Ecosystems and Human Impact (EHI)

Major and Minor in Ecosystems and Human Impact

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Ecosystems and Human Impact (EHI)

The Ecosystems and Human Impact major, leading to a Bachelor of Art degree, provides the skills, knowledge, and preparation for students to assess and address the complex interaction of humans and natural environments. The curriculum integrates principles and methodologies from ecology, biology, genetics, anthropology, human ecology, and geography, combined with an understanding of economics, ethics, and policy within a greater global perspective.

The major prepares students for entry-level employment in the public, private, or non-profit sectors concerned with a wide range of issues, such as: conservation of ecosystems, ecosystem restoration, loss of biodiversity, and development of sustainable bioresources. The major prepares students for graduate study in anthropology, geography, environmental science, sociology, natural resource management, and biology among other fields.

The major builds on the interdisciplinary sustainability core curriculum. Students will enroll in major-specific courses in their junior and senior year. In their junior or senior year students will have the opportunity to enroll in the study abroad program at Ranomafana, Madagascar, which provides training in field biology, ecology, primatology, and anthropology. Students enrolled in this program will take courses and conduct independent research that contributes to a better understanding of Ranomafana National Park and the link between the park and the people of the region. Local internships, research courses, and field courses are also available to students to build up real-world experience.

The Ecosystems and Human Impact minor is intended for students who seek to complement their chosen major with a coherent set of courses emphasizing the interaction between humans and ecosystems from an interdisciplinary perspective.

Requirements for the Major and Minor in Ecosystems and Human Impact (EHI)

Requirements for the Major

A. Required Foundation Courses for Major (32-33 credits)

- MAT 125 or MAT 131 Calculus. If students do not place into MAT 125 or 131 on the basis of the math placement examination, MAT 123 is a required course for the major.
- ECO 108 Introduction to Economics
- SBC 111 Introduction to Sustainability
- SBC 113 Physical Geography
- SBC 116 Human Geography
- ENV 115 Chemistry, Life, and Environment
- SBC 201 Systems and Models
- ANP 120 Introduction to Physical Anthropology
- SBC 204 Population Studies
- SBC 205 Introduction to Geospatial Analysis
- BIO 201 and BIO 204 Fundamentals of Biology: Organisms to Ecosystems and lab

B. Career and Leadership Skills (6 credits)

- CSK 102 Career Leadership Skills: Working in Teams
- CSK 104 Career Leadership Skills: Negotiation and Conflict Resolution
- CSK 302 Technical Writing and Communication
- One course selected from: CSK 101, CSK 103, CSK 105, CSK 106, CSK 107, or CSK 108

C. Core Courses (31 credits)

- ENV 304 Global Environmental Change
- BIO 351 Ecology
- EHI 326 Conservation Genetics
- EHI 322 Human Ecology

In addition to the 4 core courses (12 credits) above, students are required to select four courses from group I (12-14 credits) and one course (3 credits) from group II. (Note ANP 325, ANP 391, ANP 350 are offered in Madagascar)
• ANP 325 Primate Behavior
• ANP 391 Ecosystem Diversity and Evolution
• ANP 350 Field Methods in Primatology and Field Biology
• BIO 352 Ecology Laboratory
• GEO 313 Understanding Water Resources for the 21st Century
• MAR 315 Conservation Biology and Marine Biodiversity
• MAR 388 Tropical Marine Ecology
• EHI 310 Preservation and Restoration of Ecosystems
• EHI 311 Ecosystem Based Management
• EHI 321 Human Reproductive Ecology
• EHI 340 Ecological and Social Dimensions of Disease
• EHI 342 Materials in Human and Natural World
• EHI 343 Sustainable Natural Resources
• ENV 310 Sustainability and Renewable Energy - Costa Rica
• ENV 340 Contemporary Topics in Environmental Science

