Environmental Studies (CLA) (ENST)

Course information contained within the Bulletin is accurate at the time of publication in August 2023 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

ENST 0842. Sustainable Environments. 3 Credit Hours.
Humans are at a critical juncture in their relationship with the environment. Many of the global changes occurring in the atmosphere, climate, and oceans can be attributed to human activity. While the standard of living has increased for many people across the globe, the technological advancements that have made this possible endanger future generations because of their environmental impacts. Environmental toxins and air pollution are increasing, and fossil fuels and forests are being depleted at unsustainable rates. Now more than ever, the viability of human life depends on the scientific understanding of global environmental change, and on developing science-based policies to both protect the environment and promote human well-being in a just and sustainable manner. Course mission: enhance your capability to be environmentally informed consumers and citizens based on a sound understanding of the ecological, technological, economic, political, and ethical dimensions of environmental sustainability. NOTE: This course fulfills a Science & Technology (GS) requirement for students under GenEd and Science & Technology Second Level (SB) for students under Core. Students cannot receive credit for this course if they have successfully completed EES/Geology 0842, ENST 0942, or GUS 0842/0942.

Course Attributes: GS, SE, SF, SP, SS

Repeatability: This course may not be repeated for additional credits.

ENST 0942. Honors Sustainable Environments. 3 Credit Hours.
Humans are at a critical juncture in their relationship with the environment. Many of the global changes occurring in the atmosphere, climate, and oceans can be attributed to human activity. While the standard of living has increased for many people across the globe, the technological advancements that have made this possible endanger future generations because of their environmental impacts. Environmental toxins and air pollution are increasing, and fossil fuels and forests are being depleted at unsustainable rates. Now more than ever, the viability of human life depends on the scientific understanding of global environmental change, and on developing science-based policies to both protect the environment and promote human well-being in a just and sustainable manner. Course mission: enhance your capability to be environmentally informed consumers and citizens based on a sound understanding of the ecological, technological, economic, political, and ethical dimensions of environmental sustainability. NOTE: This course fulfills a Science & Technology (GS) requirement for students under GenEd and Science & Technology Second Level (SB) for students under Core. Students cannot receive credit for this course if they have successfully completed EES/Geology 0842, ENST 0842 or GUS 0842/0942.

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR.

Course Attributes: GS, HO, SE, SF, SP, SS

Repeatability: This course may not be repeated for additional credits.

ENST 2001. Environment and Society. 3 Credit Hours.
This course emphasizes the human dimensions of the relationship between societies and their natural environments. Students will be introduced to those ecological principles that are necessary to understand cultural, social, political, and economic questions at a variety of geographic scales.

Course Attributes: SI

Repeatability: This course may not be repeated for additional credits.

ENST 2002. Physical Geography. 4 Credit Hours.
Physical Geography is a foundational course for Geography and Environmental Studies, providing a basic introduction to physical phenomena and processes. It is about the earth's spheres: the atmosphere, hydrosphere, biosphere, and lithosphere. We will spend about two-thirds of our time on the basics of earth-sun relations, the earth's atmosphere and oceans, climate and weather, and water resources. The other third of the course is principally about tectonic processes and geomorphology, as well as a culminating section on the earth's biomes (major geographic regions defined mainly by climate and characterized by distinct communities of flora and fauna). The main objectives are to broaden and deepen your understanding of our physical environment. Moreover, you should be able to apply what you've learned to critical analysis of various timely and important issues - such as climate change, vulnerability to environmental hazards, and approaches to mitigating and adapting to environmental change. Though this course focuses on the physical environment, the geographic approach is very much about the relationships between humans and their environments, between nature and society. We will not view the physical environment in isolation from human dimensions and interactions.

Course Attributes: SE, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 2017. Population Geography. 3 Credit Hours.
This course provides an introduction to human populations with respect to size, composition and spatial distribution, and the issues surrounding the geographic distribution of populations at the world, regional, and local level. Emphasis will be placed on the role of population processes (mortality, fertility, migration), and population structures (age, gender, ethnicity), on economic, social, technological and political development and changes in different parts of the world. Topics covered in this course include: population policies, theories of population change, international and domestic migration flows, cultural and economic influences on population processes, urbanization, and population related issues such as food insecurity, political conflict, poverty, health and disease, and environmental degradation. Lectures and exercises will also familiarize students to publicly available population data and introduce basic analytical techniques used to measure fertility, mortality and migration.

Repeatability: This course may not be repeated for additional credits.

