Environmental Studies (ENS)

Interdisciplinary Major and Undergraduate College Academy Minor in Environmental Studies

School of Marine and Atmospheric Sciences (SoMAS)

Dean and Director: Minghua Zhang

Director of Undergraduate Studies: Mary Scranton

Assistant to Director: Carol Dovi

Education Office: 105 Endeavour Hall
Phone: (631) 632-8681
E-mail: somas@stonybrook.edu
Web address: http://www.somas.stonybrook.edu

Director of the Minor: Kamazima M. M. Lwiza, School of Marine and Atmospheric Sciences
OFFICE: 169 Endeavour Hall
PHONE: (631) 632-7309
E-MAIL: Kamazima.Lwiza@stonybrook.edu

Environmental Studies (ENS)

The Environmental Studies major, leading to a Bachelor of Arts degree, is designed to provide students with the analytical and communication skills and the broad background necessary to understand and address complex environmental issues. The major also offers the opportunity for students to carry out focused study within a specific area of interest. Environmental issues are not resolved in the scientific, technological, social, or political arenas alone. The curriculum is, therefore, interdisciplinary and integrates principles and methodologies from the social sciences, engineering, the natural sciences, and humanities. The goal is to address the complex scientific, legal, political, socioeconomic and ethical issues that define and surround environmental issues.

The major in Environmental Studies prepares the student for further education and entry-level employment in areas such as public interest science and advocacy, environmental conservation, law, journalism, management, television documentary production, ecotourism, population studies, and public service including public health.

To demonstrate depth of learning, an area of concentration is required of all students in the major. Additionally, a research course, an internship, or field study is an essential part of the curriculum to provide real-world experience in an appropriate subject area.

The Environmental Studies major is administered by the School of Marine and Atmospheric Sciences. A Living Learning Center and a minor, with a residential component, are also available. A lounge and study area are also available within the Living Learning Center for commuter students enrolled in the major or minor. The Living Learning Center, which is part of the Science and Society College, offers special programs, such as a seminar series showcasing faculty research and selected courses in the major and minor. Students may not pursue the minor in conjunction with the major.

Students should contact the director of undergraduate studies to design and approve an acceptable course of study before declaring the major.

Students may learn more about the School of Marine and Atmospheric Sciences by visiting http://www.somas.stonybrook.edu.

Requirements for the Major and Minor in Environmental Studies (ENS)

Requirements for the Major

The major in Environmental Studies leads to the Bachelor of Arts degree. No more than one course required for the major can receive a letter grade less than C.

Completion of the major requires approximately 62 credits.

A. Foundation Courses (33 credits)
1. Natural Sciences

- BIO 201 Fundamentals of Biology: Organisms to Ecosystems
- BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences I
- CHE 131, CHE 133 General Chemistry and Lab (See Note 4)
- MAT 125 or MAT 131 or MAT 141 or MAT 171 Calculus. If students do not place into MAT 125 or 131 or 141 or MAT 171 on the basis of the math placement examination, MAT 123 is a required course for the major.
- PHY 119/ENS 119 Physics for Environmental Studies (See Note 1)

One of the following:

- GEO 101 Environmental Geology or MAR 104 Oceanography or ATM 102 Weather and Climate or ENS 101 Prospects for Planet Earth

2. Social Sciences

- ANP 120 Introduction to Physical Anthropology or ANT 104 Introduction to Archaeology (by permission)
- ECO 108 Introduction to Economic Analysis
- POL 102 Introduction to American Government

3. Humanities

- PHI 104 Moral Reasoning or PHI 105 Politics and Society

4. Communications
Proficiency in writing, oral communication, and computer literacy will be encouraged in all students. These skills will be developed within the context of formal coursework and no additional credits are required.
5. Upper-Division Writing Requirement
All students in the major must register for the 0-credit ENS 459 and submit two papers from any upper division course in the major to the Director of Undergraduate Programs for evaluation by the end of the junior year.

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.

