Environmental Studies (ENVS)

ENVS 1011 (c, FYS) Why Architecture Matters
Non-Standard Rotation. Enrollment limit: 16.

Architecture is unavoidable: we spend our lives in and around buildings and in spaces and landscapes defined by them. Too often we take the built environment for granted, oblivious of how it affects us and shapes our lives. Explores architecture’s critical role in creating a sense of place, settings for community, symbols of our aspirations and fears, cultural icons, and political ideals. Investigates the fundamental principles of architecture and studies closely some of history’s great buildings and spaces. Students learn how to talk about architecture and write about it. (Same as: ARTH 1011)

Previous terms offered: Fall 2015.

ENVS 1016 (c, FYS) Art and the Environment: 1960 to Present
Non-Standard Rotation. Enrollment limit: 16.

Since the 1960s, artists in Western Europe and the United States have used the environment as a site of visual exploration, discussion, critique, and action. From Robert Smithson and his ever-disintegrating “Spiral Jetty” to Agnes Denes’s “Wheatfield” growing alongside Wall Street, to Mierle Ukeles’s installation and performance art in conjunction with the New York Department of Sanitation, to Eduardo Kac’s “GFP Bunny,” artists have explored the ways in which art objects are in dialogue with the environment, recycling, and biology. Works engage with concepts such as entropy, the agricultural industry, photosynthesis, and green tourism encouraging us to see in new ways the natural world around us. Visits to the Bowdoin College Museum of Art’s collections complement the material studied. Writing-intensive course emphasizes firm understanding of library and database research and the value of writing, revision, and critique. (Same as: ARTH 1016)

Previous terms offered: Fall 2018, Fall 2017, Fall 2016.

ENVS 1027 (b, FYS) The Politics of Climate Change
Laura Henry.
Every Other Fall. Fall 2019. Enrollment limit: 16.

Provides an overview of the major venues for climate politics and which actors are involved. Examines the politics of climate change at multiple levels—from the individual to global governance—and reviews climate policy in different countries. Pays particular attention to cases where active policy making or public mobilization around climate is occurring, asking why we see initiative and innovation in climate policy in these cities, states, and international venues and not elsewhere. Considers themes such as how climate policy is developed in democracies and authoritarian regimes, how climate policy may affect economic development, the role of non-state actors such as NGOs and business groups in climate politics, and the ethical implications of different climate policy options. (Same as: GOV 1027)

ENVS 1056 (a, INS) Ecology and Society
Non-Standard Rotation. Enrollment limit: 50.

Presents an overview of ecology covering basic ecological principles and the relationship between human activity and the ecosystems that support us. Examines how ecological processes, both biotic (living) and abiotic (non-living), influence the life history of individuals, populations, communities, and ecosystems. Encourages student investigation of environmental interactions and how human-influenced disturbance is shaping the environment. Required field trips illustrate the use of ecological concepts as tools for interpreting local natural history. (Same as: BIOL 1056)

Previous terms offered: Spring 2016.

ENVS 1060 (a, INS, MCSR) Prove It!: The Power of Data to Address Questions You Care About

Climate change, biodiversity loss, pollution, and other environmental issues present significant threats to ecological integrity, human health, and social justice. An overwhelming amount of information exists on these topics, from a variety of perspectives—some reliable, some not. Strategies are required for processing this information and drawing conclusions. Students develop skills in accessing reliable information, data analysis and interpretation, as well as science communication. In small groups, students implement these skills exploring a research question of interest using data available online. Additional sessions provide time for group research and discussion. (Same as: BIOL 1060)

Previous terms offered: Fall 2018.

ENVS 1083 (a, INS, MCSR) Energy, Physics, and Technology
Every Other Spring. Enrollment limit: 50.

How much can we do to reduce the disruptions of the Earth’s physical, ecological, and social systems caused by global climate change? How much climate change itself can we avoid? A lot depends on the physical processes that govern the extraction, transmission, storage, and use of available energy. Introduces the physics of solar, wind, nuclear, and hydroelectric power and discusses the physical constraints on their efficiency, productivity, and safety. Reviews current technology and quantitatively analyzes the effectiveness of different strategies to reduce greenhouse gas emissions. Not open to students with credit for Physics 1140. (Same as: PHYS 1083)

Previous terms offered: Spring 2019, Spring 2016.

ENVS 1090 (a, INS) Understanding Climate Change

Why is the global climate changing and how will biological systems respond? Includes sections on climate systems and climate change, reconstructing ancient climates and past biological responses, predicting future climates and biological responses, climate policy, the energy crisis, and potential solutions. Incorporates a few field trips and laboratories designed to illustrate approaches to climate change science at the cellular, physiological, and ecological levels. (Same as: BIOL 1090)

**ENVS 1101 Introduction to Environmental Studies: Interdisciplinary Approaches**

Connie Chiang; Dharni Vasudevan.
Every Fall. Fall 2019. Enrollment limit: 90.

An interdisciplinary introduction to the environment framed by perspectives from the natural sciences, social sciences, and arts and humanities. Surveys past and present status of scientific knowledge about major global and regional problems, explores both successes and inadequacies of environmental ideas to address specific crises, and assesses potential responses of governments, corporations, and individuals. Topics include food and agriculture, pollution, fisheries, and climate change and energy. Other subjects include biodiversity, population, urbanization, consumption, environmental justice, human and ecological health, and sustainability.

Previous terms offered: Fall 2018, Fall 2017, Fall 2016, Fall 2015.

**ENVS 1102 (a, INS) Oceanography**

Every Spring. Enrollment limit: 36.

The fundamentals of geological, physical, chemical, and biological oceanography. Topics include tectonic evolution of the ocean basins; deep-sea sedimentation as a record of ocean history; global ocean circulation, waves, and tides; chemical cycles; ocean ecosystems and productivity; and the ocean's role in climate change. Weekly labs and fieldwork demonstrate these principles in the setting of Casco Bay and the Gulf of Maine. Students complete a field-based research project on coastal oceanography. (Same as: EOS 1505)


**ENVS 1104 (a, INS, MCSR) Environmental Geology and Hydrology**

Non-Standard Rotation. Enrollment limit: 36.

An introduction to aspects of geology and hydrology that affect the environment and land use. Topics include lakes, watersheds and surface-water quality, groundwater contamination, coastal erosion, and/or landslides. Weekly labs and fieldwork examine local environmental problems affecting Maine's rivers, lakes, and coast. Students complete a community-based research project. (Same as: EOS 1305)


**ENVS 1117 (c, ESD) Introduction to Environmental Literature**

Samia Rahimtoola.

Introduces students to literature that features the relationship of humans with their "natural" environment. Asks how our relationship to the environment has changed over the last three centuries and considers how those changes are represented and resisted by literary texts, such as novels, nonfiction essays, poems, and film. Key topics include naturalism, place-based writing, farming and agrarianism, wilderness, and literatures of environmental justice. Devotes significant attention to examining the cultural heritage we bring to bear on our encounters with nature and the ways literature offers opportunities to rethink the major paradigms of environmental thought. Authors may include Henry David Thoreau, Aldo Leopold, Willa Cather, Helena María Viramontes, Leslie Marmon Silko, and Octavia Butler. Not open to students with credit for English 2552/Environmental Studies 2452 (Placing Modernity). (Same as: ENGL 1117)

**ENVS 1155 (c, IP) Into the Wild**

Jens Klenner.

An examination of the mix of conflicting ideas that shape the many conceptions of "wilderness." Among other questions, explores the ideas of wilderness as a space without or preceding culture and civilization, as a mental state, and as an aesthetic experience. Considers the place of wilderness in the urban jungle of cities. Puts Anglo-American and European theories and images of the wilderness into dialogue by comparing literary works, film, artworks, and philosophical texts. No knowledge of German is required. (Same as: GER 1155)

Previous terms offered: Fall 2016.

**ENVS 2004 (a, MCSR) Understanding Place: GIS and Remote Sensing**

Every Year. Enrollment limit: 20.

Geographical information systems (GIS) organize and store spatial information for geographical presentation and analysis. They allow rapid development of high-quality maps, and enable powerful and sophisticated investigation of spatial patterns and interrelationships. Introduces concepts of cartography, database management, remote sensing, and spatial analysis. The productive use of GIS and Remote Sensing technology with an emphasis on the biophysical sciences and environmental management is investigated through a variety of applied exercises and problems culminating in a semester project that addresses a specific environmental application. (Same as: DCS 2335)


**ENVS 2201 (a, INS, MCSR) Perspectives in Environmental Science**

Every Spring. Enrollment limit: 35.

