

ENVIRONMENTAL SCIENCES

Program Director: Mary Ann Vinton

Program Office: Hixson-Lied Science Building, Room 438 and Creighton Hall 110

The Environmental Science Program approaches environmental issues from a strong natural science perspective yet transcends disciplinary boundaries and prepares students to analyze and solve complex problems with scientific, societal and ethical dimensions. The program is interdepartmental, with 19 faculty from eight departments: Biology, Chemistry, Communication Studies, Cultural and Social Studies, History, Philosophy, Physics and Political Science.

The major produces well-rounded scientists with the background and skills necessary to enter graduate degree programs or gain employment in diverse environmental careers such as conservation biology, natural resource management, environmental education, urban planning, law, public health, and environmental health and medicine. Students who major in Environmental Science take core courses in biology, chemistry, atmospheric science and sociology and then specialize in one of three tracks:

1. Global Environmental Systems which explores ecological and climatological aspects of the integrated earth system
2. Organismal/Population Ecology which emphasizes biological aspects of the environment and
3. Environmental Policy and Society which addresses historical, political and sociological aspects of environmental issues.

How to Become an Environmental Science Major

Students may apply to become EVS majors after successful completion of EVS 113 (Introduction to Atmospheric Science) or BIO 201 (General Biology: Organismal and Population) or CHM 203 and 204 (General Chemistry I, Lecture and Lab). The application is online through the College of Arts and Sciences web site. Students may declare a preference for a particular faculty member as an academic advisor.

Environmental Science Minors

The Environmental Science Program offers two minors. Both minors are composed of 18 hours. The Environmental Science minor contains a survey of courses in the atmospheric/physical sciences, biology and social sciences. The Environmental Policy Minor is composed of one natural science course and several required courses in political science/policy, ethics and sociology. For specific course requirements, click on the "Minors" tab above.

Faculty

Professors: Theodore Burk, Erin Gross, John Schalles, William Stephens

Associate Professors: Alistair Cullum, Carol Fassbinder-Orth, James (Jay) Leighter, Anne Ozar, Graham Ramsden, Samantha Senda-Cook, Mackenzie Taylor, Mary Ann Vinton

Assistant Professors: Pierce Greenberg, Gabriel Rivera, Fr. John Shea, Adam Sundberg, William (Ryan) Wishart, Amy Worthington

Emeriti Professors: Robert Belknap, Arthur Douglas, Charles Harper, James Platz

Emerita Associate Professor: Jane Roberts

Specific Requirements for Admission to the Environmental Science Major

- Successful completion of EVS 113 Introduction To Atmospheric Sciences or BIO 201 General Biology: Organismal and Population or CHM 203 General Chemistry I and CHM 204 General Chemistry I Laboratory.

Majors in Environmental Sciences

- B.S. Evs., Environmental Science: Global and Environmental Systems Track (<http://catalog.creighton.edu/undergraduate/arts-sciences/environmental-sciences/environmental-science-global-environmental-systems-bsevs/>)
- B.S. Evs., Environmental Science: Organismal/Population Ecology Track (<http://catalog.creighton.edu/undergraduate/arts-sciences/environmental-sciences/environmental-science-organismal-population-ecology-bsevs/>)
- B.S. Evs., Environmental Science: Environmental Policy and Society Track (<http://catalog.creighton.edu/undergraduate/arts-sciences/environmental-sciences/environmental-science-environmental-policy-society-bsevs/>)

Minors in Environmental Sciences

- Environmental Science Minor (<http://catalog.creighton.edu/undergraduate/arts-sciences/environmental-sciences/environmental-science-minor/>)
- Environmental Policy Minor (<http://catalog.creighton.edu/undergraduate/arts-sciences/environmental-sciences/environmental-policy-minor/>)

Courses

EVS 105. The Science of Climate Change. 2 credits. (Same as ATS 105)

Introduction to the causes of climate change and how researchers use scientific tools to understand the climate system. Topics include the physics of climate, historical observation systems, numerical climate simulation, sources of error and uncertainty, and possible consequences of action and inaction.

