Environmental Studies
Environmental Science

PROFESSORS: Renee Godard (biology, director), Bansi Kalra (chemistry), Annette Sampon-Nicolas (French, international studies), LeeRay Costa (gender and women’s studies)
ASSOCIATE PROFESSORS: Jon D. Bohland (international studies), Pablo Hernandez (economics), Christina Salowey (classical studies), Morgan Wilson (biology), Thorpe Moeckel (English)
ASSISTANT PROFESSORS: Elizabeth Gleim (biology), Mary Jane Carmichael (biology), Brian Gentry (physics)
AFFILIATED FACULTY: Sandy Boatman (chemistry), Bonnie Bowers (psychology), Julie M. Clark (mathematics and statistics), Casimir Dadak (business), James Patrick Downey (philosophy), Lori J. Joseph (communication studies), Edward A. Lynch (political science), Jong Oh Ra (political science), Giancarlo Schrementi (mathematics), Darla Schumm (religious studies), Susan L. Thomas (political science)

The field of environmental studies/environmental science (ES) explores the relationship between humans and the environment. To fully understand the causes and consequences of environmental problems, and to acquire skills for developing potential solutions, an interdisciplinary approach that draws on the natural and social sciences, as well as the arts and humanities, is required. The environmental studies program offers two degree pathways for students to explore the field.

The B.A. degree in environmental studies provides students, through the core curriculum, with a background in environmental issues from scientific, cultural, historical, and societal perspectives. With this grounding, B.A. students may then explore the field through a wide distribution of elective courses in environmental studies and affiliated programs. Thus, the B.A. degree provides students significant flexibility in selecting courses that fit their interests.

The B.S. degree is more focused on developing scientific and quantitative skills which students can use to approach environmental problems at the most fundamental of levels. The Hollins ES program is distinguished by its experiential component, which requires all majors (B.A. and B.S.) to be involved in an internship or service project that pertains to their field of interest within the interdisciplinary approach of environmental studies. In addition, our affiliation with the School for Field Studies allows both B.A. and B.S. students the opportunity to study abroad and to receive major elective (and in some instances core) credit for the courses taken in this program.

REQUIREMENTS FOR A MAJOR IN ENVIRONMENTAL STUDIES (B.A.):
12 courses (minimum of 46 credits) and Experiential Component

CORE COURSES (7)
- ES 117: Environmental Science (4)
- ECON 157: Principles of Microeconomics (4)
- ES 207: Ecology and ES 207L (4, 2)
- ES 234: Environmental Politics and Policy (4) or SFS course: Policy and Socioeconomic Values
- ES 357: Conservation Biology (4) or SFS Principles of Resource Management
- ES 470: Senior Seminar in Environmental Studies (4)

FIVE ADDITIONAL COURSES
- One course must be at 300 level and three courses must be at 200 level or higher
- Two courses must be ES, the other three can come from ES or affiliated courses listed below

EXPERIENTIAL COMPONENT
- All students must complete an experiential component, which consists of a related internship, service project, or completion of the Hollins Outdoor Leadership certificate.

ENVIRONMENTAL STUDIES COURSES
- ES/CHEM 112: Environmental Analysis
- ES/PHYS 121: Introduction to Oceanography and Hydrogeology (4)
- ES/PHYS 137: Environmental Physics (4)
- ES/INTL 210: World Geography (4)
- ES/ANTH/GWS 219: Food, Culture, and Social Justice (4)
- ES/INTL 220: Globalization and Local Responses (4)
- ES/PHYS 221: Survey of Physics and the Environment (4)
- ES/ECON 230: Economics and the Environment (4)
• ES/PHYS 241: Geology and Earth History (4)
• ES 250: Special Topic in Environmental Studies (2–4) (may be taken more than once for credit)
• ES/INTL 304: Geography of Global Environment (4)
• ES/INTL 305: Cultural Geography and Landscape Studies (4)
• ES/BIOI 337: Ornithology (4)
• ES/BIOI 328: Field Vertebrate Zoology (4)
• ES 352: Topics in Human Geography (4)
• ES 390: Independent Study (2 or 4) *
• ES 480: Senior Thesis *
• ES 490: Senior Honors Thesis *
• Four elective courses are also available through the Hollins affiliated School for Field Studies. For more information see page 10 or contact Renee Godard
* A student may apply up to two semesters of ES 390, ES 480, and ES 490 toward her elective courses.

