

ENVIRONMENTAL STUDIES

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Environmental Studies offers the opportunity to examine human relations with their environments from diverse perspectives. The major encourages interdisciplinary study in a) social sciences, including anthropology, political science, law, economics, and ethics; b) humanities, to include history, literature, religion, and the arts; and c) natural sciences, such as biology, ecology, human health, geology, and chemistry. Students work with faculty advisers and the DUS to concentrate on some of the most pressing environmental and sustainability issues of our time: climate change, food and agriculture, urbanism, conservation, sustainable natural resource management, justice, markets, and governance.

Students may pursue either a B.A. or a B.S. degree within Environmental Studies. The B.A. program is intended for students who wish to concentrate in the social sciences and humanities. The B.S. program encourages students to focus in the natural sciences, especially fields such as environmental health and medicine, ecology, and climate science. Both degree programs culminate in a senior essay project that is commonly preceded by independent summer research.

The major for the Class of 2020 and previous classes With DUS approval, the following changes to the prerequisite and core major requirements of the B.A. degree program may be fulfilled by students who declared their major under previous requirements. There are no changes to the B.S. degree program.

The major for the Class of 2021 and subsequent classes The B.A. degree program does not require any specific prerequisites; there are two new core course major requirements as outlined below. There are no changes to the B.S. degree program.

PREREQUISITES

The B.A. degree program has no prerequisites.

The B.S. degree program requires a natural science laboratory or field course focusing on research and analytic methods chosen from EVST 202L, 221, 234L, 244, 290, 362, or G&G 126L; and a term course in mathematics, physics, or statistics selected from MATH 112 and above (excluding MATH 190), or PHYS 170 and above, or S&DS 101 and above; two-term lecture series in chemistry (or CHEM 170 or CHEM 167), and two terms of biology from BIOL 101-104, or G&G 125, or MCDB 123.

Students are advised to take chemistry and biology during the first year before enrolling in the EVST core courses in natural sciences. It is recommended that students complete the prerequisites by the end of their sophomore year, although this is not required.

REQUIREMENTS OF THE MAJOR

B.A. degree program The B.A. degree requires at least thirteen course credits, consisting of the core requirements, the concentration, and the senior requirement.

B.S. degree program In addition to the prerequisites, the B.S. degree requires at least twelve course credits, consisting of the core requirements, the concentration, and the two-term senior requirement.

B.A. core courses One course in statistics or mathematics, selected from S&DS 101 or above, or MATH 112 or above; two core courses in the humanities selected from EVST 120, 226, 255, 340, or 345; and three natural science core courses. Students may choose natural science courses, all of which have the science (Sc) designation, from EVST 191, 200, 223, 242; E&EB 115 or 145; G&G 120 or 140; G&G 125 or MCDB 123; CHEM 161 or 165; EVST 202L, 221, 234L, 244, 290, 362, or G&G 126L; or CDE 508. Completing one course in each area is recommended before the end of the sophomore year.

B.S. core courses Two core courses in the humanities and social sciences selected from EVST 120, 226, 255, 340, or 345; and two natural science core courses from EVST 200, 223, 242, or G&G 140. Completing one course in each area is recommended before the end of the sophomore year.

Areas of concentration Students plan their concentration in consultation with the director of undergraduate studies and the student's adviser. A concentration is defined as six courses that provide analytical depth in a particular environmental problem or issue of interest, as well as disciplinary expertise. One of these six courses must be an advanced seminar (200 level or higher) that exposes students to primary literature, extensive writing requirements, and experience with research methods. For the B.S. degree, three of the six courses must have the science (Sc) designation, and two must provide interdisciplinary context to the concentration. Past concentrations include biodiversity and conservation; climate change and energy; environmental history; environmental policy; food and agriculture; human health and environment; and urban environments. Students also have the opportunity to design a unique concentration within the major, in consultation with the DUS.

Credit/D/Fail No course taken Credit/D/Fail may be counted toward the major, including prerequisites.

Roadmap See visual roadmap of the requirements.

SENIOR REQUIREMENT

In the junior year, all students consult with their advisers on the design of their project and submit a preliminary plan to the DUS for approval.

