interactions with environment, biodiversity, energy flow, and nutrient cycling, with emphasis on human influences on living systems and applications of evolutionary biology and ecology to solving environmental problems. This course is intended primarily for students majoring in environmental studies.

**ENST 209. Rainforests and Eco-Politics in Latin America. 1 Credit.****Offered Spring Semester Only; Lecture hours:3**

We study how business interests, scientists, and indigenous peoples think and engage with rainforests in radically different ways. Attentive to these differences, the course explores how rainforests are being destroyed by some groups and protected by others. Crosslisted as ANTH 202 and LAMS 202.

**ENST 210. Environmental Ethnography. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course explores environmental issues from around the world through scholarly readings in environmental anthropology. Students will also examine and practice the ethnographic methods that qualitative social scientists use to understand environmental phenomena. Not open to first-year students. Crosslisted as ANTH 210.

**ENST 211. Environmental Pollution and Control. 1 Credit.****Offered Spring Semester Only; Lecture hours:Varies,Lab: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 who have taken CEEG 340.

**ENST 212. Stream Ecology and Restoration: The Science Behind Fly Fishing. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3,Lab:3**

Introduction to the interactions between water quality, hydrology, and aquatic ecosystems and their impact on stream ecosystem health. Stream restoration concepts will be studied including impacts of climate change, invasive species and land use. Fly fishing will be used as the common thread that ties these topics together. Crosslisted as UNIV 215.

**ENST 213. North American Environmental History. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This class introduces the practices and purposes of studying our past relationships with nature, to better understand the origins of North America's landscapes today. Crosslisted as HIST 213.

**ENST 214. Mapping History: Nature, Place, and Power. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course examines maps as markers of environmental history. Focusing on the North Atlantic and North America from the seventeenth century onward, the course will emphasize critical analysis of visual artifacts, the politics of cartography, and maps as records of our changing ideas about and impact on the natural world. Crosslisted as GEOG 206 and HIST 215.

**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 global environmental history of the preindustrial world through three thematic lenses: how the natural environment shaped patterns of human life, how ideologies toward nature shifted over time, and how human activities and ideologies reshaped the ancient landscape. Crosslisted as CLAS 220.

**ENST 221. Hazardous Waste and Society. 1 Credit.****Offered Occasionally; Lecture hours:3,Lab:2**

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 engineering students, and also not open to students who have taken CEEG 444.

**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 ENLS 224. Prerequisite: permission of the instructor.

**ENST 226. Water & Power. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

This course explores social, political, and economic power of water, and the water-energy relationship. We will consider historical cases around the world, shifting and competing philosophical approaches to water use, as well as the complex politics surrounding current water issues.

**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: permission of the instructor. Crosslisted as ENCW 240.

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

The application of basic sustainability principles to multiple design scales, including consumer products, buildings, communities, and landscapes. Emphasis is placed on the campus and its surrounding community as a living laboratory for design experimentation. Open to first year, sophomore, and junior students. Seniors by permission only.

**ENST 232. Identity, Inequality, and the Environment. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

With a focus on race, ethnicity, class, and gender, this course examines environmental issues from around the globe. Students will learn how issues of identity and inequality are central to environmental problems and solutions. Topics include colonization, toxicity and health, climate change, grassroots environmentalism, and environmental leadership.

**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 ANTH 236 and GEOG 234.

**ENST 235. Marine Environment. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Understanding the ecological and physical systems of the ocean, understanding the processes of scientific discovery in the ocean, and exploring the many interactions of humans with ocean systems. Crosslisted as GEOG 235.

**ENST 236. Environmental Ethics. 1 Credit.****Offered Either Fall or Spring; 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 237. Oceans and Society. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

In this class we will uncover the many ways in which human societies are inextricable from the world's oceans and address themes such as scientific uncertainty, environmental racism, immigration, colonialism and urban sustainability. Walrus, anchovies, artisanal fishers, coastal cities and factories will all lie at the center of weekly discussions. Crosslisted as SOCI 227.

**ENST 240. Sustaining Nature. 1 Credit.****Offered Fall Semester Only; Lecture hours:3**

Critically explores contemporary and historical processes of human manipulation and conservation of nature. How do humans consume, transform, protect, and restore nature globally in relation to interrelated crises of inequality, biodiversity loss and climate change? Crosslisted as GEOG 240.