EVS 113. Introduction To Atmospheric Sciences. 3 credits. FA, SP, SU (Same as ATS 113)

Introduction to causes of the weather for science and nonscience majors. Topics covered include cloud identification, factors influencing the development of storm systems; effects of jet streams on storm development; the formation of thunderstorms, tornadoes, and hurricanes; climatic change and human influence on climate and weather systems. P. One Magis Core Understanding Natural Science course.

EVS 114. Introduction To Atmospheric Sciences Laboratory. 1 credit. FA, SP, SU (Same as ATS 114)

Laboratory designed to familiarize students with analysis techniques in meteorology. Topics include weather observations; weather symbols and coding; map plotting and analysis; and basic forecasting techniques. Students will become familiar with the PCMcIDAS system. Accessing climate and forecast data from the internet is emphasized in select laboratory models. P. One Magis Core Understanding Natural Science course. CO: EVS 113.

EVS 201. Introduction to Environmental Sciences. 3 credits. SP

This course presents a scientific approach to the study of the environment and stresses the application of ecological concepts within a systems perspective. Topics include ecology, sustainability, populations, biodiversity, biogeochemistry, ecosystems, climate change, resources, agriculture, pollution and urban ecology. The course is an introductory course for EVS majors as well as an overview for students majoring in other areas.

EVS 301. Social and Cultural Theory. 3 credits.

An exploration of the ideas central to sociology and anthropology from the perspective of their historical and contemporary theories. Special attention is given to the implications of these ideas for understanding human social values. P. So. stdg.

EVS 307. Demography: World Population Issues. 3 credits. ENY, SP (Same as ANT 307, SOC 307)

This course will provide a sociological examination of the development and evolution of different models of population dynamics from several contemporary cultures. It will place particular emphasis on the assumptions and logical consequences of each of these models. Includes a survey of historical and contemporary trends in population growth, as well as a review of competing perspectives about natural limits to that growth. P. So. stdg.

EVS 311. Biostatistics. 4 credits.

Introduction to statistical methods, data display, and experimental design as applied to biological studies. Data analysis is conducted using open-source statistical software. Does not count as a Biology laboratory course. P. BIO 201 and BIO 202; Mathematical Reasoning.

EVS 315. Foundations of Ecology & Evolution. 3 credits.

Introduces the ecological principles governing interactions between organisms and their environment and the change of populations and species over time in the process of evolution. This is the cornerstone, population-focused course in the biology major. P. BIO 201; BIO 202; or Instructor's consent.

EVS 333. Environmental Politics And Policy. 3 credits. FA (Same as PLS 333)

An overview of the world's environmental problems from a political perspective. Focuses on the political dynamics that shape environmental policy making. P. So. stdg.

EVS 335. Zoology. 4 credits. FA (Same as BIO 335)

Biological concepts and principles exemplified by both invertebrates and vertebrates with emphasis on animal diversity, morphology, evolution, and ecological relationships. 3R, 3L. P. BIO 201/BIO 205 and BIO 202/BIO 206; Mathematical Reasoning.

EVS 341. Botany. 4 credits. FA (Same as BIO 341)

Biological concepts and principles exemplified by the plant kingdom with emphasis on plant anatomy, development and growth, physiology, and evolution. P. BIO 201/205 and BIO 202/206, One Magis Core Mathematical Reasoning course.

EVS 353. Environmental Economics. 3 credits. OD (Same as ECO 353)

The application of economic analysis to environmental issues. Emphasis on global environmental problems and policies and environmental problems and policies that are common to all nations. This course is not open to students registered in the Heider College of Business. P. Jr. stdg.

EVS 354. Environmental Ethics. 3 credits. OD (Same as PHL 354)

Critical study of the anthropocentrism-nonanthropocentrism debate and the individualism-holism debate and how they affect each other in the context of the determination of ecological value. If anthropocentrism is in some ways defective, what implications do these defects have for our moral obligations to animals, plants, waters, soil, future generations, species, ecosystems, and the planet? P. One Magis Core Philosophical Ideas course and one Magis Core Ethics course.