B.A. degree program For the B.A. degree, students most often complete two terms of EVST 496, a colloquium in which they write their senior essay. One-term senior projects require the permission of the DUS, and are generally undertaken only in conjunction with a double major. Only those students who complete a two-term essay are eligible for Distinction in the Major.

B.S. degree program For the B.S. degree, students complete two terms of EVST 496.

ADVISING AND APPLICATION TO THE MAJOR

Students typically apply to enter the major during their sophomore year. Applications are accepted throughout the year, and must be made in writing to the DUS; details can be found on the program's website. Juniors who have already completed considerable course work toward the major may also apply. Students considering a major in Environmental Studies should consult the DUS as early as possible in the first year.

Summer Environmental Fellowship During the summer, many students gain experience in the field through research or internships in an area pertinent to their academic development or their senior essay project. Internships may be arranged with nonprofit organizations, government agencies, or corporations. Although the summer program is optional, many students take advantage of this opportunity with some financial support from the program.

REQUIREMENTS OF THE MAJOR

Prerequisites *B.A.* – no prerequisites; *B.S.* – one course from EVST 202L, 221, 234L, 244, 290, 362, or G&G 126L; MATH 112 or above (excluding MATH 190), or PHYS 170 or above, or S&DS 101 or above; two-term lecture sequence in chem, or CHEM 170 or 167; two terms from BIOL 101 and 102, or 103 and 104, or G&G 125, or MCDB 123

Number of courses *B.A.* – at least 13 course credits, incl senior project; *B.S.* – at least 12 course credits, beyond prereqs and incl senior project

Specific courses required *B.A.* – 6 core courses, as specified; *B.S.* – 2 core courses in humanities and social sciences and 2 core courses in natural sciences, as specified

Distribution of courses *B.A.* – 6 courses in area of concentration, including 1 advanced sem as specified; *B.S.* – 6 courses in area of concentration, 3 of which must have Sc designation, and 1 advanced sem as specified

Senior requirement *B.A.* – one- or two-term research project and colloq (EVST 496); *B.S.* – two-term research project and colloq (EVST 496)

FACULTY ASSOCIATED WITH THE PROGRAM OF ENVIRONMENTAL STUDIES

Professors Gaboury Benoit (*Forestry & Environmental Studies*), Graeme Berlyn (*Forestry & Environmental Studies*), Ruth Blake (*Geology & Geophysics*), Mark Bradford (*Forestry & Environmental Studies*), Derek Briggs (*Geology & Geophysics*), Gary Brudvig (*Chemistry, Molecular Biophysics & Biochemistry*), Benjamin Cashore (*Forestry & Environmental Studies*), Deborah Coen (*History*), Michael Donoghue (*Ecology & Evolutionary Biology, Forestry & Environmental Studies*), Michael Dove (*Forestry & Environmental Studies, Anthropology*), Menachem Elimelech (*Chemical & Environmental Engineering*), Thomas Graedel (*Forestry & Environmental Studies*), Benedict Kiernan (*History*), Robert Mendelsohn (*Forestry & Environmental Studies, Economics*), Alan Mikhail (*History*), Jeffrey Park (*Geology & Geophysics*), Peter Perdue (*History*), David Post (*Ecology & Evolutionary Biology*), Jeffrey Powell (*Ecology & Evolutionary Biology, Forestry & Environmental Studies*), Peter Raymond (*Forestry & Environmental Studies*), Paul Sabin (*History*), James Saiers (*Forestry & Environmental Studies*), Oswald Schmitz (*Forestry & Environmental Studies, Ecology & Evolutionary Biology*), James Scott (*Political Science, Anthropology*), Karen Seto (*Forestry & Environmental Studies*), Kalyanakrishnan Sivaramakrishnan (*Anthropology, Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies, Ecology & Evolutionary Biology*), Brian Skinner (*Geology & Geophysics*), Ronald Smith (*Geology & Geophysics, Forestry & Environmental Studies*), Stephen Stearns (*Ecology & Evolutionary Biology*), Charles Tomlin (*Forestry & Environmental Studies*) (*Visiting*), John Wargo (*Forestry & Environmental Studies, Political Science*), Harvey Weiss (*Near Eastern Languages & Civilizations, Anthropology*), John Wettlaufer (*Geology & Geophysics*), Robert Wyman (*Molecular, Cellular, & Developmental Biology*)