AFFILIATED COURSES:

DIVISION I
• PHIL 181: Contemporary Moral Issues (4)
• PHIL 252: Ethics (4)
• REL 168: Introduction to Religion from Global Context (4)
• REL 218: Buddhist Traditions (4)

DIVISION II
• ANTH 145: Introduction to Anthropology (4)
• ANTH/GWS 312: Women and Social Movements Around the Globe (4)
• BUS 224: Ethical Leadership (4)
• COMM 125: Public Speaking (4)
• COMM 231: Writing for the Print Media I (4)
• COMM 238: Argumentation and Advocacy (4)
• COMM 322: Public Relations Principles (4)
• COMM 380: Global Communication & Media (4)
• ECON 241: Economics of Social Issues (4)
• ECON/INTL 259: International Political Economy (4)
• ECON 265: International Trade (4)
• ECON 312: Globalization and Development (4)
• GPS 121: Foundations of Social Justice (4)
• GWS/INTL 252: Gender and Globalization (4)
• GWS/POLS 213: Globalization and Poverty (4)
• INTL 120: Introduction to International Studies (4)
• INTL/POLS 302: Comparative Urbanism (4)
• INTL 303: Geopolitics (4)
• INTL 307: International Tourism (4)
• POLS 118: Controversial Issues in American Politics (4)
• POLS 226: International Law (4)
• POLS 363: Constitutional Law (4)
• SOC 234: Social Problems (4)

DIVISION III
• BIOL/INTL 121: Plants and People (4)
• BIOL 236/236L: Cell and Molecular Biology (6)
• BIOL 312/312L: Microbiology (6)
• BIOL 313/313L: Invertebrate Zoology (6)
• BIOL/PSY 323/323L: Animal Behavior (6)
• BIOL/ES 341/341L: Plant Biology (6)
• CHEM 214/214L: Analytical Chemistry (6)
• CHEM 221/221L and 222/222L: Organic Chemistry I and II (6, 6)
• PSY 208: Research Statistics (4)
• STAT 251: Statistical Methods I (4)
REQUIREMENTS FOR A MAJOR IN ENVIRONMENTAL SCIENCE (B.S.):
17 courses plus related laboratories (62-76 credits) and Experiential Component

CORE COURSES (7)
- ES 117: Environmental Science (4)
- ECON 157: Principles of Microeconomics (4)
- ES 207: Ecology (4) and ES 207L (4, 2)
- ES 234: Environmental Politics and Policy (4) or SFS course: Policy and Socioeconomic Values
- ES 357: Conservation Biology (4) or SFS Principles of Resource Management
- ES 470: Senior Seminar in Environmental Studies (4)

ADDITIONAL SCIENCE/MATH COURSES (9)
- CHEM 101/101L and 102/102L (12) or CHEM 105/105L (6)
- PHYS 151/151L and PHYS 152/152L: Physical Principals I and II (12) or
  PHYS 201/201L and PHYS 201/201L Analytical Physics I and II (12)
- PSY 208: Research Statistics (4) or STAT 251: Statistical Methods (4)
- STAT 324: Data Wrangling with R (2)
- Three additional science courses from the following:
  BIOL 236/236L: Cell and Molecular Biology (6);
  BIOL 312/312L Microbiology (6);
  BIOL 313/313L Invertebrate Zoology (6);
  BIOL 323/323L Animal Behavior (6);
  BIOL/ES 328: Field Vertebrate Zoology;
  ES/BIOI 337/337L: Ornithology (6);
  BIOL/ES 341/341L: Plant Biology (6);
  CHEM 214/214L: Analytical Chemistry (6);
  CHEM 221/221L: Organic Chemistry I (6);
  CHEM 222/222L Organic Chemistry II (6);
  ES/PHYS 241: Earth History and Geology (4);
  ES/PHYS 250: Wind, Weather, Water;
  ES 350: Biogeochemistry (4);
  School for Field Studies courses: SFS Directed Research (4); SFS Regional Ecology (4); SFS Resource Management (4); one semester of ES 390/480

ADDITIONAL ENVIRONMENTAL STUDIES COURSE (1)
- One course from the following:
  ES/PHIL 182: Environmental Philosophy (4);
  ES/INTL 210: World Geography (4);
  ES/ANTH/GWS 219: Food, Culture and Social Justice (4);
  ES/INTL 220: Globalization and Local Response (4);
  ES/ECON 230: Economics and the Environment (4);
  ES/INTL 304: Geography of Global Environment (4);
  ES/INTL 305: Cultural Geography and Landscape Studies (4);
  ES/CLAS 250: Environmental History of Ancient Greece;
  SFS Policy and Socioeconomic Values (4)

EXPERIENTIAL COMPONENT
- All students must complete an experiential component, which consists of a related internship, service project, or completion of the Hollins Outdoor Leadership certificate.