EVS 355. Environment and Society: Sociological Perspectives. 3 credits. SP (Same as AMS 355, ANT 355, SOC 355)

Human societies interact with the natural environments in which they are embedded. An examination of the driving economic, political, cultural, and demographic forces that cause human modification of the natural world, the resulting social and environmental problems and public controversies. A focus on movements and policies related to environmental issues, and the prospects for the emergence of more environmentally "sustainable" societies. P. So. stdg.

EVS 371. Animal Behavior. 3 credits. FA, SU (Same as BIO 371)

Evolutionary aspects of animal behavior, including physical and physiological bases of behavior, social behavior, behavioral ecology and genetics of behavior. 3R. P. BIO 201, BIO 202, BIO 205 and BIO 206.

EVS 372. Animal Behavior Laboratory. 2 credits. SP (Same as BIO 372)

Introduction to animal behavior research methods using structured observations and experiments in laboratory and field settings. P. Mathematical Reasoning course. P or CO: EVS 371 or BIO 371.

EVS 374. Management Of Environmental Risk. 3 credits. OD (Same as MGT 374)

Examination of environmental issues relevant to management decision making. Emphasis on risk analysis related to global/regional and workplace environmental issues. P. Jr. stdg.

EVS 383. Vertebrate Natural History. 3 credits. SP (Same as BIO 383)

Lecture series designed to provide students with a modern overview of vertebrate diversity. Lectures encompass ancestry, major adaptive shifts between classes of vertebrates, geographic distribution based on physiological limits, specialized feeding and locomotor modes, courtship patterns, reproductive strategies, and conservation issues. Recommended as useful prior to enrollment in EVS 440 (Field Biology of the Desert Southwest) and for students seeking a general understanding of vertebrate life, or those who are interested in teaching biological sciences. P. BIO 201, BIO 202, BIO 205, and BIO 206.

EVS 384. Vertebrate Natural History Laboratory. 1 credit. SP (Same as BIO 384)

Laboratory exercises that will provide experience in the following areas: dissection of representatives of each major vertebrate class with emphasis on the diagnostic differences between groups; identification and preservation of vertebrate specimens. Field trips are available on a limited basis. 3L. P. BIO 201, BIO 202, BIO 205, and BIO 206.

EVS 385. The Ecology, Geography and Health of Lakes. 4 credits. (Same as BIO 385)

A summer field course that examines lakes in the North Central Rocky Mountains regions of the United States. This course is a combination of lectures and field and laboratory studies of the physical, chemical and biological properties of lakes in a landscape context. The effects of human impacts on lake ecology and ecosystem health are emphasized. The course includes field work at lakes and regional field stations in northern Iowa (Iowa Lakeside Laboratory on West Okoboji Lake), the Boundary Waters and Lake Superior in Minnesota, the hyperalkaline Western Nebraska Sandhills, and alpine lakes in the Colorado Rockies (University of Colorado's Mountain Research Station at Niwot Ridge). P. BIO 201, BIO 202, BIO 205, BIO 206 and IC.

EVS 390. Environmental Science. 3 credits. SP (Same as BIO 390)

Course presents a balanced, scientific approach to the study of the environment and stresses the application of ecological concepts within a systems perspective. Topics include ecological concepts, population principles, endangered species and habitats, resources, air and water pollution, environmental health, and global perspectives. P. BIO 201/BIO 205 and BIO 202/BIO 206 or CHM 205/CHM 206 (or CHM 285/CHM 286).

EVS 415. Evolution. 3 credits.

A comprehensive introduction to the fundamental paradigm of modern Biology. Topics include the origin and history of life; historical development of evolutionary theory; genetic basis of evolution; evolutionary mechanisms; organismal diversity, speciation and phylogenetic methods of analysis; evolutionary aspects of biological subdisciplines; and selected special topics. P. BIO 201, BIO 202.