Associate Professors Laura Barraclough (*American Studies*), David Vasseur (*Ecology & Evolutionary Biology*), Julie Zimmerman (*Chemical & Environmental Engineering*)

Assistant Professors Anjelica Gonzalez (*Biomedical Engineering*), William Rankin (*History, History of Science*)

Senior Lecturers Shimon Anisfeld, Carol Carpenter, Amity Doolittle, John Grim, Fred Strebeigh

Lecturers Ian Cheney, Mary Beth Decker, Kealoha Freidenburg, Gordon Geballe, Paul Lussier, Linda Puth, Catherine Skinner

Introductory Courses

* EVST 007a, **The New England Forest** Marlyse Duguid

Exploration of the natural history of southern New England, with specific focus on areas in and around New Haven. Pertinent environmental issues, such as climate change, endangered species, and the role of glacial and human history in shaping vegetative

patterns and processes, are approached from a multi-disciplinary framework and within the context of the surrounding landscape. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program.

* **EVST 010a / G&G 010a, Earth, Resources, Energy, and the Environment** Mary-Louise Timmermans

Humankind's interactions with, and place within, the natural world. Plate tectonics and natural disasters, biological evolution and mass extinction, human evolution, population growth and ecology, industrial resources, groundwater and pollution, fossil fuels and energy transitions, the carbon cycle and greenhouse gases, paleoclimates, current global warming, alternative energies, and a planetary perspective on the Earth as a singular oasis in space. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SC

* **EVST 020a / F&ES 020a, Sustainable Development in Haiti** Gordon Geballe

The principles and practice of sustainable development explored in the context of Haiti's rich history and culture, as well as its current environmental and economic impoverishment. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. WR

* **EVST 040a, Collections of the Peabody Museum** David Skelly

Exploration of scientific questions through the study and analysis of objects within the Peabody Museum's collections. Formulating a research question and carrying out a project that addresses it are the core activities of the course. Enrollment limited to first-year students. Preregistration required; see under First-Year Seminar Program. SC

* **EVST 100b / APHY 100b / ENAS 100b / G&G 105b / PHYS 100b, Energy Technology and Society** Daniel Prober, Michael Oristaglio, and Julie Paquette

The technology and use of energy. Impacts on the environment, climate, security, and economy. Application of scientific reasoning and quantitative analysis. Intended for non-science majors with strong backgrounds in math and science. QR, SC

Core Courses

HUMANITIES AND SOCIAL SCIENCES

EVST 226a / ARCG 226a / NELC 268a, Global Environmental History Harvey Weiss

The dynamic relationship between environmental and social forces from the Pleistocene glaciations to the Anthropocene present. Pleistocene extinctions; transition from hunting and gathering to agriculture; origins of cities, states, and civilization; adaptations and collapses of Old and New World civilizations in the face of climate disasters; the destruction and reconstruction of the New World by the Old. Focus on issues of adaptation, resilience, and sustainability, including forces that caused long-term societal change. SO

EVST 255b / F&ES 255b / PLSC 215b, Global Food Challenges: Environmental Politics and Law John Wargo

We explore relations among food, environment, health, and law. We consider global-scale avoidable challenges such as: starvation & malnutrition, obesity, other food related human diseases, climate instability, soil loss, water depletion & contamination, microbial hazards, chemical contamination, food waste, dietary convergence, air pollution, energy, packaging, culinary globalization, and biodiversity loss. We focus on laws that influence the world's food system, including those intended to reduce or prevent environmental and health damages. Other laws protect rights of secrecy, property, speech, confidential business information, free trade, worker protection, equal opportunity, and freedom from discrimination. Ethical concerns of justice, equity, and transparency are prominent themes. Examples of effective law, consumer movements and corporate innovations provide optimism for the future of responsible food. SO

EVST 340b / ECON 330b, Economics of Natural Resources Robert Mendelsohn

Microeconomic theory brought to bear on current issues in natural resource policy. Topics include regulation of pollution, hazardous waste management, depletion of the world's forests and fisheries, wilderness and wildlife preservation, and energy planning. After introductory microeconomics. QR, SO

ENVIRONMENTAL SCIENCE

EVST 223a / E&EB 220a, General Ecology David Vasseur and Ann Staver

The theory and practice of ecology, including the ecology of individuals, population dynamics and regulation, community structure, ecosystem function, and ecological interactions at broad spatial and temporal scales. Topics such as climate change, fisheries management, and infectious diseases are placed in an ecological context. Prerequisite: MATH 112 or equivalent. SC

Intermediate and Advanced Courses

The following courses have been approved for developing areas of concentration. Other courses may be suitable for designing an area of concentration with permission of the director of undergraduate studies.