REQUIREMENTS FOR A MINOR IN ENVIRONMENTAL STUDIES:
7 courses (26 credits)
- ES 117: Introduction to Environmental Studies (4)
- ES 207: Ecology (4) and ES 207L (4, 2)
- ES/POLS 234: Environmental Politics and Policy (4)
- Three additional courses from the list of environmental studies elective courses or affiliated courses.

COURSES IN ENVIRONMENTAL STUDIES:

ES 112: ENVIRONMENTAL ANALYSIS (4) Kaira
Also listed and described as CHEM 112. Prerequisite: q, one to two years of high school chemistry. Not offered in 2017-2018. (Q, SCI)

ES 117: ENVIRONMENTAL SCIENCE (4) Carmichael, Gleim
This lecture/laboratory core course for ES majors explores how organisms, communities, and ecosystems function under natural conditions, as well as how they function under human influence. We will cover a variety of current environmental concerns in both the classroom and laboratory, including the patterns of human population growth, the extinction crisis, global warming, acid rain, water pollution, solid waste management, sustainable agriculture, and renewable energy. Also listed as BIOL 117. Open to first-year students. No prerequisite. Offered both terms. (SCI)
ES 121: INTRODUCTION TO OCEANOGRAPHY/HYDROGEOLOGY (4)
Also listed and described as PHYS 121. Open to first-year students. Prerequisite: q. Not offered in 2017-18. (Q, SCI)

ES 133: MARINE ECOLOGY (2)
Godard, Wilson
Students in this course will examine the ecology of marine ecosystems. Additionally, they will learn to recognize and identify characteristics and behavior of more than 100 marine species. This course is only open to students that will be participating in The Caribbean Environment Short Term course. Students will be enrolled by instructor. Offered Term 1.

ES 182: ENVIRONMENTAL ETHICS (4)
Lowney
Also listed and described as PHIL 182. Open to first-year students. No prerequisite. Offered Term 1.

ES 197F: FIRST-YEAR SEMINAR – CONSUMING FRENCH CULTURE (4)
Sampon-Nicolas
Food is a window into the culture and values of any society, and for the French, food and culture are inseparable. This course explores the idea and reality of French cuisine through critical reflection on culinary history and related socio-economic conditions. Issues explored include: the influence of immigration on France’s cuisine and culture; French and E.U. agro-food policies; food security, gleaning, pact against food waste; organic and local foods in schools. Also listed as INTL 197F. Open to first-year students only. Placement to be determined during the summer. Offered Term 1. (o, r)

ES 197F: FIRST YEAR SEMINAR – INCOMPATIBLES? ECONOMICS, NATURE, AND GLOBALIZATION (4)
Hernandez
This first year seminar will offer students an opportunity to experience the joy of learning basic research and oral communication skills and understanding fundamental ways on how economics relates to environmental problems. The course will introduce students to cross-discipline learning and to the execution of tasks in a team environment. Group discussions and team presentations based on assigned readings are the regular learning catalysts. Experiential learning through one short trip to Washington DC for a scavenger hunt during a visit to a museum, state/national monument, or visit to a state park will further help students sharpen their communication skills in a variety of formats. Also listed and described as ECON 197F. Open to first-year students only. Placement to be determined during the summer. Offered Term 1. (o, r, MOD)

ES 207: ECOLOGY (4)
Gleim, Godard
As one of the core courses for the environmental studies major, we will explore the structure and function of the natural world. We will examine the relationships between organisms and their physical and biological environment, global patterns of climate and biological life, patterns in population dynamics, as well as structure and change in communities of organisms. Also listed as BIOL 207. Open to first-year students. No prerequisite. Offered Term 1. (SCI: must take lab to fulfill SCI)

ES 207L: ECOLOGY LAB (2)
Gleim, Godard
We will explore local aquatic and terrestrial ecosystems as well as gain hands-on experience carrying out ecological research in this field laboratory course. Students will also have several opportunities to carry out their own independent research. Also listed as BIOL 207L. Corequisite: ES 207. Offered Term 1. (SCI)

ES 210: WORLD GEOGRAPHY (4)
Bohland
This course examines the methods of geography applied to global issues, patterns and linkages in the arrangement of human physical resources, mapping and elements of spatial analysis, and area studies. Also listed as INTL 210. Open to first-year students. Offered Term 2. (GLO, MOD)