EVS 420. Environment & Society: Sociological Perspectives. 3 credits. (Same as SOC/ANT 420)

Human societies interact with the natural environments in which they are embedded. An examination of the driving economic, political, cultural, and demographic forces that cause human modification of the natural world, the resulting social and environmental problems and public controversies. A focus on movements and policies related to environmental issues, and the prospects for the emergence of more environmentally "sustainable" societies. Prereq: Critical Issues in Human Inquiry; Senior standing.

EVS 424. Sustainability and Rural America. 3 credits. SP, SU (Same as ANT 424, NAS 424, SRP 424, SOC 424)

This interdisciplinary course studies sustainability and the diverse cultures of rural American peoples by looking at topics such as ethics, environmental resources, economic strategies, public policy and social inequality. This course offers off-campus field observation and ethical reflection assignments and involves students in active collaborative problem-solving research. P. Sr. stdg and one course from: PHL 270, PHL 271, PHL 272, PHL 275, THL 270, THL 272, THL 273.

EVS 435. Coastal and Estuarine Ecology. 4 credits. AY, SU (Same as BIO 435)

Coastal and Estuarine Ecology is a 3 ½ week, intensive travel course. Participants experience, first-hand, the great diversity of marine ecosystems of the Gulf of Mexico, Tropical Atlantic, and Southeastern Atlantic regions. The class will examine tropical coral reef, sea grass, and mangrove communities, barrier islands (salt marshes, beaches, mudflats), and diverse open water habitats (lagoons, bays, tidal creeks and rivers, and near-shore shelf waters). The course emphasizes physical, chemical, and biological concepts applied to coastal habitats, with an emphasis on adaptations of marine organisms to their environments, ecological relationships, sampling methods and site characterizations, and threats to coastal ecosystems. The class stays at nationally recognized oceanographic and coastal field stations in Florida, Georgia, and Mississippi. The Creighton 18' Sundance Skiff and field station boats serve as work platforms and provide access to various habitats. P. One organismal-level or field course in biology or IC.

EVS 438. Natural History Of The Caribbean. 3 credits.

Study of the natural history of the Caribbean basin in a field setting. Emphasis on the geological history of the islands and the evolution of their endemic biotas. Field trips stressing identification of the local flora and avifauna. Investigation of land use and the resultant effect on the ecology of the region. This course was offered to students in the Semester Abroad Program in the 1994 Spring Semester. Can be taken as independent study by students in future semesters in the Dominican Republic. P. IC and Dean's Office Approval; Jr. or Sr. stdg.

EVS 439. Parasitology. 0-4 credits.

A survey of protozoan, helminth, and arthropod parasites with emphasis on their morphology, taxonomy, life histories, and host/parasite relationships. Includes parasites of medical and ecological importance. P. Any 300 or higher level BIO course, Mathematical Reasoning course, Ethics course.

EVS 443. Environmental Geology. 4 credits. AY, FA (Same as ATS 443)

An introduction to physical geology designed for environmental science majors. Topics include an examination of rock types, evolution and geological times, soil development and processes, earthquakes and global tectonics. In-class laboratories will be devoted to identification of rock types, soil analysis, and determination of fossil types. P. So. stdg. or IC.

EVS 445. Environmental Physiology. 3 credits. (Same as BIO 445)

Impact of environmental changes and environmental extremes on animals and their physiological mechanisms. Examines primarily vertebrates and their responses to variations in temperature, pressure, and salinity. Basic physiological principles associated with each adaptive response covered in lecture and reading assignments. 3R. P. BIO 335, BIO 383, BIO 433 or BIO 449.

EVS 449. Animal Physiology. 3 credits.

A study of the functions of animals from the cellular to the organ-systems level with emphasis on vertebrate systems physiology. 3R, 3L. P. BIO 202/BIO 206 (or BIO 213 and BIO 215) and BIO 201/BIO 205; Jr. stdg.