Understanding environmental challenges requires scientific knowledge about the different spheres of the Earth -- land, water, air, and life -- and how they interact. Presents integrated perspectives across the fields of biology, chemistry, and earth and oceanographic science to examine the scientific basis for environmental change from the molecular to the global level. Foundational principles are developed to address major course themes, including climate change, energy, soil/air/water pollution, chemical exposure and risk, land use change, and biodiversity loss. Laboratory sessions consist of local field trips, laboratory experiments, group research, case study exercises, and discussions of current and classic scientific literature. (Same as: BIOL 1158, CHEM 1105)

Prerequisites: BIOL 1101 or BIOL 1109 or CHEM 1081 - 2260 or PHYS 1130 or PHYS 1140 or EOS 1105 or EOS 1305 (same as ENVS 1104) or EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221) or EOS 2115 or EOS 2335 or EOS 2345 (same as ENVS 2270) or EOS 2365 or EOS 2525 (same as ENVS 2251) or EOS 2535 or EOS 2585 (same as ENVS 2282) or ENVS 1101.

An advanced seminar focusing on aspects of marine science relevant to student research projects in the Bowdoin Marine Science Semester. Students choose topics and learn to (1) search for information in the scientific literature; (2) evaluate the utility of papers to their research topic; (3) spot holes in existing understanding; (4) formulate hypothesis-driven research questions; (5) integrate across research papers and apply that integrated knowledge to their own topic. Students will also advance their ability to write research plans and papers, including producing a grant proposal modeled on a National Science Foundation Graduate Research Fellowship Program (GRFP). Students will also visit several Maine Marine Research facilities and infrastructure to understand the current state of marine fisheries and regulatory and research activities in Maine. Taught in residence at Schiller Coastal Studies Center. Current Topics in Marine Science is a course-module in the Bowdoin Marine Science Semester and is taught with three other co-requisite courses. (Same as: EOS 3117)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and MATH 1000 or higher.

ENVS 2217 (a, INS, MCSR) Current Topics in Marine Science
Olaf Ellers; Amy Johnson; Steven Allen; Brittany Jellison.
Every Fall. Fall 2019. Enrollment limit: 12.

In the 1980s, NASA's satellite program turned some of its space-viewing sensors towards the earth to better understand its processes. Since that time, NASA's Earth Observatory mission has yielded a fleet of satellites bearing an array of sensors that provide a global view of the earth each day. Global-scale ocean properties, including bathymetry, temperature, salinity, wave height, currents, primary productivity, sea ice distribution, and sea level, are revealed through satellite-detection of ultraviolet, visible, infrared and microwave energy emanating from the ocean. These satellite data records currently exceed thirty years in length and therefore can be used to interpret climate-scale ocean responses from space. A semester-long research project, targeted on a student-selected oceanic region, focuses on building both quantitative skills through data analysis and writing skills through iterative writing assignments that focus on communicating data interpretation and synthesis. (Same as: EOS 2550)

Prerequisites: Two of: either EOS 1105 - 2969 or EOS 3000 or higher and either MATH 1300 - 2969 or MATH 3000 or higher or Placement in MATH 1600 (M) or Placement in MATH 1700 (M) or Placement in MATH 1750 (M) or Placement in MATH 1800 (M) or Placement in 2000, 2206 (M).

Previous terms offered: Fall 2018, Fall 2017.

ENVS 2222 (a, INS, MCSR) Satellite Remote Sensing of the Ocean
Barry Logan.
Every Other Fall. Enrollment limit: 35.

Study of the behavior of animals and plants, and the interactions between organisms and their environment. Topics include population growth and structure, and the influence of competition, predation, and other factors on the behavior, abundance, and distribution of plants and animals. Laboratory sessions, field trips, and research projects emphasize concepts in ecology, evolution and behavior, research techniques, and the natural history of local plants and animals. Optional field trip to the Bowdoin Scientific Station on Kent Island. (Same as: BIOL 2315)

Prerequisites: BIOL 1102 or BIOL 1109 or Placement in BIOL 2000 level.

Previous terms offered: Fall 2016, Fall 2015.

ENVS 2224 Previous terms offered: Fall 2018, Fall 2017.

ENVS 2223 Previous terms offered: Fall 2018, Fall 2017.

ENVS 2221 (a) Biogeochemistry: An Analysis of Global Change
Michele LaVigne.
Every Fall. Fall 2019. Enrollment limit: 35.

Understanding global change requires knowing how the biosphere, geosphere, oceans, ice, and atmosphere interact. An introduction to earth system science, emphasizing the critical interplay between the physical and living worlds. Key processes include energy flow and material cycles, soil development, primary production and decomposition, microbial ecology and nutrient transformations, and the evolution of life on geochemical cycles in deep time. Terrestrial, wetland, lake, river, estuary, and marine systems are analyzed comparatively. Applied issues are emphasized as case studies, including energy efficiency of food production, acid rain impacts on forests and aquatic systems, forest clearcutting, wetland delineation, eutrophication of coastal estuaries, ocean fertilization, and global carbon sinks. Lectures and three hours of laboratory or fieldwork per week. (Same as: EOS 2005)

Prerequisites: EOS 1100 - 1999 or BIOL 1102 or BIOL 1109 or CHEM 1092 or CHEM 1102 or CHEM 1109 or ENVIS 1102 or ENVIS 1104 or ENVIS 1515.

Previous terms offered: Fall 2018, Fall 2017, Fall 2016, Fall 2015.

ENVS 22222 (a, INS, MCSR) Plant Ecophysiology
Barry Logan.
Every Fall. Fall 2019. Enrollment limit: 35.

Examines the functional attributes of plants and the manner in which they vary across the plant kingdom by the processes of evolution and acclimation. Topics of focus include photosynthesis and protection against high-light stress, the acquisition and distribution of water and mineral nutrients, and environmental and hormonal control of development. Special topics discussed may include plant parasitism, carnivory, the origins and present state of agriculture, plant responses to global climate change, plant life in extreme environments, and the impacts of local land-use history on plant communities. Contemporary research instrumentation is used in weekly laboratories, some conducted in the field, to enable first-hand exploration of phenomena discussed in lecture. (Same as: BIOL 2210)

Prerequisites: BIOL 1102 or BIOL 1109 or Placement in BIOL 2000 level.

Previous terms offered: Fall 2018, Fall 2017, Fall 2015.

ENVS 2224 (a, INS, MCSR) Behavioral Ecology and Population Biology
Every Fall. Enrollment limit: 35.

Previous terms offered: Fall 2018, Fall 2017, Fall 2015.
ENVS 2225  (a, INS, MCSR)  Biodiversity and Conservation Science
Non-Standard Rotation. Enrollment limit: 35.

People rely on nature for food, materials, medicines, and recreation, yet the fate of Earth’s biodiversity is rarely given priority among the many pressing problems facing humanity today. Explores the interactions within and among populations of plants, animals, and microorganisms, and the mechanisms by which those interactions are regulated by the physical and chemical environment. Major themes are biodiversity and the processes that maintain biodiversity, the relationship between biodiversity and ecosystem function, and the science underlying conservation efforts. Laboratory sessions consist of student research, local field trips, laboratory exercises, and discussions of current and classic ecological literature. (Same as: BIOL 2325)

Prerequisites: BIOL 1102 or BIOL 1109 or BIOL 1158 or CHEM 1105 or ENVS 2201 (same as BIOL 1158 and CHEM 1105).

Previous terms offered: Fall 2017.

ENVS 2227  (a, INS)  Ecology
Mary Rogalski.
Every Fall. Fall 2019. Enrollment limit: 35.

Ecology, the study of how organisms interact with each other and their environment, incorporates topics from how organisms cope with environmental stressors to global carbon cycling. Addresses current questions in ecology, from global change to food security to invasive species. Lectures, labs, primary and popular literature emphasize how scientists use the tenets of ecology to address current environmental issues. Labs, excursions, and student research include ecological studies of plant-insect interactions, collection of long-term data on salamander populations, and emphasis on the natural history of midcoast Maine. An optional field trip will be included (details TBA). (Same as: BIOL 2327)

Prerequisites: BIOL 1102 or BIOL 1109 or ENVS 2201 (same as BIOL 1158 and CHEM 1105) or Placement in BIOL 2000 level.

Previous terms offered: Fall 2018.

ENVS 2229  (a, INS, MCSR)  Biology of Marine Organisms
Every Fall. Enrollment limit: 35.

The study of the biology and ecology of marine mammals, seabirds, fish, intertidal and subtidal invertebrates, algae, and plankton. Also considers the biogeographic consequences of global and local ocean currents on the evolution and ecology of marine organisms. Laboratories, field trips, and research projects emphasize natural history, functional morphology, and ecology. Lectures and four hours of laboratory or field trip per week. One weekend field trip included. Students have the opportunity to take an optional field trip to the Bowdoin Scientific Station on Kent Island in the Bay of Fundy. (Same as: BIOL 2319)

Prerequisites: BIOL 1102 or BIOL 1109 or Placement in BIOL 2000 level.

Previous terms offered: Fall 2018, Fall 2017, Fall 2016, Fall 2015.

ENVS 2231  (a, INS)  Biological Oceanography
Every Fall. Enrollment limit: 15.