ES 219: FOOD, CULTURE, AND SOCIAL JUSTICE (4)
Costa
Also listed and described as ANTH/GWS 219. Prerequisite: sophomore standing. Offered Term 2. Not offered in 2017-18. (DIV)

ES 220: GLOBALIZATION AND LOCAL RESPONSES (4)
Department
Also listed and described as INTL 220/POLS 221. Open to first-year students. Prerequisite: q. Not offered in 2017-18. (Q, GLO)

ES 221: SURVEY OF PHYSICS AND THE ENVIRONMENT (4)
Department
Also listed and described as PHYS 221. Open to first-year students. Prerequisites: q and ES 117. Not offered in 2017-18. (Q)
ES 230: ECONOMICS AND THE ENVIRONMENT (4)  
Hernandez
Also listed and described as ECON 230. Open to first-year students. Prerequisite: ECON 157. Offered Term 1. (o, r, GLO, MOD)

ES 234: ENVIRONMENTAL POLITICS AND POLICY (4)  
Department
Also listed and described as POLS 234. Open to first-year students. Prerequisite: q. Not offered in 2017-18. (Q, GLO)

ES 241: GEOLOGY AND EARTH HISTORY (4)  
Gentry
Planet Earth’s development as an integrated physical, chemical, and biological system over the past 4.6 billion years. Topics include: the origins of the solar system, Earth, and Moon; forces driving Earth’s chemical and geological differentiation; plate tectonics; origins of life and humans; Earth’s system dynamics; humans as geological agents; and Earth’s climate system. Also listed as PHYS 241. Not offered in 2017-18. (SCI)

ES 250: SPECIAL TOPIC: WIND, WEATHER AND WATER (4)  
Gentry
All living beings on earth are strongly affected by weather and climate. For example, local and global variations in precipitation, temperature, and sunlight determine where certain plants and animals live, affect their habitats, and influence organism and species adaptations. Climate and weather conditions also strongly affect human societies. This course will examine the physical principles that underlie weather and climate. By using the laws of physics and a quantitative analysis of interactions between matter in its various phases, it is possible to gain a deeper understanding of how weather actually occurs. In addition, it enables an understanding of local and global systems in which many smaller parts are connected through interactions. These interactions result in patterns and larger scale phenomena referred to as weather and climate. Prerequisite ES 117 or PHYS 151 or PHYS 201 or permission of instructor. Offered Term 2.

ES 250: SPECIAL TOPIC: GREEN BY DESIGN: SUSTAINABLE ARCHITECTURE AND THE ENVIRONMENT (4)  
Hendricks
This course will explore Sustainable Architecture in the broadest sense: from the micro level of materials and technology, through the scale of buildings, to the macro level of urban form and suburbanization. We will examine how environmentalism has informed architectural discourses, and how discourses on the built environment and urbanism have in turn impacted environmentalism globally. We will look at not only how the notion of Sustainable Architecture is conceptualized, interpreted and implemented at varying scales, but also how we might push the frontiers of knowledge toward new directions and dimensions. These new dimensions should challenge us to be conscious of resource use, ecological balance and minimizing environmental impacts, as well as the competing logistics of Green Buildings. Also listed as ART 250. Open to first-year students. No prerequisites. Offered Term 2.

ES 250: SPECIAL TOPIC: ENVIRONMENTAL HISTORY OF ANCIENT GREECE (4)  
Salowey
The course examines the question, “how did the landscape of the Mediterranean influence the development of ancient Greek society?” New techniques and methodologies in environmental archaeology have created more opportunities to study human interaction with the landscape in antiquity and made possible more sophisticated investigations into the use of land, water, plants, and animals. These data, coupled with ancient historical, literary, and philosophical texts, allow the study of the environmental history of ancient Greece: how the environment affected human behavior, the consequences of human habitation, and human attitudes towards the environment. Also listed as CLAS 250. Offered Term 2.

ES 290: INDEPENDENT STUDY (2 or 4)  
Department
Independent study conducted below the advanced level. Application must be made with faculty prior to registration. Offered any term.

ES 304: GEOGRAPHY OF GLOBAL ENVIRONMENT (4)  
Bohland
Also listed and described as INTL 304. Open to first-year students with permission. No prerequisite. Not offered in 2017-18.

ES 305: CULTURAL GEOGRAPHY AND LANDSCAPE STUDIES (4)  
Bohland
Also listed and described as INTL 305. Open to first-year students with permission. No prerequisite. Not offered in 2017-18.