EVS 451. Microbiology. 4 credits. FA (Same as BIO 451)

Microbiology is the study of organisms too small to be seen with the naked eye. Despite their small size, these organisms are ubiquitous and play important roles in human health, industry, and the functioning of ecosystems. This course is designed to cover a wide range of material in lecture and through laboratory exercises, introducing students to the breadth of microbial diversity and physiology, as well as the basic techniques used in microbiology. P. BIO 201/205 and BIO 202/206; Mathematical Reasoning course.

EVS 454. Environmental Philosophy. 3 credits. (Same as PHL 454)

Examination of a variety of theoretical approaches to philosophical issues concerning individual organisms, species, ecosystems, and the biosphere. Aesthetic, axiological, epistemological, and ontological issues may be addressed. P. One Magis Core Philosophical Ideas course, and one of the following: PHL 201, PHL 250, PHL 270, PHL 271, PHL 272, PHL 275, PHL 300, PHL 320, or PHL 399.

EVS 455. Food, Society and Environment. 3 credits. SP (Same as ANT 455, SOC 455, SRP 455)

Access to food is a universal basic human need. This course considers the social and cultural significance of food, the ecological implications of producing it, and social justice issues that surround its distribution from several disciplinary perspectives. P. PHL 250 or THL 250; Sr. stdg.

EVS 459. Environmental Communication. 3 credits. (Same as COM 459, EVS 559, COM 559)

Our communication about the natural world both interprets and defines it. We experience and understand the natural world through communication, through different channels, and through discourses that have evolved over time. This course interrogates this communication as well as the underlying assumptions that ground such communication. In doing so, we will evaluate the social construction of the environment and environmental issues through media and other communication processes. This will allow us an opportunity to recognize how dominant discourses shape individual and societal choices. P. Understanding Social Science; Contemporary Composition.

EVS 460. Environmental Remote Sensing. 4 credits. OD, SP (Same as ATS 460)

This course is an introduction to the techniques of observing the Earth from air- and space-borne instruments. We will cover basic issues of geometry and scale associated with making these measurements, electromagnetic properties of Earth surface materials, the range of instruments used to observe the Earth, and applications of satellite remote sensing to geological and environmental questions. The course will involve an independent research project utilizing remote sensing data and software. Meets Magis Designated Technology requirement. P. EVS 113 and EVS 114; or BIO 201, BIO 202, BIO 205 and BIO 206.

EVS 461. Entomology. 4 credits. FA (Same as BIO 461)

Introduction to insect biology with emphasis on the major insect groups. Anatomy, physiology, and behavior of insects and their ecological, agricultural, and medical importance. 3R, 3L. P. BIO 201, BIO 202, BIO 205, and BIO 206.

EVS 471. Conservation Biology. 3 credits.

Introduction to the science of biodiversity preservation. Relevant principles of ecology, population genetics, and behavioral biology; aspects of biodiversity, threats to biodiversity and strategies for limiting them; protected area design and management; ecological economics, environmental ethics, sustainable development, and the interplay between human needs and biodiversity preservation. P. BIO 201, 202, 205, 206, or IC.

EVS 476. National Parks - Created through Communication. 3 credits.

This course will focus on how environmental communication impacts our experiences in national parks and has consequences for US national identity. This course will investigate how communication about national parks reveals historical tensions and power struggles. Additionally, it will give students a chance to study communication within national parks in situ so that they will better understand how communication in these settings operates. P. Critical Issues in Human Inquiry; Senior standing.

EVS 480. Internship In Environmental Sciences. 1-3 credits. FA, SP, SU

An internship designed for students interested in working in an environmental setting in the public or private sector. Students may register for three hours credit for 60 hours of work. Before registering for the internship, students should consult with the director of the EVS program. The internship may be taken for a maximum of six hours. Credit does not count toward a specialization area of the Environmental Science degree. P. DC.

EVS 481. Terrestrial Ecology. 4 credits. FA (Same as BIO 481)

Introduction to the interactions of organisms and the environment, especially the biology of populations, communities, and ecosystems. Individual adaptations, the nature of the environment, population dynamics, and community organization are stressed. Laboratory exercises include field trips to terrestrial habitats. 3R, 3L. P. BIO 201, BIO 202, BIO 205 and BIO 206; Mathematical Reasoning.