Group II:
• SBC 206 Economics and Sustainability
• SBC 309 Global Environmental Politics
• SUS 341 Environmental Treatises and Protocols
• SBC 307 Environmental History of North America
• SBC 320 Sub-Saharan Africa: Geography, Cultures, and Societies
• SUS 350 Contemporary Topics in Sustainability

One of the following courses may be substituted for any of the courses in Group II, but each of these courses below has a prerequisite outside the major.
• SBC 310 Migration, Development and Population Redistribution
• SBC 321 Ecology and Evolution in American Literature
• SUS 303 Demographic Change and Sustainability
• SUS 305 Collective Action and Sustainability
• EDP 309 Planning: Policies and Regulations
• SUS 301 Environmental Ethics
• SBC 311 Disasters and Society: A Global Perspective
• SBC 312 Environment, Society, and Health
• SUS 306 Business and Sustainability
• SUS 307 Environmental Economics and Sustainability

D. Systems Course (3 credits)
Choose one of the following:
• GEO 301 Sustainability of the Long Island Pine Barrens
• SBC 401 Integrative, Collaborative Systems Project or ANP 487 or ANT 487: Independent Study: Research in Biology, Natural History or Anthropology (both Cultural and Physical) as part of study abroad in Madagascar

E. Communications and Writing requirement
Proficiency in writing, oral communication, and computer literacy is encouraged in all students. In addition to CSK 302, these skills will be developed within the context of other formal coursework and no additional credits are required. To meet the upper-division writing requirement, students must submit two papers from any 300-level or 400-level course in the major to the Director of the SUS Undergraduate Program. Students should consult with the department advisor to ensure that their plan for completing the Upper Division Writing Requirement is consistent with university graduation requirements for General Education. Students completing the Stony Brook Curriculum (SBC) must complete a course that satisfies the "Write Effectively within One's Discipline" (WRTD) learning objective to graduate. The Upper Division Writing Requirement is consistent in most cases with the SBC learning outcomes for WRTD.

Note:
One course passed with a C- may be applied to the major; all other courses offered for the major must be passed with a letter grade of C or higher. Course taken with the Pass/NC option may not be applied to the major.

Minor
The Ecosystems and Human Impact minor is intended for students who seek to complement their chosen major with a coherent set of courses emphasizing the interaction between humans and ecosystems from an interdisciplinary perspective.

Requirements for the Minor
No more than six credits that are used to satisfy your major can be applied to this minor. No more than one three-credit course in the minor may be taken under the Pass/No Credit option. All upper-division courses offered for the minor must be passed with a letter grade of C or higher.
Completion of the minor requires 19 to 20 credits. Students electing this minor should arrange a meeting with the EHI director to develop a course plan and complete the necessary forms.

1. Required introductory courses:
   
   - SBC 111 Introduction to Sustainability
   - BIO 201 Fundamentals of Biology: Organisms to Ecosystems
   - SBC 201 Systems and Models

   One of the following two courses:
   
   - ANP 120 Introduction to Physical Anthropology
   - ENV 115 Chemistry, Life, and Environment

2. Required minimum of three advanced courses chosen from the following:
   
   - ANP 325 Primate Behavior*
   - ANP 350 Methods in Studying Primates*
   - ANP 391 Ecosystem Diversity and Evolution*
   - BIO 301 Sustainability of the Long Island Pine Barrens
   - BIO 351 Ecology
   - BIO 352 Ecology Laboratory
   - EHI 310 Restoration Ecology
   - EHI 311 Ecosystem-Based Management
   - EHI 322 Human Ecology
   - EHI 343 Sustainable Natural Resources
   - ENV 304 Global Environmental Change
   - ENV 310 Sustainability and Renewable Energy - Costa Rica
   - ENV 340 Contemporary Topics in Environmental Science
   - GEO 313 Understanding Water Resources for the 21st Century
   - MAR 315 Conservation Biology and Marine Biodiversity
   - SBC 309 Global Environmental Politics

   * These courses are offered as part of the Madagascar Study Abroad Program.