**ENST 241. Environmental Health & Climate. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course examines the connection between human-induced climate change, environmental exposures and health. We will situate climate/ environmentally related health problems within social contexts by attending to everyday biological, physical and chemical agents of the environment. Crosslisted as GEOG 241.

**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 Politics, Policy, & Justice. 1 Credit.****Offered Either Fall or Spring; 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.****Offered Either Fall or Spring; 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 and Activism. 1 Credit.****Offered Alternating Spring Semester; Lecture hours:3**

Explores environmental injustice in United States and internationally. Includes discussion of: structural racism, class issues, ecological justice, morality and environmental policy, and the environmental justice movement.

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

Using a political ecology framework, this course explores politics of mining and fossil fuel extraction around the world to meet global energy and mineral demand. We will study the connection between mining and climate change politics and many examples of resistance to extractivism.

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

Introduction for non-engineers to energy concepts including: energy balance; energy demand; technologies to meet demand; and, effects on the environment. Not open to students who have taken ENGR 200, MECH 213, CHEG 200, PHYS 147, PHYS 211. Crosslisted as ENGR 262.

**ENST 263. Conservation in Africa. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Through a series of case studies and a final research project, students will gain in-depth knowledge of conservation efforts on the African continent. Emphasizing local and global contexts, course themes include the colonial origins of protected areas, African environmental activists and scholars, and the multiple methods used in political ecology. Crosslisted as CBST 263.

**ENST 278. World Literature and Environmental Justice. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course examines how writers from outside of Europe and the United States seek environmental justice through a range of literary forms. Crosslisted as ENLS 278.

**ENST 286. Imagining Sustainability. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

The course covers critical understandings and applications of sustainability across the humanities, the social sciences, and the natural sciences as integrative of environmental, social, economic, and cultural perspectives.

**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 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. Community-Based 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 303. Diversity in the Great Outdoors. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

The great outdoors is for everyone, right? Perhaps it should be, but outdoor recreation has not always been so inviting to all. Through films, field trips, readings, speakers and projects, this course will challenge students to grapple with the complex intersection of social justice and environmental relationships in outdoor recreation.

**ENST 305. Gender, Environment & Health. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

This course explores how gender (intersecting with other identities) shapes interactions with the environment and related health outcomes. We will attend to multiple forms of power structures that enable and constrain possibilities of well-being. Crosslisted as GEOG 305 and WMST 305.

**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. Crosslisted as ENST 615.

**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 320. Language & Environmental Politics. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3**

Communication is central to how people perceive the environment, understand their relationship to it, and organize actions to change it. This course draws on concepts from linguistic anthropology, including discourse analysis, to examine debates about wildlife conservation, clean energy, eco-friendly products, environmental rights, and climate change. Crosslisted as ANTH 307 and LING 320.

**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 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. 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 CEEG 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 353. Ecosystem Ecology. 1 Credit.****Offered Either Fall or Spring; Lecture hours:3,Recitation:1**

Interactions between organisms and the physical and chemical environment including nutrient cycling and energy flow, biogeochemistry, and temporal and spatial dynamics of ecosystems. Prerequisites: BIOL 208, junior or senior status, and permission of the instructor. Crosslisted as ANBE 353, ANBE 653, BIOL 353, BIOL 653.

**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, Nature & the Future. 1 Credit.**

**Offered Occasionally; Lecture hours:3**

This course explores: the politics and geographies of nationalism; how nature is nationalized; the various ways ethnocentrism, racism, and sexism become part of national identity construction; ideas about and representations of nature in environmental contestations and in reactions to nationalism; and the intersection of nationalism with other social constructions. Crosslisted as IREL 356 and POLS 356.

**ENST 357. Petroleum Putinism & Plutonium. 1 Credit.**

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

This course explores the role of nationalism, alongside ideas about energy and nature, in the Russian state's current historical colonial relationships with neighboring countries, Central Asia and Indigenous communities of Siberia. Topics include Russian imperial/Soviet state extractivist economics, Russian/regional pipeline and petro politics, social resistance and climate change futures. Crosslisted as POLS 357 and RUSS 357.

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

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

This advanced seminar focuses on an applied and critical examination of international aid for solving environmental problems. It explores topics including: theories of international relations, environmental politics, and development; how international organizations, states, and non-governmental actors relate, and 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, ENSC, and GEOG majors.