EVS 483. History of Environmental Inequalities. 3 credits. (Same as BIO 483)

This course explores the connections between environmental change and human inequality from the early modern period until today. It reaches across local and global scales, drawing on local case studies to emphasize global historical themes such as the roles of colonialism, segregation, and economic vulnerability. This service-learning course will introduce students to a variety of theoretical tools to understand environmental justice and explore their implications on the ground. Student will use these tools and experiences to better interrogate their own social and environmental position. P. Critical Issues in Human Inquiry course; senior standing.

EVS 485. Marine And Freshwater Ecology. 3 credits. SP (Same as BIO 485)

An introduction to the community structure, biological production, and physical and chemical properties of aquatic ecosystems. The major features of water columns, benthic substrates, and lotic zones will be reviewed and compared. P. BIO 201, BIO 202, BIO 205 and BIO 206.

EVS 486. Freshwater Ecology Laboratory. 2 credits. SP (Same as BIO 486)

Introduction to methods for analyzing lake, stream, and wetland habitats. Exercises will examine physical and chemical properties, biological production and food chains, and water quality of freshwater ecosystems. P or CO: EVS 485.

EVS 487. Marine Ecology Laboratory. 2 credits. SP (Same as BIO 487)

Direct observation of marine coastal habitats (reefs, sea grass beds, mangrove forests, rocky intertidal zones, and offshore waters) at Roatan Island, Honduras. Exercises in the field and campus laboratory sessions will examine physical and chemical properties; marine organisms and community structure and productivity of marine ecosystems. CO: EVS 485 or IC; P. BIO 201/BIO 205 and BIO 202/BIO 206.

EVS 488. Global Environmental History. 3 credits.

What has been humanity's role in changing the face of the earth? What part has the environment played in shaping human history? These questions drive the study of environmental history. This course surveys the history of humanity's ever-changing relationship with nature, from fire-wielding hunter-gatherers to the present. It emphasizes new global perspectives on environmental history and focuses on themes such as agroecology, invasion, sustainability, energy, urbanization, and empire. It will also introduce students to the diverse methods of investigating our environmental past including documentary and material sources, natural archives, and geospatial analysis. P. Critical Issues in Human Inquiry; Contemporary Composition; Oral Communication; Ethics; Senior standing.

EVS 490. Senior Seminar: Discussion. 1 credit.

The Senior Seminar: Discussion is required of all EVS and SUS students as the first of two capstone courses. The course provides an opportunity for students to interact with natural and social scientists as well as others engaged in environmental research, policy, and practice. Students will learn about the fields of interest of peers and hear from others working in environment-related fields.

EVS 491. Senior Seminar. 1 credit. FA, SP

This course is the capstone course required for all Environmental Science and Sustainability majors. Each student will design and deliver a professional presentation on an environmental topic agreed upon by the student and faculty seminar coordinator(s). If time allows, seminars may also be given by invited, outside speakers. The course provides an opportunity for students to interact with natural and social scientists as well as others engaged in environmental research, policy, and practice. Students will learn about the fields of interest of peers and hear from others working in environment-related fields. P. Oral Communication.

EVS 493. Directed Independent Readings. 0-3 credits. FA, SP, SU

Assigned readings in the student's area of interest. Course is only an addition to and not a substitution for any portion of the major requirement. May be repeated to a limit of six hours. P. Jr. stdg.; IC.

EVS 495. Directed Independent Study. 0-3 credits. FA, SP, SU

A program of independent study with emphasis on activities other than laboratory or field research. (Examples include library research or special course attendance). Course is only an addition to and not a substitution for any portion of the major requirement. May be repeated to a limit of six hours. P. Jr. stdg.; IC.

EVS 497. Directed Independent Research. 0-3 credits. FA, SP, SU

A program of independent study with emphasis on laboratory or field research. Course is only an addition to and not a substitution for any portion of the major requirement. May be repeated to a limit of six hours. P. Jr. stdg.; IC.