B. Core Courses (17 credits)

1. One of the following statistics courses:
   AMS 102, AMS 110, AMS 310, ECO 320, POL 201, PSY 201, or SOC 202
2. MAR 340 Environmental Problems and Solutions
3. ENS 301 Contemporary Environmental Issues and Policies
4. ENS 311/BIO 386 Ecosystem Ecology and the Global Environment
5. ENS 312 Population, Technology, and the Environment
6. One of the following (2 credits):
   ENS 443 Environmental Problem Solving#Independent Research (See Note 2)
   or 487 Research or 488 Internship (See Note 3)

C. Concentration (12 credits)
Students should select four upper division courses in a thematic area in consultation with the undergraduate director. Some sample concentrations are listed below, but other possibilities may be approved if discussed in advance with the departmental advisor. For all concentrations, appropriate substitutions will be permitted with approval of the undergraduate director.
1. Atmospheric Studies

- ATM 205 Introduction to Atmospheric Science
- ATM 237 Global Atmospheric Change
- ATM 397 Air Pollution and its Control
- MAR 334 Remote Sensing in the Environment
- Other upper-division ATM courses (ATM 345, ATM 346, or ATM 348) may be substituted with permission of the undergraduate program director

2. Conservation Biology/Physical Anthropology
Four courses from the following:

- ANP 321 Primate Evolution
- ANP 350 Methods in Studying Primates
- ANP 360 Primate Conservation
- MAR 315 Conservation Biology and Marine Biodiversity
- BIO 336 Conservation Biology
- BIO 356 Applied Ecology and Conservation and Biology Lab

3. Marine Science, Marine or Terrestrial Ecology
A variety of courses focusing on different aspects of ecology and marine sciences are available in both MAR and BIO. Students should choose four related courses from those below in consultation with the undergraduate director or departmental advisor.
The following courses are biological in nature: BIO 351, BIO 352, BIO 353, BIO 354 or BIO 385, BIO 319, BIO 356, BIO 359, MAR 301, MAR 302, MAR 305, MAR 315, MAR 349, MAR 366, MAR 370, MAR 371, MAR 375, MAR 380, MAR 385, MAR 386, MAR 388
The following courses are cover aspects of marine science other than biology:
MAR 303, MAR 304, MAR 320, MAR 333, MAR 334, MAR 336, MAR 346, MAR 351, MAR 352+MAR 353 (other courses may be substituted with permission)

4. Environmental Economics

- ECO 303 Intermediate Microeconomic Theory
- ECO 305 Intermediate Macroeconomic Theory
- ECO 373 Economics of the Environment and Natural Resources

- One of ECO 335, ECO 301; ENS/POL 333, HIS 365, AAS/HIS 352, EDP 303 Spatial Economics, or EDP 305 Risk Assessment and Sustainable Development.

5. Environmental History

- HIS 103 American History to 1877 or HIS 104 United States since 1877

Plus three additional courses from the following:

- HIS 281, HIS 302, HIS 365, AAS/HIS 352

6. Environmental Law, Waste Management, and Public Policy
Four courses from among the following:

- POL 320, POL 329, POL 351, PHI 364, PHI 366, PHI 375, POL 359, POL 364, HIS 365, AAS/HIS 352, HIS 302, MAR 392, MAR 393, MAR 394/BCP 394, ENS 333/POL 333.

Notes:
1. PHY 121/PHY 123, PHY 122/PHY 124 or PHY 125, PHY 126, PHY 127 or PHY 131/PHY 133, PHY 132/PHY 134 or PHY 141, PHY 142 may be substituted for PHY 119/ENS 119.
2. Two credits of any course numbered 487 or equivalent with one of the following designators: ANP, ANT, ATM, BCP, BIO, CHE, ECO, ENS, EST, GEO, MAR, PHY, POL. In addition to other prerequisites, credit toward the major requires approval of the research topic by the Director of Undergraduate Studies of the Marine Sciences Research Center.
3. Two credits of any course numbered 488 or equivalent with one of the following designators: ANP, ANT, ATM, BCP, BIO, CHE, ECO, ENS, EST, GEO, MAR, PHY, POL. In addition to other prerequisites, credit toward the major requires approval of the internship by the Director of Undergraduate Studies.
4. CHE 129/130 may be substituted for CHE 131.

Honors Program in Environmental Studies

Graduation with departmental honors in Environmental Studies requires the following:

1. Students are eligible to participate in the Honors Program if they have a 3.50 GPA in all courses for the major by the end of the junior year. Students should apply to the SoMAS undergraduate director for permission to participate.
2. Students must prepare an honors thesis based on a research project written in the form of a paper for a scientific journal. A student interested in becoming a candidate for honors should submit an outline of the proposed thesis research project to the SoMAS undergraduate director as early as possible, but no later than the second week of classes in the last semester. The student will be given an oral examination in May on his or her research by his or her research supervisor and the undergraduate research committee. The awarding of honors requires the recommendation of this committee and recognizes superior performance in research and scholarly endeavors. The written thesis must be submitted before the end of the semester in which the student is graduating.
3. If the student maintains a GPA of 3.5 in all courses in their major through senior year and receives a recommendation by the undergraduate research committee, he or she will receive departmental honors.