Declaration of the Minor

Students should declare the Ecosystems and Human Impact minor no later than the middle of their sophomore year, at which time they should consult with the minor coordinator or undergraduate director and plan their course of study for fulfillment of the requirements.

Sample Course Sequence for the Major in Ecosystems and Human Impact

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### SOPHOMORE

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Human ecology investigates how humans and human societies interact with nature and with their environment. Course first introduces the concepts and methods of human ecology. Following this foundation, the course will give special emphasis to empirical examples, case studies and lessons from history. The course will focus on individuals, communities and traditional societies. Human Ecology complements Human Geography, which studies patterning at the larger scale.

Prerequisite: BIO 201

SBC: STEM+

3 credits

EHI 326: Conservation Genetics

This course is an introduction to genetics taught in the context of conservation. The course will cover a basic introduction to Mendelian, molecular, population, evolutionary and meta-population genetics, and then examine specific applications of these concepts to topics in conservation biology.

Prerequisite: MAT 125 or MAT 131; BIO 201

DEC: E

SBC: STEM+

3 credits

EHI 340: Ecological and Social Dimensions of Disease

The ecology and evolutionary biology of disease will be examined to provide a more general context for human diseases. Pathogens may have large effects on many different types of organisms, from bacteria to plants to humans. We will build on this biological background to examine the social dimensions of disease in human populations and societies, including historical, political and economic aspects to issues of money, power, sexuality, international development and globalization. Specific case studies (the chestnut blight in North America, AIDS in Africa, etc.) will be used to examine concepts and principles in detail in a real-world context. This course will investigate basic fundamentals and recent research on these issues in a unified framework.

Prerequisite: BIO 201

DEC: H

SBC: STAS

3 credits

EHI 342: Materials in the Natural and Human World

Course explores in depth the origin, composition, use, bioavailability, mobility, persistence, and fate of selected materials and chemical compounds. Compounds or materials, such as DDT, aldicarb, freon, plastics, organotin, nuclear fuel, antibiotics, and carbon nanotubes, are used to illustrate how man-made substances once released into the environment can lead to environmental degradation, ecological degradation, and/or public health issues.

Prerequisite: ENV 115 or CHE 131; BIO 201

DEC: H

SBC: STAS

3 credits

EHI 343: Sustainable Natural Resources

This course explores in depth the economic viability, social acceptance, and potential of sustainable natural resources to replace non-renewable resources. Examples are drawn from water resource management, agriculture, forestry, fisheries, and renewable energy resources (wind, solar, biofuel, etc.). There is particular emphasis on examples of integrated, participatory and sustainable natural resources management project in less developed countries.

Prerequisite: SBC 111 or ENS 101; ENV 115 or CHE 131; BIO 201

DEC: H

SBC: STAS

3 credits

EHI 487: Research in Ecosystems and Human Impact

Qualified advanced undergraduates may carry out individual research projects under the direct supervision of a faculty member. May be repeated.

Prerequisite: Permission of instructor

SBC: ESI, WRTD

1-6 credits, S/U grading
ECOSYSTEMS AND HUMAN IMPACT (EHI) - COURSES

SBC 113: Physical Geography Lecture
This study of geosystems examines modern environmental problems through quantitative methods, analysis, and modeling grounded in basic and applied science and research. The goal of the course is to introduce students to the fundamental processes that dominate the atmosphere, hydrosphere, lithosphere, and biosphere, their characteristics and complex interactions, and their impact on human life and society.

DEC: E
SBC: SNW
3 credits

SBC 114: Physical Geography Lab
This laboratory course provides hands on experience in understanding the geosystems, including distribution and interrelationships of climate, vegetation, soils, and landforms.