EVST 125a / G&G 120a, Earth's Changing Climate Jeffrey Park

The science of contemporary climate change or "global warming." Historical and contemporary methods used by scientists to draw conclusions concerning Earth's complex climate system and human influences on it, and to predict future climates. Risk assessment, response options. SC

EVST 182a / ANTH 300a / E&EB 300a, Primate Behavior and Ecology Eduardo Fernandez-Duque

Socioecology of primates compared with that of other mammals, emphasizing both general principles and unique primate characteristics. Topics include life-history strategies, feeding ecology, mating systems, and ecological influences on social organization. SC, SO

EVST 191b, Trees: Environmental Biology and Global Significance Craig Brodersen

Underlying principles that govern tree biology in both time and space. The biophysics of energy balance, water transport, and gas exchange, from individual plant organs to the tree and forest canopy; principles of cells and membranes; the fundamental differences between plant and animal cells; regional and global patterns in forest dynamics; implications of disruptions in the biotic and abiotic environment. Case studies focus on understanding forests and forest products and their global significance. SC

*** EVST 200b / G&G 115b, Earth System Science** Jeffrey Park

A survey of geoscience. Interaction of lithosphere, hydrosphere, atmosphere, and Earth's deep interior; natural controls on environment and climate in past, present, and future; rocks, minerals, glaciers, earthquakes, and volcanoes; natural hazards and natural resources. (Formerly G&G 200) SC

*** EVST 212a / EP&E 390a / PLSC 212a, Democracy and Sustainability** Michael Fotos

Democracy, liberty, and the sustainable use of natural resources. Concepts include institutional analysis, democratic consent, property rights, market failure, and common pool resources. Topics of policy substance are related to human use of the environment and to U.S. and global political institutions. WR, SO

*** EVST 215a / ENGL 459a / MB&B 459a, Writing about Science, Medicine, and the Environment** Carl Zimmer

Advanced non-fiction workshop in which students write about science, medicine, and the environment for a broad public audience. Students read exemplary work, ranging from newspaper articles to book excerpts, to learn how to translate complex subjects into compelling prose. Admission by permission of the instructor only. Applicants should email the instructor at carl@carlzimmer.com with the following information: 1. One or two samples of nonacademic, nonfiction writing. (No fiction or scientific papers, please.) Indicate the course or publication, if any, for which you wrote each sample. 2. A note in which you briefly describe your background (including writing experience and courses) and explain why you'd like to take the course. WR RP

*** EVST 221a / E&EB 230a / F&ES 221a, Field Ecology** Linda Puth

A field-based introduction to ecological research, using experimental and descriptive approaches, comparative analysis, and modeling for field and small-group projects. Weekly field trips explore local lake, salt marsh, rocky intertidal, traprock ridge, and upland forest ecosystems. Includes one Saturday field trip and a three-day trip during the October recess. Concurrently with or after E&EB 220 or with permission of instructor. SC

*** EVST 224a / ENGL 241a, Writing About The Environment** Alan Burdick

Exploration of ways in which the environment and the natural world can be channeled for literary expression. Reading and discussion of essays, reportage, and book-length works, by scientists and non-scientists alike. Students learn how to create narrative tension while also conveying complex – sometimes highly technical – information; the role of the first person in this type of writing; and where the human environment ends and the non-human one begins. WR

*** EVST 231a, Temperate Woody Plant Taxonomy and Dendrology** Marlyse Duguid

Identification of the major temperate plant families, with a focus on North American forest species; integration of morphology, phenology, ecology, biogeography, and the natural history of tree species. Course work includes field identification of woody plants, and phylogenetic systematics as the structure for understanding the evolutionary history and relationships between species. SC

