

Coastal Environmental Studies (COS)**Major in Coastal Environmental Studies**

Director: Dr. Michael Sperazza

Office: W0511 Melville Library

Phone: (631)632-1687

Email: michael.sperazza@stonybrook.edu

Website: <http://www.stonybrook.edu/commcms/sustainability/>

Coastal Environmental Studies

The Coastal Environmental Studies major, leading to a Bachelor of Science degree, provides the skills, knowledge, and preparation for students to assess and address coastal environmental problems. The curriculum integrates principles and methodologies from physical sciences, natural sciences, and physical geography, combined with an understanding of environmental ethics, environmental policy, and environmental law.

The major prepares students for entry-level employment in the public, private, or non-profit sectors concerned with assessment, abatement, or regulation of a wide range of coastal environmental problems. The major prepares students for graduate study in environmental science, marine science, geoscience, environmental planning and related fields.

Coastal zones have always concentrated people and economic activities because of their natural resources and trading opportunities. Many of the world's largest cities are on seacoasts and at the mouths of the great rivers. The development of coastal zones around the world has created an array of environmental problems and water and land resource issues, further complicated by sea level rise.

Students will enroll in major-specific courses in their junior and senior year. As part of the degree requirements, students will work in teams with students enrolled in related majors to solve problems collaboratively. Students are encouraged to take advantage of independent research opportunities, internships, and field camps to gain real-world experience.

Requirements for the Major in Coastal Environmental Studies**A. Required Foundation Courses for Major (34-35 credits)**

MAT 131-C or MAT 125/MAT 126-C (4-6)

CHE 131-E/CHE 133 and CHE 132 (9)

SBC 111 Introduction to Sustainability (3)

SBC 113-E/SBC 114 Physical Geography (4)

SBC 201 Systems and Models (1)

AMS 102-C Elements of Statistics (3)

SBC 205 Introduction to Geospatial Analysis (1)

BIO 201-E Fundamentals of Biology (3)

BIO 204 Fundamentals of Scientific Inquiry in the Biological Sciences (2)

ENS 119 Physics for Environmental Studies (4)

B. Career and Leadership Skills (6)

CSK 102 Career Leadership Skills: Working in Teams (1)

CSK 302 Technical Writing and Communication (3)

And two courses selected from CSK 101, 103-109 (1 credit each)

C. Core Courses (29 credits)

MAR 333-H Coastal Oceanography (3)

ENV 315 Coastal Groundwater Hydrology (3)

ENV 316 Coastal Zone Management (3)

SBC 313 GIS Design and Applications (4)

ENV 320/ENV 321 Chemistry for Environmental Scientists (4)

Students are required to select 9 credits from group A and 3 credits from group B.

Group A: Environmental Science Electives

BIO 351-H Ecology (3)

BIO 352 Ecology Laboratory (3)

EDP 305 Risk Assessment and Sustainable Development (3)

ENV 304-H Global Environmental Change (3)

ENV 340 Contemporary Topics in Environmental Science (3)

ENV 317 Coastal Pond Algal Ecology

ENV 487 Research in Environmental Science (1-3)

ENV 405 Field Camp (3-6)

MAR 303 Long Island Marine Habitats (3)
 MAR 304-E Waves, Tides, and Beaches (3)
 MAR 315-H Conservation Biology and Marine Biodiversity (3)
 MAR 336 Marine Pollution (3)
 MAR 388 Tropical Marine Ecology (4)
 EHI 310 Restoration Ecology (3)
 ENS 380: Stony Brook in Tanzania: Lake Victoria Environment and Human Health (4)

Group B: Environment, Society, and Policy

SUS 341-H Environmental Treatises and Protocols (3)
 SBC 307-K4 Environmental History of North America (3)
 SBC 309 Global Environmental Politics (3)
 SUS 342-H Energy and Mineral Resources (3)
 EHI 340 Ecological and Social Dimensions of Disease (3)

One of the following courses may also be used to substitute for any of the courses in Group B, however, each of the courses below has a prerequisite outside the major.

EDP 301 The Built Environment I (3)
 EDP 309 Planning: Policies and Regulations (3)
 SBC 330-G Extreme Events (3)
 SBC 308-K American Environmental Politics (3)
 SBC 312-F Environment, Society, and Health (3)
 SUS 301 Environmental Ethics (3)
 SUS 303: Demographic Change and Sustainability (3)
 SBC 311-H Disasters and Society: A Global Perspective (3)

D. Systems Course (3 credits)

One Integrative, Collaborative Systems Project course:

GEO 301 Sustainability of the Long Island Pine Barrens (3)
 SBC 401 Integrative, Collaborative Systems Project (3)

With permission of the Program Director, a student may take SBC 488 Internship in lieu of a Systems Course.