ES 328: FIELD VERTEBRATE ZOOLOGY (4)  
Godard
In this lecture/lab course, we will use vertebrates as our focus as we explore issues of evolution, ecology, physiology, behavior and conservation as well as develop skills associated with studying vertebrates in the field. Beyond the
scheduled classes, students are required to participate in a 3 day weekend field trip to the Eastern Shore of Virginia to study avian biodiversity as well as several evening excursions to examine patterns of amphibian biodiversity. Course fee of $150 is required. Prerequisite: BIOL/ES 207 or permission from instructor. Also listed as BIOL 328. Prerequisite: BIOL/ES 207 or permission. Not offered in 2017-18.

ES 337: ORNITHOLOGY (4) Wilson
Also listed and described as BIOL 337. Prerequisite: ES 207 and 207L. Offered Term 2.

ES 337L: LABORATORY FOR ORNITHOLOGY (2) Wilson
Also listed as BIOL 337L. Corequisite: BIOL/ES 337. Prerequisite: BIOL/ES 207 or permission. Offered Term 2.

ES 341: PLANT BIOLOGY (4) Gleim
Also listed as BIOL 341. Prerequisite: BIOL/ES 207. Not offered in 2017-18.

ES 341L: LABORATORY FOR PLANT BIOLOGY (2) Gleim

ES 350: SPECIAL TOPIC: BIOGEOCHEMISTRY: AN ANALYSIS OF GLOBAL CHANGE (4) Carmichael
Much like the human body, the Earth's climate and ecological systems have been finely tuned to maintain homeostasis. In the human body, this occurs via feedback loops and exchange between major organ systems. In the Earth's climate and ecological systems, this balance is maintained by the flow of energy and materials. Biogeochemistry is the study of this flow of energy and materials within the Earth's planetary system. In this course, we will cover processes that control the cycling of C, N, and P and other biochemical elements in terrestrial and aquatic systems, with special emphasis placed on the coupling between human and natural systems. Topics include the origin of Earth and the development of elemental cycles, the Earth as a chemical system, the biogeochemical cycling of elements in the atmosphere, lithosphere, and biosphere, the global cycles of H2O, C, N and P, and the expanding human footprint on biogeochemical processes. Prerequisites: CHEM 101/102 or 105, ES 117 or 207. Offered Term 1.

ES 357: CONSERVATION BIOLOGY (4) Gleim
In this seminar, students will apply active learning strategies to build a conceptual foundation for conservation biology, including conservation values and ethics. Building on this foundation, we will explore the primary threats to biological conservation, including habitat degradation, overexploitation, invasive species, and biological impacts of climate change. We will also explore how to apply this knowledge through learning about and utilizing various professional approaches used to solve conservation problems. Also listed as BIOL 357. Prerequisites: BIOL/ES 207 and 207L or permission. Offered Term 2.

ES 357L: CONSERVATION BIOLOGY LAB (2) Gleim
Laboratory activities will cultivate an understanding of real-world, hands-on conservation biology through field trips, primary research with data collection and analysis, and training on the use of professional tools and methods used by conservation biologists (e.g. Geographic Information Systems (GIS) and population modeling), which aid in the management and preservation of biodiversity. Also listed and described as BIOL 357L. ES majors are strongly encouraged to take this laboratory course. Corequisite: ES 357. Offered Term 2.

ES 390: INDEPENDENT STUDY (2 or 4) Department
Independent study conducted at the advanced level. Application must be made with faculty prior to registration. Offered any term.

ES 399: INTERNSHIP (4) Department
Application must be made with faculty prior to registration. May be proposed in any term.

ES 470: SEMINAR IN ENVIRONMENTAL STUDIES (4) Godard
Students in this capstone course tie together the various academic perspectives that form their major by exploring common readings and presenting (30-45 minutes) on a relevant topic of interest. In addition, each student prepares a portfolio (paper, course summaries, internship summaries, c.v., résumé) summarizing her academic experience. Students will also explore career options in the ES field as well as graduate school opportunities. This course is intended for senior ES majors and minors. Offered Term 1.
ES 480: SENIOR THESIS (4)
Students must undertake a research project investigating a specific aspect of environmental studies. Students must consult with the ES director in the spring semester of junior year and if approved, research would traditionally be carried out during Fall and Short Terms.

ES 490: SENIOR HONORS THESIS (4, 4)
Offered to qualified ES majors. Students must consult with the ES director in the spring semester of the junior year. If approved, the research project is completed over Fall, Short, and Spring Terms. Departmental honors will be awarded only if the research project is successfully defended to a panel of ES faculty members.