Features classroom, laboratory, and fieldwork emphasizing fundamental biological processes operating in pelagic environments. It includes a hybrid of topics traditionally taught in physical and biological oceanography courses: major ocean current systems, physical structure of the water column, patterns and process of primary production, structure and function of pelagic food webs. Field trips to Casco Bay and Harpswell Sound will introduce students to the methods and data structures of biological oceanography. Taught in residence at the Bowdoin Marine Laboratory, Biology 2501/Environmental Studies 2231 is a course-module in the Bowdoin Marine Science Semester. Biology 2232 (same as Environmental Studies 2232), Biology 2330 (same as Environmental Studies 2233), and English 2804 (same as Environmental Studies 2804) are co-requisites of this course. (Same as: BIOL 2501)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and MATH 1000 or higher.

Previous terms offered: Fall 2018, Fall 2017, Fall 2016, Fall 2015.

ENVS 2232  (a, INS, MCSR)  Benthic Ecology
Every Fall. Enrollment limit: 15.

The principles of ecology emphasizing the hard- and soft-bottom communities of Casco Bay and Harpswell Sound. Field trips and field exercises demonstrate the quantitative principles of marine ecological research, including good practices in sampling designs and field experiments. A class field project designs and implements a long-term study based at the Bowdoin Marine Laboratory, to monitor and detect changes in community structure driven by climate change in the twenty-first century. Assumes a basic knowledge of biological statistics. Taught in residence at the Bowdoin Marine Laboratory, Biology 2232/Environmental Studies 2232 is a course-module in the Bowdoin Marine Science Semester. Biology 2501 (same as Environmental Studies 2231), Biology 2330 (same as Environmental Studies 2233), and English 2804 (same as Environmental Studies 2804) are co-requisites of this course. (Same as: BIOL 2232)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and MATH 1000 or higher.

Previous terms offered: Fall 2018, Fall 2017, Fall 2016, Fall 2015.
ENVS 2235 (a, INS, MCSR) Methods in Ocean Change Ecology
Olaf Ellers; Amy Johnson; Steven Allen; Brittany Jellison.
Every Fall. Fall 2019. Enrollment limit: 12.

Explores how marine organisms, populations, communities, and ecosystems will respond to global ocean change. Concepts in ecology, behavior, physiology, and evolution will be highlighted to demonstrate how marine systems are affected by ocean change factors like warming, ocean acidification, hypoxia, habitat loss, and invasive species. Emphasizes in-depth discussion of key literature to exemplify the theory, study design, and analysis tools marine scientists employ to research current and projected ocean change. Also integrates laboratory, fieldwork, and computer activities to illustrate approaches to monitoring and predicting shifts in biological communities. A trip to Hawaii will allow students to get hands-on experience monitoring ecosystem health and change in a coral reef system. Taught in residence at Schiller Coastal Studies Center. Ocean change ecology is a course-module in the Bowdoin Marine Science Semester and is taught with three other co-requisite courses. module in the Bowdoin Marine Science Semester and is taught with three other co-requisite courses. (Same as: BIOL 2503)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and MATH 1000 or higher.

ENVS 2250 (a, INS) Earth, Ocean, and Society
Every Spring. Enrollment limit: 35.

Explores the historical, current, and future demands of society on the natural resources of the earth and the ocean. Discusses the formation and extraction of salt, gold, diamonds, rare earth elements, coal, oil, natural gas, and renewable energies (e.g., tidal, geothermal, solar, wind). Examines how policies for these resources are written and revised to reflect changing societal values. Students complete a research project that explores the intersection of natural resources and society. (Same as: EOS 2020)

Prerequisites: EOS 1100 - 1999 or EOS 2005 (same as ENVS 2221) or ENVS 1102 or ENVS 1104 or ENVS 1515 or ENVS 2221.


ENVS 2251 (a) Marine Biogeochemistry
Every Spring. Enrollment limit: 15.

Oceanic cycles of carbon, oxygen, and nutrients play a key role in linking global climate change, marine primary productivity, and ocean acidification. Fundamental concepts of marine biogeochemistry used to assess potential consequences of future climate scenarios on chemical cycling in the ocean. Past climate transitions evaluated as potential analogs for future change using select case studies of published paleoceanographic proxy records derived from corals, ice cores, and deep-sea sediments. Weekly laboratory sections and student research projects focus on creating and interpreting new geochemical paleoclimate records from marine archives and predicting future impacts of climate change and ocean acidification on marine calcifiers. (Same as: EOS 2525)

Prerequisites: Two of: EOS 1100 - 1999 or either ENVS 1102 or ENVS 1104 or ENVS 1515 and EOS 2005 (same as ENVS 2221).

Previous terms offered: Spring 2019, Spring 2017, Fall 2015.

ENVS 2253 (a, INS, MCSR) Atmospheric and Ocean Dynamics
Every Other Fall. Enrollment limit: 35.

A mathematically rigorous analysis of the motions of the atmosphere and oceans on a variety of spatial and temporal scales. Covers fluid dynamics in inertial and rotating reference frames, as well as global and local energy balance, applied to the coupled ocean-atmosphere system. (Same as: PHYS 2810, EOS 2810)

Prerequisites: PHYS 1140.

Previous terms offered: Fall 2017, Fall 2015.

ENVS 2255 (a, INS) Environmental Chemistry
Every Other Spring. Enrollment limit: 35.

Focuses on two key processes that influence human and wildlife exposure to potentially harmful substances, chemical speciation and transformation. Equilibrium principles as applied to acid-base, complexation, precipitation, and dissolution reactions are used to explore organic and inorganic compound speciation in natural and polluted waters; quantitative approaches are emphasized. Weekly laboratory sections are concerned with the detection and quantification of organic and inorganic compounds in air, water, and soils/sediments. (Same as: CHEM 2050, EOS 2325)

Prerequisites: CHEM 1092 or CHEM 1102 or CHEM 2000 - 2969 or Placement in CHEM 2000 level or Placement in CHEM 2000/1109.

Previous terms offered: Spring 2018, Spring 2016.

ENVS 2270 (a) Geomorphology: Form and Process at the Earth’s Surface
Michelle Fame.
Every Other Fall. Fall 2019. Enrollment limit: 35.

Earth’s surface is marked by the interactions of the atmosphere, water and ice, biota, tectonics, and underlying rock and soil. Even familiar landscapes beget questions on how they formed, how they might change, and how they relate to patterns at both larger and smaller scales. Examines Earth’s landscapes and the processes that shape them, with particular emphasis on rivers, hillslopes, and tectonic and climatic forcing. (Same as: EOS 2345)

Prerequisites: EOS 1105 or EOS 2005 (same as ENVS 2221) or ENVS 2221.

Previous terms offered: Fall 2018, Fall 2016.

ENVS 2281 (a, INS) Forest Ecology and Conservation
Every Other Fall. Enrollment limit: 15.

An examination of how forest ecology and the principles of silviculture inform forest ecosystem restoration and conservation. Explores ecological dynamics of forest ecosystems, the science of managing forests for tree growth and other goals, natural history and historic use of forest resources, and the state of forests today, as well as challenges and opportunities in forest restoration and conservation. Consists of lecture, discussions, field trips, and guest seminars by professionals working in the field. (Same as: BIOL 2581)

Previous terms offered: Fall 2018, Fall 2016.
ENVS 2282 (a, INS, MCSR) Ocean and Climate
Non-Standard Rotation. Enrollment limit: 18.

The ocean covers more than 70 percent of Earth's surface. It has a vast capacity to modulate variations in global heat and carbon dioxide, thereby regulating climate and ultimately life on Earth. Beginning with an investigation of paleo-climate records preserved in deep-sea sediment cores and in Antarctic and Greenland glacial ice cores, the patterns of natural climate variations are explored with the goal of understanding historic climate change observations. Predictions of polar glacial and sea ice, sea level, ocean temperatures, and ocean acidity investigated through readings and discussions of scientific literature. Weekly laboratory sessions devoted to field trips, laboratory experiments, and computer-based data analysis and modeling to provide hands-on experiences for understanding the time and space scales of processes governing oceans, climate, and ecosystems. Laboratory exercises form the basis for student research projects. Mathematics 1700 is recommended. (Same as: EOS 2585)

Prerequisites: Two of: either EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221) or either ENVS 1102 or ENVS 2221 and MATH 1600 or Placement in MATH 1700 (M) or Placement in MATH 1750 (M) or Placement in MATH 1800 (M) or Placement in 2000, 2020, 2206 (M).

Previous terms offered: Fall 2018, Fall 2017.

ENVS 2284 (a) Ecology of Rivers
Every Other Fall. Enrollment limit: 12.

Explores the ecology of river systems. Rivers are linear features through watersheds and across the landscape where ecosystem influences are reflected, focused, and transported from hilltops to coastal estuaries, and sometimes back again. Considers the role of rivers as corridors connecting a wide range of ecosystems, as indicators of broader landscape ecology, and as ecosystems in their own right with particular focus on the interaction of geomorphology, hydrology, and biology in the development and function of these dynamic and essential ecosystems. (Same as: BIOL 2284)

Prerequisites: BIOL 2315 (same as ENVS 2224) or BIOL 2316 or BIOL 2319 (same as ENVS 2229) or BIOL 2325 (same as ENVS 2225) or BIOL 2330 (same as ENVS 2233) or ENVS 2224 or ENVS 2229 or ENVS 2225 or ENVS 2233.