EVS 506. Environmental Chemistry and Natural Resources. 3 credits. OD (Same as CHM 506)

The nature, identification, and quantitative determination of air and water pollutants. Study of natural resources and energy production. Topics covered include the atmosphere, ozone, the troposphere, natural water, acid rain, drinking water, metals, organochlorine compounds and waste management. P. CHM 205.

EVS 523. Environmental Toxicology. 3 credits. SP (Same as BIO 523)

Principles of environmental tolerance, bioenergetics and nutrition, homeostasis, and toxicology and disease will be developed and related to the organismal, population and community levels and to comparative responses to environmental disturbance. The course uses a reading/discussion format. Meets Magis Designated Oral Communication requirement. 3R. P. BIO 201, BIO 202, BIO 205 and BIO 206; Oral Communication.

EVS 533. Physical Climatology and Climate Change. 3 credits. FA (Same as ATS 533)

This course stresses the theories and models of natural climate change and of that induced by human beings. The ethical issues of inadvertent and planned change of climate by humans will be raised. Major topics include effects of CO₂ warming (greenhouse effect), ozone depletion; human-induced desertification; acid rain; urban microclimates. Methods of monitoring these systems will be stressed relative to an increased world-wide need to limit or prevent human-induced climate changes.

EVS 539. Ecology of Zoonotic Diseases. 3 credits. (Same as BIO 539)

Over the past few decades there has been a resurgence of zoonotic diseases such as SARS and Avian Influenza. Why do zoonotic diseases emerge, and what factors lead to epidemics? This course will address these questions, and apply an ecological approach to an understanding of epidemiology in human, livestock, and wildlife populations. P. One of the following: BIO 390, BIO 432, BIO 451, or BIO 481; Contemporary Composition; Oral Communication.

EVS 541. Special Topics in Plant Biology. 3 credits. (Same as BIO 541)

This course focuses on historical and current questions in plant biology. Students will explore the evolution, function, and development of plants from the genetic, cellular, and organismal perspective. Specific topics may include hormone function, plant responses to stimuli, the evolution of plant structures, and plant reproductive strategies. 3R. P. BIO 201, BIO 202, BIO 205 and BIO 206; Contemporary Composition; Oral Communication; Senior standing or IC.

EVS 544. Hydrology. 3 credits. AY, SP (Same as ATS 544)

Study of the waters of the earth, especially with relation to the effects of precipitation and evaporation upon the occurrence and character of water in streams, lakes, and on or below the land surface. In terms of hydrologic cycle, the scope of this course may be defined as that portion of the cycle from precipitation to evaporation or return of the water to the seas. P. EVS 113 or ATS 231.

EVS 545. Plant Diversity and Evolution. 4 credits. ((Same as BIO 545))

An investigation of the diversity, morphology, and evolution of fossil and living plants. Topics emphasized include the origin of land plants, plant life cycles, evolution of the vascular cylinder, leaf, seed and flower, and the origin of flowering plants. P. BIO 201, BIO 202, BIO 205, and BIO 206; Contemporary Composition; Oral Communication; Senior standing or IC.

EVS 548. Introduction to Solar-Terrestrial Environment. 3 credits.

Course designed to acquaint the student with the basic phenomenology associated with solar processes and activity, and the impact of these processes upon the earth and its atmosphere. Designed to familiarize the student with the concepts of upper atmospheric energetic processes and their influences upon everyday activities. P. MTH 246 and PHY 212.

EVS 552. Boundary Layer Meteorology. 3 credits. OD (Same as ATS 552)

Structure of the boundary layer, surface energy budget, vertical profiles of temperature, humidity and wind, turbulence, Monin-Obukhov theory. Determination of surface heat and moisture fluxes. Some discussion of applications to diffusion and dispersion of substances in the atmosphere. P. ATS 572 or equiv.