Pre- or corequisite: SBC 113
1 credit

SBC 115: Introduction to Human Demography
An introductory course on the study of human population. Measurement issues and data in demographic analysis, as well as demographic perspectives on the basis of a review of major sources of information about population studies will be presented. Theories incorporating social, economic and political explanations for influences on human population growth will be considered. Population processes, with focus on fertility, mortality and migration, are reviewed. Population structure and characteristics, the interaction of the population processes and the number of people in a society of a given age, sex, race, ethnicity, socioeconomic levels, marital status, and gender, are reviewed. Major issues related to sustainability (such as economic development, food and pollution, urbanization, gender and minority empowerment, and the human relationship and ecology with other organisms and species) are reviewed.

Prerequisite: MAT 125, MAT 131, MAT 132, or level 6 or higher on math placement exam.

SBC: SBS
3 credits

SBC 117: Design Drawing
This introductory course exposes the student to the fundamental theories and practices employed in visually representing design concepts from observational through technical and speculative drawing. The course content introduces the student to contour drawing, rendering, orthographic projection, and pictorial drawing. Project work engages the student in the application of the above-mentioned drawing techniques and develops skills through the solution of student tailored problems.

DEC: D
SBC: TECH
3 credits

SBC 200: Human Settlement: History and Future
The history of city growth over the millennia as affected by technological change is a basis for understanding the future of human settlement. More than half of the world’s population currently lives in cities and urbanization continues on a global scale. The universality of urban development and resulting patterns will be presented as well as limits on growth of cities. Architectonic and socioeconomic planning theories and strategies for sustainable growth are presented. The development of Long Island, which is a microcosm of national and global patterns, will be discussed in detail.

DEC: F
SBC: SBS
3 credits

SBC 201: Systems and Models
Introduction to the dynamic modeling of complex systems. Students will learn to use simulation software that facilitates the visualization, formulation, and analysis of systems. Students will learn about systems with positive and negative feedbacks, the effects lags on system performance, and the difference between stocks and flows. Systems studied will include ecological models, economic models, chemical models, population models, epidemiological models, and models that include the interactions between population, economic development, and the environment.

Prerequisite: AMS 151 or MAT 125 or MAT 131 or MAT 141
1 credit

SBC 203: Interpretation and Critical Analysis
An introduction to interdisciplinary inquiry and representation in arts, culture, and theory with emphasis on the roles of analysis, argument, and imagination in multiple media. Requires serious engagement with sophisticated texts.

Pre- or corequisite: WRT 102
DEC: G
SBC: CER, HUM, WRTD
3 credits

SBC 204: Population Studies
The course will present basic mathematics of population growth and introduce various approaches for modeling populations, including population viability analysis (PVA). PVA, the quantitative assessment of the extinction risk of rare species or populations, takes biological information (habitat requirements, birth and death rates, population size) and makes predictions about future population sizes. Real examples will be discussed for a range of organisms, from bacteria to plants and mammals. This course will provide also the background for understanding human population growth. The impacts of human population growth in the developed and developing world on the ecology of other organisms, habitats and systems will also be discussed.

Prerequisite: MAT 125
DEC: E
SBC: STEM+
3 credits

SBC 205: Introduction to Geospatial Analysis (lab course)
Introduction to geographic information systems (GIS) and remote sensing techniques as applied to documenting, mapping, analyzing, interpreting, and managing natural and cultural resources. Overview of types of GIS data, computer hardware and software used for geospatial analysis, basic cartography, and global positioning system (GPS).

1 credit

SBC 206: Economics and Sustainability
Introduction to the basic economic concepts used in sustainability analysis. Students will learn the basic concepts and how to apply them in various context. Topics include the analysis of situations in which the behavior of individuals indirectly affects the well-being of others, strategic behavior and the environment, and the use of market-oriented policies to help in the stewardship of the environment.