Previous terms offered: Fall 2017.

ENVS 2287 (a) Poles Apart: Exploration of Earth's High Latitudes
Collin Roesler.

Compares and contrasts the tectonic evolution, geography, climate, glaciers and sea ice, ocean circulation and ocean biology of the Arctic and Antarctic regions. Emphasis on the Polar Regions' role in global climate regulation and the sensitivity of these regions to climate change. In addition to scientific readings (textbook chapters and journal articles), students read exploration journals and polar biographies focused on polar exploration from the turn of the twentieth century. Fulfills the within-department elective in the EOS major. Taught in collaboration with ANTH 2572 Contemporary Arctic Environmental and Cultural Issues in fall 2019 to encourage interdisciplinary Arctic learning at the 2000-level. Students registering for both courses need only fulfill prerequisites for one of the courses; permission of instructor will override missing prerequisites. (Same as: EOS 2530)

Prerequisites: EOS 1105 or EOS 1305 (same as ENVS 1104) or EOS 1505 (same as ENVS 1102) or EOS 2005 (same as ENVS 2221).

Previous terms offered: Spring 2017.

ENVS 2301 (b, MCSR) Building Resilient Communities
Every Year. Enrollment limit: 20.

Examines efforts by communities and regions to build resilience in the face of changing environmental and social conditions. Examines how local leaders can work in complex settings to set goals and mobilize federal, private, and non-profit resources to achieve specific, cross-cutting objectives that include strengthening local economies, safeguarding important environmental values, protecting public health, and addressing issues of economic and social justice. Provides students with firsthand understanding of how Geographic Information Systems (GIS) are playing an increasingly important role in understanding and informing effective approaches for expanding resilience at a community level by integrating social and natural data to inform policy decision. Students learn GIS as part of the course.

Previous terms offered: Fall 2016, Fall 2015.

ENVS 2302 (b, MCSR) Environmental Economics and Policy
Non-Standard Rotation. Enrollment limit: 35.

An exploration of environmental degradation and public policy responses in industrial economies. Market failures, property rights, and materialistic values are investigated as causes of pollution and deteriorating ecosystem functions. Guidelines for equitable and cost-effective environmental policy are explored, with an emphasis on the roles and limitations of cost-benefit analysis and techniques for estimating non-monetary values. Three core themes are the transition from "command and control" to incentive-based policies; the evolution from piecemeal regulation to comprehensive "green plans" (as in the Netherlands); and the connections among air pollution, energy systems, and global warming. (Same as: ECON 2218)

Prerequisites: ECON 1050 or ECON 1101 or Placement in ECON 1102 or Placement in earned ECON 1101 or Placement in ECON 2000 Level.

Previous terms offered: Fall 2017, Spring 2016.
ENVS 2303 (b, MCSR) Natural Resource Economics and Policy  
Non-Standard Rotation. Enrollment limit: 35.

A study of the economic issues surrounding the existence and use of renewable natural resources (e.g., forestry/land use, fisheries, water, ecosystems, and the effectiveness of antibiotics) and exhaustible resources (such as minerals, fossil fuels, and old growth forest). A basic framework is first developed for determining economically efficient use of resources over time, then extended to consider objectives other than efficiency, as well as the distinguishing biological, ecological, physical, political, and social attributes of each resource. Uncertainty, common property, and various regulatory instruments are discussed, as well as alternatives to government intervention and/or privatization. (Same as: ECON 2228)

Prerequisites: ECON 1050 or ECON 1101 or Placement in earned ECON 1101 or Placement in ECON 2000 Level.


ENVS 2304 (b) Environmental Law and Policy  
Conrad Schneider.
Every Other Fall. Fall 2019. Enrollment limit: 35.

Critical examination of some of the most important American environmental laws and their application to environmental problems that affect the United States and the world. Students learn what the law currently requires and how it is administered by federal and state agencies, and are encouraged to examine the effectiveness of current law and consider alternative approaches. (Same as: GOV 2915)

Previous terms offered: Fall 2017, Fall 2015.

ENVS 2306 (b, IP) Comparative Environmental Politics  
Non-Standard Rotation. Enrollment limit: 35.

Examines environmental politics from a comparative perspective, drawing on case material from the United States, Europe, Latin America, Africa, and Asia. Asks why, despite the fact that many contemporary environmental problems are shared globally, states develop different environmental policies. Readings cover issues ranging from forest conservation to climate policy and consider explanatory factors such as type of political regime, level of economic development, activism by citizens, and culture and values. (Same as: GOV 2484)

Previous terms offered: Fall 2016.

ENVS 2308 (b, IP) International Environmental Policy  
Non-Standard Rotation. Enrollment limit: 35.

Examines the political, legal, and institutional dimension of international efforts to protect the environment. Problems discussed include transboundary and marine pollution, maintaining biodiversity, and global climate change. (Same as: GOV 2615)

Previous terms offered: Spring 2017, Fall 2015.

ENVS 2312 (b, ESD, IP) Contemporary Arctic Environmental and Cultural Issues  
Susan Kaplan.

Throughout the Arctic, northern peoples face major environmental changes and cultural and economic challenges. Landscapes, icescapes, and seascapes on which communities rely are being transformed, and arctic plants and animals are being affected. Many indigenous groups see these dramatic changes as endangering their health and cultural way of life. Others see a warming Arctic as an opportunity for industrial development. Addressing contemporary issues that concern northern peoples in general and Inuit in particular involves understanding connections between leadership, global environmental change, human rights, indigenous cultures, and foreign policies, and being able to work on both a global and local level. (Same as: ANTH 2572)

Prerequisites: Two of: either ANTH 1150 or ANTH 1101 or ANTH 1102 and ENVS 1101.

Previous terms offered: Fall 2016.

ENVS 2313 (b, IP) Food, Environment, and Development  
Non-Standard Rotation. Enrollment limit: 35.

Explores the nexus of food, environment, and development in global environmental politics. Examines the interconnected challenges of governing across trans-boundary socio-ecological systems amidst competing demands on scarce natural resources—to sustain a global food system, foster economic development, and promote equity and justice. Prepares students to engage with interdisciplinary scholarship from political science, international development, public policy, and food studies. Draws on comparative cases from local to global scales, with an emphasis on Maine, the U.S., and Latin America. (Same as: GOV 2482, LAS 2513)

Prerequisites: ENVS 1101 or ENVS 2330 (same as GOV 2910).

Previous terms offered: Spring 2019.

ENVS 2314 (b, ESD) Talking to Farmers and Fishermen: Social Science Field Methods for Environmental Policy Research  
Shana Starobin.
Every Fall. Fall 2019. Enrollment limit: 12.

Natural resource users—like farmers and fishermen—possess intimate knowledge of the complex socioecological systems where they live and work. How can researchers appropriately and ethically engage individual and community stakeholders as participants in environmental research? Through assignments, activities, and class excursions (lab), students will gain competence in collaborative field research skills, including the ethical conduct of research with human subjects, participant observation, conducting interviews and focus groups, writing up field notes, developing metadata, and establishing protocols for data management. Students will also practice preliminary data analysis—transcription and text analysis of field collected data, descriptive statistics, and identification of future research questions. (Same as: GOV 2902)

Prerequisites: ENVS 2330 (same as GOV 2910) or ENVS 2313 (same as GOV 2482 and LAS 2513).

Previous terms offered: Spring 2019.
ENVS 2321  Troubled Waters: Fishing in the Gulf of Maine
Non-Standard Rotation. Enrollment limit: 16.

Around the world and in the Gulf of Maine, overfishing, threats to
habitat, and climate change are putting marine ecosystems and coastal
communities under great stress. Interdisciplinary seminar draws on
oceanography, ecology, history, economics, anthropology, and political
science to explore the causes and scope of pressures on the marine
environment; the potential for restoring ecosystems, fisheries, and
coastal economies; political conflicts over fisheries and related issues;
federal, state, and community-based approaches to managing marine
ecosystems; and strategies for coping with scientific and management
uncertainties.

Previous terms offered: Spring 2019.

ENVS 2330  (b, IP) Environmental Policy and Politics
Shana Starobin.
Every Fall. Fall 2019. Enrollment limit: 35.

Explores the political, economic, legal, ethical, and institutional
dimensions of the environmental policy-making process. Examines
the formation and implementation of regulatory institutions and
policies across a range of issues in the U.S. and internationally—
including terrestrial, coastal and marine natural resources management,
biodiversity, water and air pollution, sustainable development, and
environmental justice. Prepares students to analyze historical cases as
well as contrive and evaluate competing policy alternatives to emerging
problems. (Same as: GOV 2910)

Prerequisites: ENVS 1101.

Previous terms offered: Fall 2018, Spring 2018, Fall 2017.