*** EVST 234La, Field Science: Environment and Sustainability** L. Kealoha Freidenburg

A field course that explores the effects of human influences on the environment. Analysis of pattern and process in forested ecosystems; introduction to the principles of agroecology, including visits to local farms; evaluation of sustainability within an urban environment. Weekly field trips and one weekend field trip. SC

*** EVST 237b / ENGL 237b / HUMS 234b / LITR 323b, Animals in Literature and Theory** Jonathan Kramnick

Consideration of the role animals play in our aesthetic, ethical, political, and scientific worlds through reading of fiction, poetry, philosophy, and critical theory. Topics include: animal sentience and experience; vegetarianism; animal fables; pet keeping; animals alongside disability, race, and gender; and the representation of animal life in the visual arts. WR, HU

*** EVST 244a, Coastal Environments in a Changing World** Mary Beth Decker

The effects of human action and natural phenomena on coastal marine ecosystems. Methods used by coastal scientists to address environmental issues; challenges associated with managing and conserving coastal environments. Priority to Environmental Studies majors; open to nonmajors as space permits. SC

EVST 245b / F&ES 245b / PLSC 146b, Global Environmental Governance Benjamin Cashore

The development of international environmental policy and the functioning of global environmental governance. Critical evaluation of theoretical claims in the literature and the reasoning of policy makers. Introduction of analytical and theoretical tools used to assess environmental problems. Case studies emphasize climate, forestry, and fisheries. SO

*** EVST 247b / EP&E 497b / PLSC 219b, Politics of the Environment** Peter Swenson

Historical and contemporary politics aimed at regulating human behavior to limit damage to the environment. Goals, strategies, successes, and failures of movements, organizations, corporations, scientists, and politicians in conflicts over environmental policy. Focus

on politics in the U.S., including the role of public opinion; attention to international regulatory efforts, especially with regard to climate change. SO

EVST 255b / F&ES 255b / PLSC 215b, Global Food Challenges: Environmental Politics and Law John Wargo

We explore relations among food, environment, health, and law. We consider global-scale avoidable challenges such as: starvation & malnutrition, obesity, other food related human diseases, climate instability, soil loss, water depletion & contamination, microbial hazards, chemical contamination, food waste, dietary convergence, air pollution, energy, packaging, culinary globalization, and biodiversity loss. We focus on laws that influence the world's food system, including those intended to reduce or prevent environmental and health damages. Other laws protect rights of secrecy, property, speech, confidential business information, free trade, worker protection, equal opportunity, and freedom from discrimination. Ethical concerns of justice, equity, and transparency are prominent themes. Examples of effective law, consumer movements and corporate innovations provide optimism for the future of responsible food. SO

* **EVST 258b / AMST 258b, Wilderness in the North American Imagination** Yuhe Wang

The idea of wilderness in American history, art, literature, and public policy. Authors include Henry David Thoreau, Nathaniel Hawthorne, John Muir, Aldo Leopold, John McPhee, and Ramachandra Guha. A class dinner and field trip are held during the term. HU

* **EVST 261a / F&ES 261a / G&G 261a, Minerals and Human Health** Ruth Blake

Study of the interrelationships between Earth materials and processes and personal and public health. The transposition from the environment of the chemical elements essential for life. After one year of college-level chemistry or with permission of instructor; G&G 110 recommended. SC

* **EVST 264a, Environmental Influences on Human, Community, and Global Health** Philip Johnson

An introduction to the concepts, principles, tools, and applications of environmental health. Study of the intersections and relationships between environmental sources, hazardous agents, and public health, including the physical, chemical, and biological agents in air, water, soil, food, and other environmental media, as well as social factors, that may adversely affect human health.

EVST 273b, Ecology and the Future of Life on Earth Oswald Schmitz

Study of sustainability in a new epoch of human domination of Earth, known as the Anthropocene. Students will learn to think critically and construct arguments about the ecological and evolutionary interrelationship between humans and nature and gain insight on how to combine ethical reasoning with scientific principles, to ensure that species and ecosystems will thrive and persist. SC

* **EVST 285b / F&ES 285b, Political Ecology of Tropical Forest Conservation** Amity Doolittle

Study of the relationship between society and the environment focusing on tropical forest conservation. Global processes of environmental conservation, development, and conflicts over natural resource use and control; approaches to conserving trees and forest cover using strategies that support biodiversity and rural agricultural livelihoods; specific focus on tropical forest landscapes dominated by agriculture and cattle ranching practices using Panama and Colombia as a case studies. SO

* **EVST 290b / F&ES 290b, Geographic Information Systems** Charles Tomlin

A practical introduction to the nature and use of geographic information systems (GIS) in environmental science and management. Applied techniques for the acquisition, creation, storage, management, visualization, animation, transformation, analysis, and synthesis of cartographic data in digital form.