Prerequisite: ECO 108
SBC 307: American Environmental History
This course provides an overview of the history of how Americans have used, viewed and valued the natural environment. Beginning with the Indians and the early colonists (15th-16th centuries), the course will examine the cultural, social, economic, political, and technological currents that shaped North Americans' relationships with their environment in early and later industrial eras, after World War II, and finally, in the late 20th and early 21st centuries. Historical snapshots will center on people living in more natural places, such as farms and forests, as well as more built places, such as factories, cities, and suburbs. Events in the northeastern U.S. will provide a geographic focus, but the course will also look at related happenings elsewhere on the North American continent and beyond. Finally, it will examine at the growing array of movements that have identified themselves as 'environmental,' at the 'greenness' of modern culture, and at the environmental dimensions of a globalizing era.
Prerequisite: U3/U4 standing
DEC: K & 4
SBC: SBS+
3 credits

SBC 308: American Environmental Politics
This course will survey the politics of environmental policy-making in the United States. It examines how contrasting political, economic and social interests and values have clashed and contested with one another, and the exerted power, in the environmental policy realm. The course will explore past precedents and roots, but with a view to explain the shape of this realm in the modern United States, including the many actors and institutions: local, regional and national governments, non-governmental organizations and interest groups, as well as the public. It will look at the main patterns by which these groups have defined environmental problems and formulated and implemented solutions. A chief goal is to illuminate how and why solutions of real-world environmental problems, if they are to be effective, differ from those of scientific or engineering puzzles.
Prerequisite: POL 102
DEC: K
SBC: SBS+
3 credits

SBC 309: Global Environmental Politics
This course will explore the politics of environmental policy-making within the international realm. Focused especially on environmental dilemmas that cross national boundaries (i.e., pollution), or that are shared by multiple nations (i.e., global warming) it will look at the ways that such problems have been defined and their solutions sought, both with and without an over-arching state or governance. It will survey the many groups, interests and values that have clashed and competed with one another to exert power and influence international environmental policies, as well as the variety of international institutions and agreements that have sought to formulate and implement solutions. One goal is to illuminate how and why effective solutions to global environmental problems differ from those to scientific or engineering puzzles. The course also aims to spur student engagement with the sometimes overwhelming nature of global environmental threats, the tenuous and sometimes counterproductive ways that knowledge and power can be linked, and the ways individuals may act powerfully in service of "sustainability."
Prerequisite: SBC 111 or ENV 115 or ENS 101 or GEO 101 or permission of instructor
SBC: GLO
3 credits

SBC 310: Migration, Development and Population Redistribution
This course draws upon the contributions of various social and natural sciences (including population and urban geography, demography, political science, sociology, history, economics, public health and environmental sciences) to explore the effects of migratory and demographic shifts on the environment, social welfare, public health, economic development, ethnic diversity, urbanization, public policy and planning. It will examine the political, social, environmental, health and economic effects on sustainability.
Prerequisite: SBC 115
3 credits

SBC 311: Disasters and Society: A Global Perspective
This class introduces students to the sociological examination of natural, technological, and industrial disasters. Students will explore how and why disasters are fundamentally social events: What do disasters reveal about society? Why are the human consequences of disasters unequally distributed? What are the typical ways in which states, organizations, and communities respond to disasters? Focusing on case studies from around the world, students will discuss: What are the long-term/short-term causes of particular disasters? What forms of suffering the disasters under consideration generated? What state/civil society actions did they trigger? What advocacy networks were put in place in their aftermath?
Prerequisite: SBC 111, or ENS 101, or GEO 101; POL 102 or SOC 105
DEC: H
SBC: STAS
3 credits

SBC 312: Environment, Society, and Health
This class examines the interactions between environment, social structures, and institutions. The first part of the class examines the ways in which environmental issues are perceived and constructed by various social actors (lay public, state officials, scientists, activists, media). The second part of the class will examine the differential impact of class, race, and gender on the distribution of hazards and risks (what is commonly known as 'environmental inequality'). In the third part of the class, students will be introduced to different cases of 'contested environmental illnesses' (cancer, lead-poisoning, asthma).
Prerequisite: SBC 111, or ENS 101, or GEO 101; POL 102 or SOC 105
DEC: F
SBC: SBS+
3 credits