ENVS 2331  (b, MCSR) The Nature of Data: Introduction to
Environmental Analysis

Examines emerging digital techniques in environmental management
and analysis within government, academic and media sectors. Examines
social science methods used in environmental inquiry including text
analysis, spatial analysis, and social network analysis. Topics include
collaborative resource management, leveraging the power of social
networks, spatial analysis, social-ecological system management, the
role of volunteered information and citizen science, and expanding
capacities for adaptation and resilience. Labs as part of class time
provide students exposure to standard software programs used in social
science research including NVivo, ArcGIS, and Gephi and introduce the
basics of R as a programming language for text analysis, spatial analysis,
egotagging, and crowdsourcing. (Same as: DCS 2331)

Prerequisites: ENVS 1101 or DCS 1000 - 2969.


ENVS 2333  (a, INS, MCSR) Benthic Ecology
Olaf Ellers; Amy Johnson; Steven Allen; Brittany Jellison.
Every Fall. Fall 2019. Enrollment limit: 15.

The principles of ecology, emphasizing the hard- and soft-bottom
communities of Casco Bay and Harpswell Sound. Field trips and field
exercises demonstrate the quantitative principles of marine ecological
research, including good practices in sampling designs and field
experiments. A class field project designs and implements a long-term
study, based at the Bowdoin Marine Laboratory, to monitor and detect
changes in community structure driven by climate change in the twenty-
first century. Assumes a basic knowledge of biological statistics. Taught
in residence at the Schiller Coastal Studies Center. Benthic Ecology is a
course-module in the Bowdoin Marine Science Semester and is taught
with three other co-requisite courses. (Same as: BIOL 2333)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and MATH 1000 or
higher.

ENVS 2351  (b, MCSR) Institutional Approaches to Climate Change
Every Other Fall. Enrollment limit: 35.

How do various public and private institutions, including governments,
firms, and nonprofits, incorporate climate change into their decision-
making? Explores how and why institutions set greenhouse gas
mitigation goals, how they propose to achieve their goals, and the larger
economic and social implications of institutional climate action plans.
Further, questions how institutions at all levels are adapting or planning
to adapt to climate change. Critiques the efficacy and efficiency of
climatic action plans. Topics explored include renewable energy credit
and offset markets; energy markets; carbon markets and taxes; financing
climatic action plans; incentivizing energy efficiency and other climate-
friendly practices; technology adoption; the economics of technological
change; employee, student, and citizen activism; shareholder activism;
and corporate social responsibility. Introduction to basic economic
modeling by working with graphs, tables, and schematics. Problem sets
and written assignments used to assess learning. For a final project,
students write a climate action plan for an institution of their choice.
(Same as: ECON 2219)

Prerequisites: Two of: either ECON 1050 or ECON 1101 or Placement in
earned ECON 1101 or Placement in ECON 2000 Level and ENVS 1101.

Previous terms offered: Fall 2018.

ENVS 2377  (b, IP) Arctic Politics
Non-Standard Rotation. Enrollment limit: 35.

The Arctic looms in our political imagination as the region most
directly affected by a changing global climate that threatens the
displacement of northern communities and cultures. It is also a site of
fierce competition for state control and economic development. This
course investigates the Arctic as a political space that encapsulates
elements of comparative politics and international relations. It examines
cross-national variation in policies toward Arctic regions in states
such as the United States, Canada, Russia, Iceland, and Norway. It also
explores dynamic international engagement around the Arctic by state
officials, corporations, indigenous communities, and activists. The course
will address governance issues such as indigenous rights, economic
development and natural resource exploitation, environmental issues and
climate change, the potential militarization of the region, international
law, and the role of the Arctic Council. (Same as: GOV 2577)

Previous terms offered: Spring 2019.
ENVS 2403 (c, ESD) Environment and Culture in North American History
Every Spring. Enrollment limit: 35.

Explores relationships between ideas of nature, human transformations of the environment, and the effect of the physical environment upon humans through time in North America. Topics include the "Columbian exchange" and colonialism; links between ecological change and race, class, and gender relations; the role of science and technology; literary and artistic perspectives of "nature"; agriculture, industrialization, and urbanization; and the rise of modern environmentalism. Note: This course is part of the following field(s) of study: United States. (Same as: HIST 2182)

Prerequisites: ENVS 1101.


ENVS 2416 (c, ESD) California Dreamin': A History of the Golden State
Non-Standard Rotation. Enrollment limit: 16.

Seminar. Sunshine, beaches, shopping malls, and movie stars are the popular stereotypes of California, but social conflicts and environmental degradation have long tarnished the state's golden image. Unravels the myth of the California dream by examining the state's social and environmental history from the end of Mexican rule and the discovery of gold in 1848 to the early twenty-first century. Major topics include immigration and racial violence; radical and conservative politics; extractive and high-tech industries; environmental disasters; urban, suburban, and rural divides; and California in American popular culture. This course is part of the following field(s) of study: United States. (Same as: HIST 2640)

Previous terms offered: Spring 2017.

ENVS 2420 (c) The History of Energy
Non-Standard Rotation. Enrollment limit: 35.

Explores how and why Americans (and others) have made the energy choices that they have. The production and distribution of energy is one of the key challenges for modern societies. It involves the development of specific technologies and industries- from fossil fuels to solar power to nuclear plants. But the history of energy transcends the technical. It intersects with law, politics, and economics; social norms and cultural values play a role as well. The connections between the technical and non-technical are central to understanding both the history of energy itself, as well as its place in the history of the modern Unites States. This course is part of the following field(s) of study: United States. (Same as: HIST 2202)

Previous terms offered: Spring 2017.

ENVS 2423 (c) Telling Environmental Stories
Non-Standard Rotation. Enrollment limit: 12.

Intended for students with a demonstrated interest in environmental studies as an introduction to several modes of storytelling, which communicate ideas, historical narratives, personal experiences, and scientific and social issues in this increasingly important area of study and concern. Explores various techniques, challenges, and pleasures of storytelling, and examines some of the demands and responsibilities involved in the conveyance of different types of information with clarity and accuracy in nonfiction narrative. Engages student writing through the workshop method, and includes study of several texts, including "The Control of Nature," "Cadillac Desert," "Living Downstream," and "Field Notes from a Catastrophe." Note: Fulfills the creative writing concentration requirement for English majors. (Same as: ENGL 2854)

Previous terms offered: Fall 2018, Fall 2016.

ENVS 2425 (c, ESD, IP) Natives, Borderlands, and Empires in Early North America
Non-Standard Rotation. Enrollment limit: 35.

Survey of the making of North America from initial contact between Europeans and Africans and Native Americans to the creation of the continent’s three largest nations by the mid-nineteenth century: Canada, Mexico, and the United States. Topics include the history of native populations before and after contact; geopolitical and imperial rivalries that propelled European conquests of the Americas; evolution of free and coerced labor systems; environmental transformations of the continent’s diverse landscapes and peoples; formation of colonial settler societies; and the emergence of distinct national identities and cultures in former European colonies. Students write several papers and engage in weekly discussion based upon primary and secondary documents, art, literature, and material culture. Note: This course is part of the following field(s) of study: United States, Atlantic Worlds, Colonial Worlds, and Latin America. (Same as: HIST 2180, LAS 2180)

Previous terms offered: Spring 2016.

ENVS 2431 (c, VPA) Modern Architecture: 1750 to 2000
Non-Standard Rotation. Enrollment limit: 35.

Examines major buildings, architects, architectural theories, and debates during the modern period, with a strong emphasis on Europe through 1900, and both the United States and Europe in the twentieth century. Central issues of concern include architecture as an important carrier of historical, social, and political meaning; changing ideas of history and progress in built form; and the varied architectural responses to industrialization. Attempts to develop students’ visual acuity and ability to interpret architectural form while exploring these and other issues. (Same as: ARTH 2430)

Previous terms offered: Fall 2018, Spring 2016.
ENVS 2432 (c, ESD)  History of the American West
Non-Standard Rotation. Enrollment limit: 35.

Survey of what came to be called the Western United States from the nineteenth century to the present. Topics include Euro-American relations with Native Americans; the expansion and growth of the federal government into the West; the exploitation of natural resources; the creation of borders and national identities; race, class, and gender relations; the influence of immigration and emigration; violence and criminality; cities and suburbs; and the enduring persistence of Western myths in American culture. Students write several papers and engage in weekly discussion based upon primary and secondary documents, art, literature, and film. This course is part of the following field(s) of study: United States. (Same as: HIST 2160)

Previous terms offered: Fall 2016.

ENVS 2438 (c)  Natural Supernaturalism
David Collings.

Examines the Romantic attempt to blend aspects of the transcendental – such as the sublime, immortality, and divinity – with ordinary life, the forms of nature, and the resources of human consciousness. Discusses theories of the sublime, poetry of the English landscape, mountaintop experiences, tales of transfiguration, and evocations of intimacy with nature. Explores the difficulties of representing the transcendental in secular poetry and the consequences of natural supernaturalism for our own understanding of nature. Authors include Burke, Wordsworth, Coleridge, Kant, and Shelley. (Same as: ENGL 2352)

Previous terms offered: Spring 2018.

ENVS 2444 (c)  City, Anti-City, and Utopia: Building Urban America
Non-Standard Rotation. Enrollment limit: 35.