E. Upper-Division Writing Requirement

Proficiency in writing, oral communication, and computer literacy will be 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 COS Undergraduate Program.

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.

Sample Course Sequence - Major in Coastal Environmental Studies

Freshman			
Fall	Credits	Spring	Credits
First Year Seminar 101	1	First Year Seminar 102	1
SBC 111	3	CSK 102	1
WRT 101 (DEC A1)	3	WRT 102 (DEC A2)	3
MAT 125 or MAT 132 (DEC C)	3-4	CHE 131/CHE 133 (DEC E)	5
SBC 113/SBC 114 (DEC E)	4	MAT 126 or MAT 132	3-4
		SBC 205	1
Total:	14-15	Total:	14-15
Sophomore			
Fall	Credits	Spring	Credits
SBC 201	1	BIO 201 (DEC E)	3
CSK 100-level selection #2	1	BIO 204	2
AMS 102	3	CHE 132	4
DEC	3	Foreign Language or elective	4
Foreign Language or elective	4	CSK 302	3
ENS 119	4		

Total:	16	Total:	16
Junior			
Fall	Credits	Spring	Credits
SBC 313	4	MAR 333 (DEC H)	3
DEC	3	Group A course selection #1	3
DEC	3	ENV 315	3
ENV 320/ENV 321	4	ENV 316	3
CSK 100-level selection #3	1	DEC	3
Total:	15	Total:	15
Senior			
Fall	Credits	Spring	Credits
Group A selection #2	3	GEO 301 or SBC 401	3
Group A selection #3	3	Group B course selection	3
DEC	3	DEC	3
Research/Elective/Internship	3	DEC	3
DEC	3	Elective	3
Total:	15	Total:	15

—

ENV

Environmental Science

ENV 115 - E: Chemistry, Life, and Environment

This survey course introduces chemical principles by emphasizing the role chemistry plays in everyday life, the natural environment, the built environment, energy production, and in processes leading to environmental degradation. In addition, the role of chemistry in the development of alternative energy sources, remediation technologies, and eco-friendly products is discussed. This course for non-science majors introduces chemical principles using mostly qualitative approaches rather than quantitative approaches. Interactive tools and interactive visualization tools are extensively used to illustrate concepts, reactions, and processes. This course is offered as both CHE 115 and ENV 115.

3 credits

ENV 304 - H: Global Environmental Change

An analysis of the physical, chemical, and biological processes in the atmosphere, hydrosphere, lithosphere, and biosphere that are susceptible to change either from natural or anthropogenic causes. In addition to focusing on the processes, this course will examine the spatial/temporal scales of environmental changes, their consequences to systems including our economic, political, and social systems, and will consider our responsibility and capability in managing systems in a sustainable way. This course is offered as both ENV 304 and GEO 307.

Prerequisites: SBC 111, or SBC 113, or ENS 101, or GEO 101, or GEO 102; ENV 115 or CHE 131

3 credits

ENV 315: Principles and Applications of Groundwater Hydrology

Principles of groundwater hydrology. Aquifer geology, with an emphasis on coastal ground water systems and Long Island in particular. Introduction to quantitative numerical methods to simulate regional groundwater flow and contaminant transport in aquifers. Development and management of freshwater aquifers as drinking water resources.

Prerequisite: MAT 126 or MAT 131; ENS 119; SBC 113 and SBC 114

3 credits

ENV 316: Coastal Zone Management

Coastal zones are dynamic environments shaped by natural forces as well as human intervention. Developing management strategies is critical and requires an understanding of the coastal zones environments, the threats to these environments, as well as the applicable laws and policies. This course examines past and present coastal zone management strategies at the national, regional, and local level. Coastal zone management on Long Island will be extensively reviewed and discussed.

Prerequisite: ENS 101, SBC 113, POL 102, or MAR 104

3 credits

ENV 317: Ecology of Algae and Plants of Coastal Plains Freshwater Habitats

An introduction to the ecology of algae and aquatic plants of Long Island's freshwater habitats. Specific focus is on the lakes and ponds, rivers and streams, and wetlands (bogs, swamps, and marshes) of the coastal plains. Emphasis is on natural ecology, biodiversity, and water quality. Subject matter includes the major functional groups of algae and aquatic plants, taxonomic identification skills, aquatic field and lab methods, water quality analyses, and data analysis.