EVST 292a / GLOBL 217a / PLSC 149a, Sustainability in the Twenty-First Century Daniel Esty

Sustainability as a guiding concept for addressing twenty-first century tensions between economic, environmental, and social progress. Using a cross-disciplinary set of materials from the "sustainability canon," students explore the interlocking challenges of providing abundant energy, reducing pollution, addressing climate change, conserving natural resources, and mitigating the other impacts of economic development. SO

EVST 318b / AMST 236b / HIST 199b / HSHM 207b, American Energy History Paul Sabin

The history of energy in the United States from early hydropower and coal to present-day hydraulic fracturing, deepwater oil, wind, and solar. Topics include energy transitions and technological change; energy and democracy; environmental justice and public health; corporate power and monopoly control; electricity and popular culture; labor struggles; the global quest for oil; changing national energy policies; the climate crisis. HU

* **EVST 324a / ANTH 322a / SAST 306a, Environmental Justice in South Asia** Kalyanakrishnan Sivaramakrishnan

Study of South Asia's nation building and economic development in the aftermath of war and decolonization in the 20th century. How it generated unprecedented stress on natural environments; increased social disparity; and exposure of the poor and minorities to environmental risks and loss of homes, livelihoods, and cultural resources. Discussion of the rise of environmental justice movements and policies in the region as the world comes to grips with living in the Anthropocene. SO

* **EVST 344a / F&ES 344a, Aquatic Chemistry** Gaboury Benoit

A detailed examination of the principles governing chemical reactions in water. Emphasis on developing the ability to predict the aqueous chemistry of natural, engineered, and perturbed systems based on a knowledge of their biogeochemical setting. Calculation of quantitative solutions to chemical equilibria. Focus on inorganic chemistry. Topics include elementary thermodynamics, acid-base equilibria, alkalinity, speciation, solubility, mineral stability, redox chemistry, and surface complexation reactions. SC

EVST 347b, Introduction to Environmental Chemistry Gaboury Benoit

Introduction to environmental chemistry and to the nature and behavior of environmental pollutants, including chemical, biological, and physical processes. The fundamental classes of chemical reactions in the environment; critical analysis of chemical data; sampling techniques; analytical methods; natural biogeochemical controls on environmental chemistry. Case studies examine contaminants of special interest such as acid precipitation, nutrients, and sewage.

*** EVST 351b, The Anthropocene** Harvey Weiss

Examination of the detailed record of societal transformations of the earth from early agriculture through the Industrial Age, including the global interrelations of agriculture, deforestation, and carbon dioxide and methane production. The "Early Anthropogenic" hypothesis and its models for east Asia, west Asia, and Europe, as well as the global effects of subsequent land-use intensification and industrialization that mark the Anthropocene. SO

*** EVST 352b / AMST 304b, Food and Documentary** Ian Cheney

Survey of contemporary public debates and current scientific thinking about how America farms and eats explored through the medium of documentary film. Includes a brief history of early food and agrarian documentaries, with a focus on twenty-first century films that consider sustainable food. HU

*** EVST 362b / ARCG 362b / G&G 362b, Observing Earth from Space** Xuhui Lee and Ronald Smith

A practical introduction to satellite image analysis of Earth's surface. Topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, the merging of satellite imagery with GIS and applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, archaeology, and watershed management. Prerequisites: college-level physics or chemistry, two courses in geology and natural science of the environment or equivalents, and computer literacy. QR, SC