Examines the cultural and political history of the American frontier from the nineteenth century through the present. What is it about the American wilderness that has so fascinated artists through the centuries? Why does the American frontier play such an important role in the nation's cultural history, even in the twentieth and twenty-first centuries? Explores literary representations of space, the intersections between literature and geopolitics, and environmental literary criticism. Includes texts by Henry David Thoreau, Ralph Waldo Emerson, Willa Cather, Gary Snyder, Cormac McCarthy, and Toni Morrison and films by John Ford and Quentin Tarantino. Note: Fulfills the literature of the Americas requirement for English majors. (Same as: ENGL 2546)

Previous terms offered: Fall 2015.

ENVS 2447 (c)  American Frontiers
Non-Standard Rotation. Enrollment limit: 35.

Examines the cultural and political history of the American frontier from the nineteenth century through the present. What is it about the American wilderness that has so fascinated artists through the centuries? Why does the American frontier play such an important role in the nation's cultural history, even in the twentieth and twenty-first centuries? Explores literary representations of space, the intersections between literature and geopolitics, and environmental literary criticism. Includes texts by Henry David Thoreau, Ralph Waldo Emerson, Willa Cather, Gary Snyder, Cormac McCarthy, and Toni Morrison and films by John Ford and Quentin Tarantino. Note: Fulfills the literature of the Americas requirement for English majors. (Same as: ENGL 2546)

Previous terms offered: Fall 2016.

ENVS 2448 (c)  History of Harpswell and the Coast of Maine
Olaf Ellers; Amy Johnson; Sarah McMahon; Steven Allen; Brittany Jellison.

Examines the long history of Harpswell as part of the coast of Maine, and the research methodologies used to uncover and analyze that history from environmental, community, socioeconomic, political, racial and ethnic, and cultural perspectives. Topics include bonds and tensions in a peninsula and islands community; coastal agriculture and stone walls; inshore and deep-sea fisheries; shipbuilding and shipping; the Civil War; ethnic, religious, and cultural diversity; poverty and living on the margin; and the rise of tourism. Culminates with an individual research project prospectus for a projected essay on an aspect of that history. Taught in residence at the Schiller Coastal Studies Center. History 2129/Environmental Studies 2449 is a course-module in the Bowdoin Marine Science Semester. Harpswell and Maine Coast History is a course-module in the Bowdoin Marine Science Semester and is taught with three other co-requisite courses. Note: This course is part of the following field(s) of study: United States. (Same as: HIST 2607)

Previous terms offered: Spring 2019, Spring 2016.

ENVS 2449 (c)  History of Harpswell and the Coast of Maine
Olaf Ellers; Amy Johnson; Sarah McMahon; Steven Allen; Brittany Jellison.

Examines the long history of Harpswell as part of the coast of Maine, and the research methodologies used to uncover and analyze that history from environmental, community, socioeconomic, political, racial and ethnic, and cultural perspectives. Topics include bonds and tensions in a peninsula and islands community; coastal agriculture and stone walls; inshore and deep-sea fisheries; shipbuilding and shipping; the Civil War; ethnic, religious, and cultural diversity; poverty and living on the margin; and the rise of tourism. Culminates with an individual research project prospectus for a projected essay on an aspect of that history. Taught in residence at the Schiller Coastal Studies Center. History 2129/Environmental Studies 2449 is a course-module in the Bowdoin Marine Science Semester. Harpswell and Maine Coast History is a course-module in the Bowdoin Marine Science Semester and is taught with three other co-requisite courses. Note: This course is part of the following field(s) of study: United States. (Same as: HIST 2129)

Previous terms offered: Fall 2017.
ENVS 2451  Religion and Ecofeminism in India and Sri Lanka
Every Other Fall. Enrollment limit: 35.  .5 Credit

Focuses on environmental predicaments faced by disadvantaged people (especially rural women and the agrarian and tribal poor) in contemporary India and Sri Lanka. Students read and discuss case studies that illustrate how various Hindu and Buddhist religious concepts, as well as various political discourses about nationhood, have been deployed by various actors (government, business, political organizations, environmental activists, and the disadvantaged themselves) in order to legitimate or critique the exploitation and alienation of natural resources (rivers, forests, and farm lands). Students write three short essays aimed at gaining an understanding of how issues germane to environmental degradation, economic development, and eco-feminism are understood specifically within contemporary South Asian social, cultural, and political contexts. This one-half credit course meets from September 2 thru October 26. (Same as: ASNS 2651, GSWS 2300, REL 2284)

Previous terms offered: Fall 2015.

ENVS 2452  (c, ESD)  Placing Modernity
Non-Standard Rotation. Enrollment limit: 35.

From Thoreau’s cabin at Walden Pond to Annie Dillard’s life at Tinker Creek, American literature has situated questions of national identity and environmental ethics in relation to an individual’s intimacy with place. Focusing primarily on twentieth- and twenty-first–century literature, examines how experiences of human and non-human displacement at the heart of modernity reflect on the tradition of place-based writing. Explores how exile, migration, and other modes of dislocation impact literary representations of place, and how literature can make sensible the unequal distribution of environmental waste. Significant emphasis placed on environmental justice perspectives and the experience of dislocated peoples. Authors may include Gloria Anzaldúa, Rachel Carson, Teju Cole, Leslie Marmon Silko, and WC Williams. (Same as: ENGL 2552)

Previous terms offered: Fall 2017.

ENVS 2459  (c)  The Ethics of Climate Change
Non-Standard Rotation. Enrollment limit: 35.

Examines moral questions raised by climate change including: What would constitute a just allocation of burdens? What do we collectively owe to future generations? If collective action fails, what are our obligations as individuals? When, if at all, is civil disobedience justified? Readings drawn primarily from contemporary philosophy. (Same as: PHIL 2359)


ENVS 2460  (c, IP)  Nature and the Environment in Russian Culture
Non-Standard Rotation. Enrollment limit: 35.

Introduces students to major works of Russian/Soviet/post-Soviet literature (by authors such as Pushkin, Turgenev, Chekhov, Solzhenitsyn, Alexievich, and others), supplemented by films and visual art, within the thematic context of a focus on nature and the environment in the Russian geographic and cultural space. Topics include the role of nature in the Russian Romantic sublime; artistic constructions of the exotic in Russia’s borderlands (Georgia, Mongolia); representations of the peasant village; feminization of the land and related metaphors of violent conquest; testimonials to the instrumentalization of nature (St. Petersburg, Belomor Canal, Gulag); and the cultural legacy of environmental decay and disaster (pollution, Chernobyl). (Same as: RUS 2447)

Previous terms offered: Fall 2018.

ENVS 2470  (c, VPA)  The Bauhaus and its Legacy: Designing the Modern World

The centennial of the Bauhaus—the school of modern design opened in 1919 in Weimar, Germany, and closed by the Nazis in 1933—is being celebrated around the world. More than just a school, the Bauhaus gave modernity a distinct physical form by connecting art to nature and industry in new ways. The Bauhaus also advanced the radical notion that modern design had a key social role to play: to improve the lives of all people. The course investigates the social mission, arts, vibrant way of life, and prominent figures at the Bauhaus, many leaders in fields of modern architecture, urbanism, and the arts of design. The course also explores the Bauhaus legacy that flourished throughout the twentieth century, focusing on US and Europe. The Bauhaus changed the world and even today we feel its impact, in the smallest of objects, our built environments, and the cities in which we live. Students will work closely with the Bauhaus exhibition that opens March 1, 2019, at the Bowdoin College Museum of Art and will carry out their own research projects. (Same as: ARTH 2470)

Previous terms offered: Spring 2019.

ENVS 2475  (c, IP, VPA)  Ecocinema: China’s Ecological and Environmental Crisis
Shu-chin Tsui.
Every Other Spring. Fall 2019. Enrollment limit: 35.

Examines how China’s economic development has caused massive destruction to the natural world and how environmental degradation affects the lives of ordinary people. An ecological and environmental catastrophe unfolds through the camera lens in feature films and documentaries. Central topics include the interactions between urbanization and migration, humans and animals, eco-aesthetics and manufactured landscapes, local communities and globalization. Considers how cinema, as mass media and visual medium, provides ecocritical perspectives that influence ways of seeing the built environment. The connections between cinema and environmental studies enable students to explore across disciplinary as well as national boundaries. Note: Fulfills the non-US cinema requirement and the film theory requirement for cinema studies minors. (Same as: ASNS 2075, CINE 2075)

Previous terms offered: Spring 2017.
ENVS 2491 (c, IP) East Asian Environmental History, 1600-2000
Every Other Spring. Enrollment limit: 16.

Seminar. The Anthropocene defines an epoch in which humans have become the dominant force in shaping their environment. Examines the role of East Asia in the emergence of this new era, from the seventeenth century to the present. In debating the narrative of ecological change in China, Japan, and Korea, readings and discussions focus on how successive regimes transformed their environments, and conversely, how those environments also structured modern human society. Questions what specific political, social, and economic changes triggered the Anthropocene in East Asia; how cultural, religious, and intellectual constructs have conditioned its arrival and acceleration. Weekly topics include: commodity frontiers, environmental sustainability, public health, industrial pollution, and nuclear technology. Note: This course is part of the following field(s) of study: East Asia. It fulfills the non euro/us requirement for history majors and minors. (Same as: HIST 2891, ASNS 2890)

Previous terms offered: Spring 2018, Spring 2016.