EVS 553. Tropical Meteorology. 3 credits. FA (Same as ATS 553)

Characteristics of the tropical atmosphere including convection, boundary layer processes, local and diurnal weather phenomena, mesoscale tropical systems, tropical storm structure, and energetics. This course relies heavily on satellite interpretation of tropical cloud systems. P. EVS 113.

EVS 555. Meteorological Remote Sensing. 3 credits. SP (Same as ATS 555)

First section of the course is devoted to meteorological interpretations of cloud fields as observed from weather satellites. Second section of the course devoted to examination of general and specific applications of remote sensing of the environment. Includes imagery from satellite, ground based, and airborne systems; data analysis and decision methods; multispectral analysis and evaluation of water, terrain, mineral, forest, and soil resources. P. EVS 113 or IC.

EVS 556. Introduction To Physical Oceanography. 3 credits. AY, FA (Same as ATS 556)

Geomorphology of the ocean bottom; properties of sea water; salinity and temperature distributions; major ocean currents and circulations; equations of motion, horizontal wind-driven currents; thermohaline circulations; wind waves and swell.

EVS 559. Environmental Communication. 3 credits. (Same as COM 559)

Our communication about the natural world both interprets and defines it. We experience and understand the natural world through communication, through different channels, and through discourses that have evolved over time. This course interrogates this communication as well as the underlying assumptions that ground such communication. In doing so, we will evaluate the social construction of the environment and environmental issues through media and other communication processes. This will allow us an opportunity to recognize how dominant discourses shape individual and societal choices. P. Understanding Social Science; Contemporary Composition.

EVS 566. Climate Theory. 3 credits. OD (Same as ATS 566)

Theories of global climate and variability. Examination of climate models, including internal and external parameters and feedback mechanisms. P. EVS 113; EVS 561.

EVS 570. Introduction to Geographic Information Systems. 4 credits. ENY, SP (Same as AMS 570, ANT 570, SOC 570)

An introduction to the design, development, and application of geographic information systems (GIS) and related technologies to conduct spatial analysis in applied research settings that require the integration of data from diverse sources. Students will complete individual projects focusing on a topical area of their choice in order to develop an understanding of the basic technologies, and to demonstrate their skill in using these technologies to analyze a research topic. Research topics may be drawn from any subject field for which data sets with geographic variables are available. These may include anthropology, criminal justice, demography, economics, environmental science, health care, marketing, political science, sociology and social work.

EVS 573. Cloud Physics And Dynamics. 3 credits. OD (Same as ATS 573)

Thermodynamic processes which control the development and growth of clouds. Relationship between atmospheric properties and cloud structure. Distribution of condensation nuclei, water droplet spectra. Initiation and growth of cloud hydrometers. Structure of severe storms, radiative effects of clouds. P. ATS 571.

EVS 580. Current Topics in Ecology. 3 credits. (Same as BIO 580)

The focus of this course will be advanced topics in ecology, with an emphasis on the concepts and current approaches in ecosystem ecology. Primary literature will serve as a key resource for students. The structure and function of several model ecosystems will be explored in detail, with particular attention to the concepts of biodiversity, productivity, decomposition and nutrient cycling. In addition, the degree of human alteration of ecosystem structure and function as well as consequences for global ecological processes will be presented. P. EVS 390, 481, 485 or BIO 390; Contemporary Composition; Oral Communication.

EVS 581. Evolution. 4 credits. FA, SU (Same as BIO 581)

Lectures and discussion designed to provide junior and senior students with a broad understanding of the science of evolutionary biology. Organized in three parts, each takes a chronological approach: (A) evolutionary theory, (B) mechanisms of evolution, (C) the implications and consequences of theory and mechanism; and as part of both the lecture and laboratory experience in (C, above) topics in evolutionary medicine will be covered. Laboratory sessions include computer modeling exercises to illustrate the mechanisms of evolutionary changes, an excellent film series, discussion opportunities designated to explore in more depth questions and topics associated with speciation, biodiversity and human evolution as well as a review session prior to each exam. 3R, 3L. P. One upper-division BIO course or Jr. stdg.