*** EVST 368b / HIST 491b / HSHM 479b / RLST 368b, The History of the Earth from Noah to Darwin** Ivano Dal Prete

Young earth creationism and flood geology have long been among the most divisive features of American culture and politics. Yet a basic postulate is shared across the spectrum: for better or worse, the old age of the Earth is regarded as the recent product of a secular science, consistently rejected by traditional Christianity. This seminar challenges this long-established narrative, by uncovering the surprising boldness, complexity, and societal diffusion of pre-modern debates on the history of the Earth, and of humankind itself. Students have opportunity to explore the nature, assumptions, and methods of Earth sciences before the advent of modern geology, to question ingrained assumptions about their relation to religion and society, and to place outstanding issues into historical perspective. How have the great monotheistic religions dealt with the possibility of an ancient Earth? Was a young creation always important in traditional Christianity? If not, what led to the emergence of young Earth creationism as a force to be reckoned with? What are the intellectual roots of American preadamism, which claims that the black and white races were created at different times and do not descend from the same ancestor? These and other questions are addressed not only through scholarly literature in the field, but also with the analysis of literary, visual, and material sources available on campus. WR, HU

*** EVST 399a / ANTH 478a / ARCG 399a / NELC 399a, Agriculture: Origins, Evolution, Crises** Harvey Weiss

Analysis of the societal and environmental drivers and effects of plant and animal domestication, the intensification of agroproduction, and the crises of agroproduction: land degradation, societal collapses, sociopolitical transformation, sustainability, and biodiversity. SO

*** EVST 415b / BENG 405b, Biotechnology and the Developing World** Anjelica Gonzalez

Study of technological advances that have global health applications. Ways in which biotechnology has enhanced quality of life in the developing world. The challenges of implementing relevant technologies in resource-limited environments, including technical, practical, social, and ethical aspects. Prerequisite: MCDB 120, or BIOL 101 and 102.

*** EVST 422a / ANTH 409a / ER&M 394a / F&ES 422a, Climate and Society from Past to Present** Michael Dove

Discussion of the major traditions of thought – both historic and contemporary – regarding climate, climate change, and society; focusing on the politics of knowledge and belief vs disbelief; and drawing on the social sciences and anthropology in particular. SO

*** EVST 424a / ANTH 406a / PLSC 420a, Rivers: Nature and Politics** James Scott

The natural history of rivers and river systems and the politics surrounding the efforts of states to manage and engineer them. SO

*** EVST 430b / AMST 425b / ENGL 430b, American Culture and the Rise of the Environment** Michael Warner

U.S. literature from the late eighteenth century to the Civil War explored in the context of climate change. Development of the modern concept of the environment; the formation and legacy of key ideas in environmentalism; effects of industrialization and national expansion; utopian and dystopian visions of the future. WR, HU

*** EVST 454b / PLSC 454b, Data Science for Politics and Policy** Fredrik Sävje

Data plays an increasingly important role in policy making and politics. The ability to draw valid conclusions from quantitative information can tilt elections or be the difference between a successful or failed policy. This course teaches how to use tools from statistics, data science, and machine learning to solve problems and challenges faced in policy making and politics. Students learn how data can help people make campaign decisions, detect election fraud, predict election outcomes, and investigate if a policy had the intended effect. Students receive an introduction to statistical programming in R, supervised and unsupervised machine learning, and causal inference.

QR, SO

* **EVST 463a and EVST 464b / AMST 463a and AMST 464b / FILM 455a and FILM 456b, Documentary Film Workshop** Charles Musser

A yearlong workshop designed primarily for majors in Film and Media Studies or American Studies who are making documentaries as senior projects. Seniors in other majors admitted as space permits. RP

* **EVST 473b / ANTH 473b / ARCG 473b / NELC 473b, Climate Change, Societal Collapse, and Resilience** Harvey Weiss

The coincidence of societal collapses throughout history with decadal and century-scale abrupt climate change events. Challenges to anthropological and historical paradigms of cultural adaptation and resilience. Examination of archaeological and historical records and high-resolution sets of paleoclimate proxies. HU, SO

Senior Project

* **EVST 496a or b, Senior Research Project and Colloquium** Staff

Independent research under the supervision of members of the faculty, resulting in a senior essay. Students meet with peers and faculty members regularly throughout the fall term to discuss the progress of their research. Projects should offer substantial opportunity for interdisciplinary work on environmental problems. Students typically complete a two-term senior essay, but students completing the requirements of two majors may consider a one-term senior project.