ENVS 2504 (c) Animals in American History
Every Other Year. Enrollment limit: 16.

Seminar. Although modern humans tend to think of themselves as above nature, they are in fact part of it: partners in a myriad of relationships that have tied them to other members of the animal kingdom throughout their history. Examines a number of these relationships, focusing on North America from the sixteenth through the twentieth century. Topics considered include the role of animals in the development of the American economy, how domestic and wild animals have shaped the American environment, how Americans have conceived of the boundary between humanity and animality, and how pets have come to be viewed as part of the modern family. Note: This course is part of the following field(s) of study: United States. (Same as: HIST 2504)

Previous terms offered: Spring 2018.

ENVS 2548 (c) American Wilderness
Non-Standard Rotation. Enrollment limit: 35.

Examines changing American attitudes towards the environment through the specific lens of wilderness literature from first encounters with the American wilderness by European colonialists to the current period, which some scientists call the sixth mass extinction. Topics include the mastery of nature; myths of natural plenitude and natural scarcity; the relationship of wilderness to nature and civilization; race, gender, and wilderness; and the end of nature. Devotes attention to queer, feminist, and of color interventions, from the outright rejection of wilderness to the cultivation of alternative wilderness traditions such as feminist/queer pastoral and African American georgic. Texts may include literary works by Mary Rowlandson, Henry David Thoreau, Ralph Waldo Emerson, Frederick Douglass, T.S. Eliot, Ezra Pound, Jean Toomer, Gary Snyder, and Octavia Butler, as well as visual/multimedia works by Jacob Riis, Ang Lee, Werner Herzog, and Maya Lin. (Same as: ENGL 2548, GSWS 2548)

Previous terms offered: Fall 2016.

ENVS 2802 (c) Writing about the Coastal Environment
Non-Standard Rotation. Enrollment limit: 12.

A creative writing course whose subject is environmental science. Students spend a month in a concentrated writing program involving intensive reading and composition. The reading emphasizes the work of science journalists and of scientists writing for lay publications. Analyzes the readings to explore what makes a worthy (or flawed) translation of complicated science concepts into layman’s language. Considerations of accuracy, complexity, readability, and style are applied directly to students’ writing projects, which include daily blog posts, short assignments, and a longer opus requiring more extensive research and reporting whose final form incorporates all aspects of long-form science writing. Writing assignments are designed to help students bridge between their scientific research and the larger public world that their research involves and affects. To that end, stories may dovetail with lab work students have been pursuing during the semester. Taught in residence at the Bowdoin Marine Studies Center. English 2802/Environmental Studies 2802 is a course-module in the Bowdoin Marine Science Semester. Biology 2501 (same as Environmental Studies 2231), Biology 2330 (same as Environmental Studies 2233), and Biology 2232 (same as Environmental Studies 2232) are co-requisites of this course. (Same as: ENGL 2802)

Previous terms offered: Fall 2016, Fall 2015.

ENVS 2804 (c) Maine Writers and the Environment
Non-Standard Rotation. Enrollment limit: 12.

Explores the wild and diverse literary territories of the state of Maine -- past and present -- with a focus on coastal narratives and environmental writing. Considers Maine's multi-ethnic folkways, its austere modernisms, remorseless gothic landscapes, natural splendors and antagonisms, coastal rhapsodies and adversities, and contemporary environmental imperatives. Includes poetry, short stories, novels, memoirs, personal narratives, children's literature, nature writing, and environmental advocacy by such writers as Thoreau, Jewett, Robinson, Millay, Beston, Carson, Mccloskey, King, Russo, Stout, and Bryan. Taught in residence at the Bowdoin College Schiller Coastal Studies Center. English 2804/Environmental Studies 2804 is a course-module in the Bowdoin Marine Science Semester. Biology 2232 (same as Environmental Studies 2232), Biology 2330 (same as Environmental Studies 2233), and Biology 2501 (same as Environmental Studies 2231) are co-requisites of this course. (Same as: ENGL 2804)

Previous terms offered: Fall 2018.

ENVS 3280 (a, INS) Plant Responses to the Environment
Non-Standard Rotation. Enrollment limit: 16.

Plants can be found growing under remarkably stressful conditions. Even your own backyard poses challenges to plant growth and reproduction. Survival is possible only because of a diverse suite of elegant physiological and morphological adaptations. The physiological ecology of plants from extreme habitats (e.g., tundra, desert, hypersaline) is discussed, along with the responses of plants to environmental factors such as light and temperature. Readings from the primary literature facilitate class discussion. Excursions into the field and laboratory exercises complement class material. (Same as: BIOL 3280)

Prerequisites: BIOL 2210 (same as ENVS 2223) or BIOL 2325 (same as ENVS 2225) or ENVS 2223 or ENVS 2225.

Previous terms offered: Spring 2018.
**ENVS 3308 (a, INS) Research in Ecology, Evolution, and Marine Biology**

Every Spring. Enrollment limit: 16.

Focuses on research methods in field biology, reading the primary literature, and training in scientific writing and presentation, careers in ecology, and next steps to pursuing those careers. Prepares students for productive future research experiences in areas of ecology, marine biology, animal behavior, and evolution. Students will focus on a research topic of their interest, for which they will read the primary literature, design experiments, produce a draft of a scientific paper, deepen their understanding of statistics and present their proposed research. Includes field excursions to marine and terrestrial environments. (Same as: BIOL 3308)

Prerequisites: Two of: either BIOL 1102 or BIOL 1109 and either BIOL 2315 (same as ENVS 2224) or BIOL 2316 or BIOL 2319 (same as ENVS 2229) or BIOL 2325 (same as ENVS 2225) or BIOL 2330 (same as ENVS 2223) or BIOL 2210 (same as ENVS 2222).

Previous terms offered: Spring 2019, Spring 2018.

**ENVS 3391 (c, IP) Mapping Germany: Nature and Knowledge**

Non-Standard Rotation. Enrollment limit: 16.

Considers how German terrain and culture were mapped or charted through representations of nature and the wilderness in a diverse range of texts. Examinations of discourses about nature and landscape reveal how Germany constitutes itself as a nation with a particular relationship to the environment. A comparison of Austrian, German, and Swiss novels, short stories, films, and artworks emphasize the varied but powerful place of nature in the German imagination. Possible works, among others, by Kant, Goethe, Humboldt, Fanck, Ransmayr, Kehlmann, Jelinek, Richter. All materials and coursework in German. (Same as: GER 3391)

Prerequisites: GER 2204 - 2969 or GER 3000 or higher or Placement in GER 3000 level.

Previous terms offered: Spring 2016.

**ENVS 3902 (a) Earth Climate History**

Every Spring. Enrollment limit: 16.

The modern world is experiencing rapid climate warming and some parts extreme drought, which will have dramatic impacts on ecosystems and human societies. How do contemporary warming and aridity compare to past changes in climate over the last billion years? Are modern changes human-caused or part of the natural variability in the climate system? What effects did past changes have on global ecosystems and human societies? Students use environmental records from rocks, soils, ocean cores, ice cores, lake cores, fossil plants, and tree rings to assemble proxies of past changes in climate, atmospheric CO2, and disturbance to examine several issues: long-term carbon cycling and climate, major extinction events, the rise of C4 photosynthesis and the evolution of grazing mammals, orbital forcing and glacial cycles, glacial refugia and post-glacial species migrations, climate change and the rise and collapse of human civilizations, climate/overkill hypothesis of Pleistocene megafauna, climate variability, drought cycles, climate change impacts on disturbances (fire and hurricanes), and determining natural variability versus human-caused climate change. (Same as: EOS 3020)

Prerequisites: EOS 2005 (same as ENVS 2221) or ENVS 2221.


**ENVS 3905 (a, INS) Environmental Fate of Organic Chemicals**

Non-Standard Rotation. Enrollment limit: 16.

More than 100,000 synthetic chemicals are currently in daily use. In order to determine the risk posed to humans and ecosystems, the extent and routes of chemical exposure must be understood and anticipated. Addresses the fate of organic chemicals following their intentional or unintentional release into the environment. Why do these chemicals either persist or break down, and how are they distributed between surface water, ground water, soil, sediments, biota, and air? Analysis of chemical structure used to gain insight into molecular interactions that determine the various chemical transfer and transformation processes, while emphasizing the quantitative description of these processes. (Same as: CHEM 3050)

Prerequisites: CHEM 2250.

Previous terms offered: Fall 2015.

**ENVS 3907 (b, IP) Food, Environment, and Development**

Every Spring. Enrollment limit: 16.