SBC 320: Sub-Saharan Africa: Geography, Cultures, and Societies
This course presents a broad perspective on Sub-Saharan Africa, a region of sharp geographic, cultural, and economic contrasts. The legacy of the region's triple heritage (indigenous, Islamic, and European) is presented as a framework for understanding the complexity and diversity of contemporary Sub-Saharan Africa in terms of distribution of languages, religions, ethnicity, family relations, and governance systems. The influence of globalization, migration, HIV/AIDS, conflicts, population growth, and socioeconomic development policies on modern Sub-Saharan African are discussed.
Prerequisite: Junior or Senior Standing
DEC: J
SBC: SBS+
3 credits

SBC 321: Ecology and Evolution in American Literature
This course is a review of 19th- and 20th-century American writers who trace the evolution of the US with respect to ecological
practices through various multicultural perspectives. Literature covered will include transcendentalist essays, utopian/dystopian novels, ecofeminist fiction, and journalism.

**Prerequisite:** SBC 203 or EGL 204

**DEC:** G  
**SBC:** HFA+, WRTD  
**3 credits**

**SBC 325: Environmental Writing and the Media**

An examination of multiple genres (including: photo journalism, literary nonfiction, fine art and advertising and documentary film) in order to understand ways in which these genres are utilized to inform and manipulate public opinion regarding the environment. The culmination of the course will be a final project using multiple genres.

**Prerequisite:** WRT 102  
**Advisory Prerequisite:** SBC 203

**DEC:** G  
**SBC:** HFA+, WRTD  
**3 credits**

**SBC 330: Extreme Events in Literature**

A course that examines the depiction of extreme events (both natural and human-related) in literature, journalism, art, and film, with special emphasis paid to the extended political and social issues that are raised by the events in question.

**Prerequisite:** SBC 203 or EGL 204

**DEC:** G  
**SBC:** HFA+, WRTD  
**3 credits**

**SBC 331: City, Suburb, Sprawl**

A course that traces the shift from city to suburb to sprawl in texts that span the late-nineteenth century through the early twenty-first century, with special attention paid to phenomena such as industrialization, immigration, mass society, globalization, and postmodern hyperspace. An interdisciplinary set of texts will include works by novelists, artists, architects, and literary theoreticians.

**Prerequisite:** SBC 203 or EGL 204

**DEC:** G  
**SBC:** HFA+  
**3 credits**

**SBC 354: Drawing for Design--CAD**

Techniques and Theory of Drawing; Architectural Drawing; Learning Computer Assisted Design (CAD). This course will serve as an introduction to CAD tools relevant to design and architectural rendering.

**Prerequisite:** SBC 117

**SBC:** STEM+  
**3 credits**

**SBC 401: Integrative, Collaborative Systems Studies**

Problem-based capstone course.

**Prerequisite:** U3 or U4 status

**SBC:** ESI  
**3 credits**

**SBC 475: Undergraduate Teaching Practicum**

Work with a faculty member as assistant in a regularly scheduled course. The student must attend all classes and carry out all assignments; in addition the student will be assigned a specific role to assist in teaching the course. The student will meet with the instructor on a regular basis to discuss intellectual and pedagogical matters relating to the course.

**Prerequisites:** Permission of instructor and undergraduate director

**SBC:** ESI, EXP+  
**3 credits, S/U grading**

**SBC 476: Undergraduate Teaching Practicum II**

Work with a faculty member as an assistant in one of the faculty member's regularly scheduled courses. Students assume greater responsibility in such areas as leading discussions and analyzing results of tests that have already been graded. Students may not serve as teaching assistants in the same course twice.

**Prerequisites:** Permission of instructor and undergraduate director

**SBC:** EXP+  
**3 credits, S/U grading**