Undergraduate College Academy Minor in Environmental Studies

The Environmental Studies Undergraduate College Academy, housed in the Science and Society College, offers a minor in Environmental Studies as well as activities that emphasize both scientific and social issues encompassed by the broad field of environmental studies. Through this program, motivated natural science and social science students are able to apply their other coursework specifically to the study of the environment. In addition, participation in the program adds a rewarding academic component to each student's residential experience. The minor in Environmental Studies provides enhanced exposure to one subfield of environmental studies, the natural science of the environment.

Requirements for the 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 18 credits.
1. One introductory course chosen from the following:

- ATM 102/EST 102 Weather and Climate
- BIO 113 General Ecology
- BIO 201 Principles of Biology: From Organisms to Ecosystems
- GEO 101 Environmental Geology
- MAR 101 Long Island Sound: Science and Use
- MAR 104 Oceanography

2. ENS 101 Prospects for Planet Earth
3. ENS 301 Contemporary Environmental Issues and Policies
4. Two advanced courses chosen from the following:

- ANP 360 Primate Conservation

- ANT 420 Environmental Analysis Using Remote Sensing and Geographic Information Systems
- ATM 397 Air Pollution and Its Control
- BIO 351 Ecology
- BIO 352 Ecology Laboratory
- BIO 353/GEO 353 Marine Ecology
- CHE 310 Chemistry in Technology and the Environment
- GEO 304 Energy, Mineral Resources, and the Environment
- GEO 315 Groundwater Hydrology
- MAR 320 Limnology
- MAR 333 Coastal Oceanography
- MAR 340 Environmental Problems and Solutions

5. At least three credits of independent study or research in any department, approved by the minor coordinator or undergraduate director.

Declaration of the Minor

Students should declare the Environmental Studies minor no later than the middle of their junior 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 Environmental Studies
A course planning guide for this major may be found here.

FRESHMAN

FALL	Credits
First Year Seminar 101	1
WRT 101	3
ENS 101, MAR 104, GEO 101, or ATM 102	3
MAT 125	3
SBC	3
ANP 120	3
Total	16

SPRING	Credits
First Year Seminar 102	1
WRT 102	3
CHE 131	4
CHE 133	1
PHI 104 or PHI 105	3
SBC	3
Total	15

SOPHOMORE

FALL	Credits
AMS 110 or other statistics	3
SBC	3
SBC	3
SBC	3
SBC	3
Total	15

SPRING	Credits
ECO 108	3
POL 102	3
SBC	3
SBC	3
SBC	3
Total	15

JUNIOR

FALL	Credits
BIO 201 and BIO 204	5
MAR 340	3
ENS 119	4
SBC	3
Elective	3
Total	18

SPRING	Credits
ENS 301	3
Upper-division concentration	3
Upper-division concentration	3
Upper-division SBC	3
Elective	3
Total	15

SENIOR

FALL	Credits
ENS 312	3
ENS 311 or BIO 386	3
SBC	3
MAR 458	0
Upper-division SBC	3
Upper-division SBC	3
Total	15

SPRING	Credits
ENS 443 or research	2
MAR 459	0
Upper-division concentration	3
Upper-division concentration	3
Upper-division elective	3
Elective	3

Total	14

ENS

Environmental Studies

ENS 101: Prospects for Planet Earth

An introduction for non-science majors to global environmental change. Exploration of the natural science of Earth's environment; the scientific, socioeconomic, and political issues that influence human impact on the global environment and responses to environmental changes; the strategies for humans to live in greater harmony with planet Earth. Global issues are related to the particular issues of the United States, the Northeast, and the greater metropolitan New York City-Long Island area.

DEC: *E*
SBC: *SNW*

3 credits

ENS 119: Physics for Environmental Studies

The principles of physics as they apply to environmental issues. A review of mathematics is followed by a discussion of Newton's laws, conservation principles, topics in fluids and wave motion, optical instruments, and radioactivity. Three lectures and one laboratory session per week. This course is offered as both ENS 119 and PHY 119.

Prerequisites: MAT 123; CHE 131

DEC: *E*
SBC: *SNW*

4 credits

ENS 301: Contemporary Environmental Issues and Policies

The scientific, socioeconomic, legal and legislative aspects of current environmental issues and policies. Invited experts address current environmental issues and policies of local, regional and global significance. Topics may include: land use practices and reform, farmland and open space preservation; soil and water conservation; wetlands protection and rehabilitation; waste management and reduction, recycling and composting; air pollution, global warming and sea level rise; and marine wilderness areas.