Prerequisite: BIO 201 and CHE 131 or ENV 115, or permission by instructor

3 credits

ENV 320: Chemistry for Environmental Scientists

Course designed to provide a firm understanding of the chemical principals and reactions of importance in environmental degradation of natural environments or built environments, remediation and abatement processes, energy production. In addition, the course reviews the chemical processes that control the transport, fate, and bioavailability of common organic pollutants, metals, and metalloids. The course expands on concepts from general chemistry, and introduces concepts from physical chemistry, analytical chemistry, organic chemistry, photochemistry, and geochemistry. Not for credit in addition to CHE 310.

Prerequisite: CHE 131 and CHE 132

3 credits

ENV 321: Chemistry for Environmental Scientists-Lab

Laboratory course is designed to illustrate principles, processes, and reactions presented in ENV 320. In addition, the laboratory will focus on the quantitative analysis and identification of common chemical pollutants, including common volatile and semi-volatile

organics, metals and metalloids. Some of the laboratory meetings will be in the form of short field trips to practice sampling techniques as well as in situ and on site analysis techniques.

Pre- or corequisite: ENV 320

1 credit

ENV 340: Contemporary Topics in Environmental Science

Course explores one or more contemporary environmental science topics in depth. Topic(s) vary by semester. Examples of topics include: formation and fate of Asian Brown Cloud; Arsenic in Drinking water; Acid Rain; Environmental issues related to mining; Environmental impact of burning and mining coal; Pesticides and Herbicides in the Environment. Course may be repeated once.

Prerequisite: U3/U4; ENV 115 or CHE 131

3 credits

ENV 405: Field Camp

A field course in environmental science of closely related field that may be taken at any one of several approved university programs. Student should plan in consultation with Undergraduate Program Director.

Prerequisite: U3/U4 standing

1-6 credits, S/U grading

ENV 447: Readings in Environmental Sciences

Tutorial readings in the environmental science. May be repeated.

1-2 credits, S/U grading

ENV 487: Research in Environmental Sciences

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

0-6 credits, S/U grading

SBC

Sustainability Block Curriculum

SBC 104 - B: Introduction to Moral Reasoning

An introductory inquiry into the formation and evaluation of moral judgments and reasoning. The major theories and problems of ethics are surveyed, such as utilitarianism, Kant's categorical imperative, ethical relativism, egoism, and various concepts of the good and virtue. Readings from historical and contemporary figures.

3 credits

SBC 111: Introduction to Sustainability Studies

Survey course introduces concept of sustainability. Sustainability is often defined as the ability to provide for the needs of the world's current population without damaging the ability of future generations to provide for themselves. This course reviews the needs of the current population and future generations, trends that affect our ability to provide those needs, and possible solutions that are environmentally, economically, and socially acceptable.

3 credits

SBC 113 - E: 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.

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, socio-economic 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.

3 credits

SBC 116: Introduction to Human Geography

Survey course introduces geography as a social science by emphasizing the relevance of geographic concepts to human problems. Course emphasizes globalization and cultural diversity.

3 credits

SBC 117 - D: 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.

3 credits

SBC 200 - F: 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 the world's population currently live 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.

3 credits

SBC 201: Systems and Models

Introduction to the dynamic modeling of complex systems with feedbacks. Students will learn to use simulation software that facilitates the visualization, formulations, 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: MAT 125; EHI, EDP. SUS, COS, or EHM major, or permission of the instructor

1 credit

SBC 203 - G: 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

3 credits

SBC 204 - E: 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, SBC 201

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. Types of GIS data, computer hardware and software used for geospatial analysis, basic cartography, and global positioning system (GPS).

1 credit

SBC 206 - F: 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 affect 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

3 credits

SBC 307 - K: 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

3 credits

SBC 308 - K: 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

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, ENV 115, ENS 101, GEO 101, or permission of instructor

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 - H: 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

3 credits

SBC 312 - F: 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

3 credits

SBC 313: GIS Design and Application

This course provides the basic concepts underlying modern geographic information science and technology. Emphasis is placed on the principles of GIS for characterizing environmental systems and computer-based techniques for processing and analyzing spatial data. The course includes three hours of lecture and three hours of laboratory exercises each week.

Prerequisite: MAT 125 or MAT 131

4 credits

SBC 320 - J: 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: U3 or U4 standing

3 credits

SBC 321 - G: 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

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

3 credits

SBC 330 - G: 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

3 credits

SBC 331 - G: 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

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.

3 credits

SBC 401: Integrative, Collaborative Systems Studies

Problem-based capstone course.

Prerequisite: U3/U4, CSK 102

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

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

3 credits, S/U grading

SBC 488: Internship

Participation in local, state, and national public and private agencies and organizations. May be repeated to a limit of 12 credits.

Prerequisites: U3/U4 status and permission of the Undergraduate Program Director

0-12 credits, S/U grading