Examines the complex socio-economic and ecological challenges in the global governance of food and agriculture. Drawing on literature in political science, environmental politics, and public policy, students wrestle with key questions central to the study of the competing yet interconnected issues of food production, environmental protection, and economic development, such as: the seeming trade-offs between feeding the world and saving the planet; the socio-ecological dimensions of agricultural biotechnology (i.e., genetically modified plants and animals); and the governance of global value chains for food and natural resources. (Same as: GOV 3902)

Prerequisites: Two of: either ENVS 2330 (same as GOV 2910) or ENVS 2403 (same as HIST 2182) or ENVS 2302 or ENVS 2304 (same as GOV 2915) or GOV 2910 or HIST 2182 and ENVS 1101.

Previous terms offered: Spring 2018.

**ENVS 3908 (b, IP) Private Actors, Public Goods: Corporate Social Responsibility (CSR) in Comparative Perspective**

Every Year. Enrollment limit: 16.

From fair trade chocolate to Kimberly Process certified diamonds, voluntary sustainability initiatives increasingly “govern” complex trans-border trade -- to minimize environmental damages and human rights abuses exacerbated by globalization, especially when states prove incapable or unwilling to do so. Intensive in reading, research, and discussion, adopts a commodity-centered lens to examine transnational trade in comparative perspective. Students explore how global value chains -- like “fast fashion” from Bangladesh and cell phones from China -- defy conventional notions of political, geographic, and ecological boundaries and prompt a shift from “government” to “governance.” (Same as: GOV 3430)

Prerequisites: Two of: either ENVS 2302 or ENVS 2304 (same as GOV 2915) or ENVS 2330 (same as GOV 2910) or ENVS 2403 (same as HIST 2182) or GOV 2300 - 2599 and ENVS 1101.

Previous terms offered: Fall 2018.
ENVS 3909  (b, MCSR)  Building Resilient Communities  
Non-Standard Rotation. Enrollment limit: 16.

Explores approaches by communities and regions to build resilience in the face of changing environmental and social conditions. Examines the ways communities establish policies and collaborate with state, federal, private and nonprofit sectors towards strengthening local economies, safeguarding environmental values, protecting public health, addressing issues of economic and social justice, and implementing mitigation and adaptation strategies. Examines the role of big data in informing goal setting and measuring outcomes. Provides students with firsthand understanding of how digital and computational technologies including Geographic Information Systems (GIS) are playing an increasingly important role in understanding and informing effective approaches for expanding resilience at a community level to inform policy decision. Students learn GIS as part of the course. (Same as: DCS 3040)

Prerequisites: ENVS 1101.

Previous terms offered: Spring 2019.

ENVS 3918  (b)  Environmental and Natural Resource Economics  
Guillermo Herrera.  

Seminar. Analysis of externalities and market failure; models of optimum control of pollution and efficient management of the renewable and nonrenewable natural resources such as fisheries, forests, and minerals; governmental vs. other forms of control of common-pool resources; and benefit-cost analysis of policies, including market-based and non-market valuation. Permission of instructor required during add/drop for students who have credit for Economics 2218. (Same as: ECON 3518)

Prerequisites: Two of: ECON 2555 and ECON 2557.

Previous terms offered: Fall 2017, Spring 2016.

ENVS 3921  (b)  The Economics of Land Use, Ecosystem Services, and Biodiversity  
Non-Standard Rotation. Enrollment limit: 18.

Seminar. Analysis of the economic forces that shape land-use patterns, the relationship between land-use patterns and ecosystem service provision and biodiversity persistence, and the economic value of ecosystem service provision. Investigates methods for increasing ecosystem service values on the landscape and the economic cost of these methods. Analysis of land-use externalities and the failure of land-use patterns to generate maximum societal net benefits; neoclassical economic theory on land-use; methods for estimating market value of land; methods of non-market valuation; efficient land-use patterns from a societal perspective; methods for finding efficient land-use patterns; and governmental and non-governmental organization land conservation programs. Permission of instructor required during add/drop for all students; required at all times for students who have credit for Economics 2218 (same as Environmental Studies 2302) or 2228 (same as Environmental Studies 2228). (Same as: ECON 3521)

Prerequisites: Three of: either ECON 1050 or ECON 1101 or Placement in earned ECON 1101 or Placement in ECON 2000 Level and ECON 1102 or Placement in earned ECON 1102 or Placement in ECON 2000 Level and MATH 1600 or higher or Placement in MATH 1700 (M) or Placement in MATH 1750 (M) or Placement in MATH 1800 (M) or Placement in 2000, 2020, 2206 (M).

Previous terms offered: Spring 2019, Fall 2016, Fall 2015.

ENVS 3930  (a, INS)  Ecotoxicology  
Every Other Spring. Enrollment limit: 15.

Chemical exposure can strongly impact both ecological communities and human health, often in complex and unexpected ways. Examines pollution impacts on biological systems at the organismal, population, and community levels. Readings and class discussions focus on the value and limitations of traditionally conducted toxicity tests as well as emerging research areas, including evolutionary ecotoxicology and the potential synergy of multiple environmental stressors. A research paper based on primary and secondary sources explores the impacts of a specific chemical and how society might use available (often limited) data to protect ecological and human health from risks of exposure. Two field excursions outside of regular class meetings complement class discussions. (Same as: BIOL 3309)

Prerequisites: BIOL 2000 - 2969 or CHEM 2000 - 2969 or EOS 2000 - 2969 or ENVS 2201 (same as BIOL 1158 and CHEM 1105).

Previous terms offered: Spring 2019.

ENVS 3938  (c, ESD)  Consumed: The Nature of Consumerism  
Non-Standard Rotation. Enrollment limit: 16.

Explores connections between consumerism and the environment in North America and internationally. Analyzes the evolution of consumerism from the sixteenth century to the present, the material effects of consumers upon nearby and distant locales, and the social and cultural conflicts entailed in consumption across from the local to the global. Topics include relationships between producers and consumers, transformations to industries like mining or fishing, the rise of the leisure and outdoor recreation, industrialization and its discontents, the natural food and health movements, shopping and mass consumption, and the paradoxes of modern environmentalism and consumerism. Writing-intensive, including several short papers and a longer project based on original archival and/or field research.

Prerequisites: Two of: ENVS 1101 and ENVS 2403 (same as HIST 2182) or HIST 2182.

Previous terms offered: Fall 2016.

ENVS 3963  (b, IP)  Advanced Seminar in International Relations: Law, Politics, and the Search for Justice  
Non-Standard Rotation. Enrollment limit: 15.

Examines the complex relationship between law and policy in international relations by focusing on two important and rapidly developing areas of international concern: environmental protection and humanitarian rights. Fulfills the environmental studies senior seminar requirement. (Same as: GOV 3610)

ENVS 3980 (c) The Nature of Health in the United States and the World
Non-Standard Rotation. Enrollment limit: 16.

Explores relationships between humans, environment, and health in the United States and North America in their global context from the sixteenth century to the present day. Overall focus is on how the history of health and the environment in the US connects to global and transnational history. Topics may include the evolution of public health interventions, biomedical research, and clinical practice; folk remedies and popular understandings of health; infectious and chronic diseases; links between landscape, health, and inequality; gender and reproductive health; occupational health and safety; the effects of agriculture, industrialization, and urbanization on human and ecological health; state and federal policies in the United States; and the colonial and transnational dimensions of public health and medicine. Students write a major research paper based on primary sources. Environmental Studies 1101, 2403, and at least one history course numbered 2000-2969 recommended. Note: This course is part of the following field(s) of study: United States. (Same as: HIST 3180)

Previous terms offered: Fall 2018, Spring 2017.

ENVS 3982 (c) The Beach: Nature and Culture at the Edge
Non-Standard Rotation. Enrollment limit: 16.

Examines the development of the North American coastline, a place of dynamic environmental transformations and human interactions. Students consider physical changes on the coast, the coast as a zone for economic development and social conflict, and shifting perceptions of the shoreline. Topics may include: fisheries and whaling, conservation and political management, environmental disasters, resource extraction, industrialization and urbanization, tourism, beach and surfer culture, climate change and sea-level rise; and representations of the beach in art, literature, photography, film, and music. Students write a major research paper based on primary and secondary sources.

Prerequisites: ENVS 1101.

Previous terms offered: Fall 2017.

ENVS 3994 (a) Ecological Recovery in Maine's Coastal Ecosystem
Non-Standard Rotation. Enrollment limit: 15.

Maine's coastal ecosystems once supported prodigious abundances of wildlife that benefitted human communities for millennia before succumbing to multiple stresses during the industrial era. Today, it is possible to restore ecosystem structure and functionality for the benefit of wildlife and to regain some of the original ecological services for human benefit. Students examine Maine's coastal ecosystems as socioecological systems and apply ecological principles to understand how society could promote ecological recovery and maintain resilient ecosystems and ecosystem services over the long term. Interdisciplinary seminar with focus on ecology and environmental history. (Same as: BIOL 3394)

Prerequisites: ENVS 2201 (same as BIOL 1158 and CHEM 1105) or BIOL 1158 or CHEM 1105 or BIOL 2000 - 2969 or BIOL 3000 or higher or CHEM 2000 - 2969 or CHEM 3000 or higher or EOS 2000 - 2969 or EOS 3000 or higher or PHYS 2000 - 2969 or PHYS 3000 or higher.