Prerequisite: U3 or U4 status; ENS major or minor or permission of instructor

DEC: *H*
SBC: *STAS*

3 credits

ENS 311: Ecosystem Ecology and the Global Environment

Ecosystem ecology with an emphasis on biogeochemical cycling in oceans and on land, as well as on biosphere-atmosphere interactions. Topics include earth system processes such as climate and atmospheric composition, the hydrological cycle, cycling of chemicals such as nutrients and metals in the oceans, the soil cycle, and the fate and transport of materials in the atmosphere. Natural and perturbed systems are discussed. This course is offered as both BIO 386 and ENS 311.

Prerequisites: C or higher in BIO 201; CHE 129 or CHE 131 or CHE 141 or CHE 152 Advisory Prerequisite: MAR 104

DEC: *H*
SBC: *STEM+*

3 credits

ENS 312: Population, Technology, and the Environment

A study of the biological, social, and economic factors that influence population growth. The development of new technologies and their influence on resource use and the effects that increasing population and changing technologies have on the environment are explored.

Prerequisites: MAR 340; one semester of BIO

DEC: *H*
SBC: *STAS*

3 credits

ENS 333: Environmental Law

Survey of the origins of environmental law and the major legislation enacted by Congress and the state of New York. Special emphasis is placed on the application of environmental law to the problem of solid waste management on Long Island. This course is offered as both ENS 333 and POL 333.

Prerequisites: ECO 108; POL 102

3 credits

ENS 339: Economics of Coastal and Marine Ecosystems

This course will view human interactions with coastal and marine ecosystems through the lens of economics. Consideration of the socioeconomic implications of policy decisions involving environmental and natural resources has become increasingly important for ecosystem management. Topics will include the basics of welfare analysis, the concept of ecosystem services, the challenges associated with public goods, methods for economic valuation of non-market goods and services, strategies for sustainable use of coastal and marine resources, and case studies of the application of fundamental principles of environmental economics to national and international policy. This course is offered as both ENS 339 and ENV 339.

Prerequisite: U3/U4 status; ENS 101 or SBC 111 or MAR 104

DEC: *H*
SBC: *STAS*

3 credits

ENS 395: Topics in Environmental Sciences

May be repeated as the topic changes.

Prerequisite: one upper division ENS course

3 credits

ENS 443: Environmental Problem Solving

The integration of information and skills from the natural sciences, social sciences, engineering and the humanities to address important environmental problems. An environmental problem of current interest is presented. Working in small groups, students develop a proposal to solve the problem, collect and analyze data, and present results. Data collection may include field and laboratory work outside of scheduled class meetings.

Prerequisites: U3 or U4 standing; ENS major or minor

2 credits

ENS 447: Readings in Environmental Studies

Tutorial readings in the environmental sciences. This course may be repeated but no more than 3 credits may be used toward Environmental Studies major requirements.

Prerequisite: Permission of instructor and SoMAS undergraduate director

1-3 credits, S/U grading

ENS 459: Write Effectively in Environmental Studies

A zero credit course that may be taken in conjunction with any 300- or 400-level ENS course, with permission of the instructor. The course provides opportunity to practice the skills and techniques of effective academic writing and satisfies the learning outcomes of the Stony Brook Curriculum's WRTD learning objective.

Prerequisite: WRT 102; permission of the instructor

SBC: *WRTD*

S/U grading

ENS 487: Independent Research in Environmental Studies

An independent project, developed out of advanced coursework in environmental studies, designed in consultation with and supervised by a faculty member. The project should be formulated before the start of the semester in which the research will be done and should culminate in a substantial written paper. May be repeated.

Prerequisites: Permission of a supervising faculty member and SoMAS Undergraduate Programs Director

SBC: *EXP+*

0-6 credits

ENS 488: Internship in Environmental Studies

Internships provide students with an opportunity of gaining experience working in the community at government agencies, environmental groups, aquaria, summer camps, field studies, etc. A suitable proposal must be presented by the student and approved by the Director of Undergraduate Studies before the internship begins. May be repeated for a maximum of 6 credits for the ENS major, 3 credits for the ENS minor.

Prerequisite: Permission of the SoMAS Undergraduate Programs Director

SBC: *EXP+*

0-6 credits, S/U grading