ENST 2022. Gender, Race, Class, and the City. 3 Credit Hours.
This course will focus on the ways that race, class, and gender significantly shape US cities and urban life. The course will explore how urban spaces reflect and perpetuate different relations of power, inequity, and identity. How do multiple and contradictory identities shape one's experience of the city? How are economic, social, and political processes interacting with public policy (or the lack thereof) to determine how resources and power are unequally distributed? How are contemporary urban sustainability initiatives imbued with racial, gender, and class politics? First, we explore critical geographic frameworks for urban analysis that help to explain the social and spatial organization of US cities. We will develop a framework for urban analysis that integrates race, class, and gender, and draws upon the geographic concepts of place and scale. Second, we will use qualitative methods to apply our integrated framework to contemporary metropolitan processes and problems in the Philadelphia area. Key topics that we will address include: everyday experiences of urban life in public and private spaces; environmental (in)justice; neoliberal urban governance; urban social movements; and urban policy and planning. NOTE: The following course numbers are cross-listed: GUS 2022, ENST 2022, or GSWS 2022; students may receive credit for only one of these instances.

Repeatability: This course may not be repeated for additional credits.

ENST 2025. Environmental Law and Regulation. 3 Credit Hours.
This course analyzes how our society protects (or fails to protect) the environment through law and regulation. Students will examine and compare several U.S. environmental laws that are designed to redress environmental damage and to protect the environment. In doing so, they will analyze the relative costs and benefits of various forms of environmental regulation within the context of the American political, administrative, and legal systems. The course focuses on U.S. environmental law, but will also consider the increasingly important field of international environmental law and agreements. Duplicate credit warning: This course was previously taught under ENST 3025. Students who have earned credit under the prior number will not earn additional credit if the course is repeated.

Course Attributes: SF, SP, SS

Repeatability: This course may not be repeated for additional credits.

ENST 2051. The Urban Environment. 3 Credit Hours.
This course examines the interactions between theory, policy, and the urban environment. Students have the opportunity to study the urban environment not only as a physical landscape or natural ecosystem, but also as a constructed landscape shaped by local, regional and global social, economic and political processes. The course addresses issues that continue to challenge urban society, including environmental injustice and racism, degradation of local environmental quality, the impact of local-global relationships on community-scale environments and the commodification of nature.

Course Attributes: SE, SF, SP, SS

Repeatability: This course may not be repeated for additional credits.

ENST 2096. Problems of Environmental Quality. 3 Credit Hours.
Specific environmental problems, especially in the Philadelphia area. Students acting as research teams seek better understanding of such problems and practical solutions to them. Duplicate credit warning: This course was previously taught under GUS and ENST 4096. Students who have earned credit under the prior number will not earn additional credit if the course is repeated.

Course Attributes: SF, WI

Repeatability: This course may not be repeated for additional credits.

ENST 2097. Research Design in Environmental Studies. 3 Credit Hours.
This course is an introductory survey of research design in Environmental Studies. It is designed to allow students to explore what it means to conduct social science research, particularly around issues of sustainability. Students have the opportunity to learn how to research using scholarly articles, write a literature review, and collect and analyze primary and secondary data. Methods covered include case study research, interview design and technique, analysis of census data, and tools commonly used in community and participatory action research. Individual assignments will focus on researching sustainability. This is a writing intensive course and will require extensive writing and revision of your assignments in a semester long assignment sequence.

Course Attributes: SF, WI

Repeatability: This course may not be repeated for additional credits.

ENST 2157. Environmental Ethics. 3 Credit Hours.
A study of the ethical dimensions of several contemporary environmental controversies. The course examines the major theoretical approaches to environmental ethics, including human-centered (anthropocentric), animal-centered (zoocentric), and nature-centered (biocentric and ecocentric) value systems, as well as the most important critiques of these ethical approaches. The course will also address specific issues such as biodiversity and wilderness preservation; human use of animals as food, entertainment, and research subjects; environmental racism and toxic dumping; sustainable development, population and consumption. NOTE: Students will receive credit only one time for any of the following course numbers: ENST 2157, ENST 2957, PHIL 2157, or PHIL 2957.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 2957. Honors Environmental Ethics. 3 Credit Hours.
A study of the ethical dimensions of several contemporary environmental controversies. The course examines the major theoretical approaches to environmental ethics, including human-centered (anthropocentric), animal-centered (zoocentric), and nature-centered (biocentric and ecocentric) value systems, as well as the most important critiques of these ethical approaches. The course will also address specific issues such as biodiversity and wilderness preservation; human use of animals as food, entertainment, and research subjects; environmental racism and toxic dumping; sustainable development, population and consumption.

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR.

Course Attributes: HO, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3000. Special Topics in Environmental Studies. 3 Credit Hours.
Variable offerings on special topics that are not part of the standard roster of courses. Check with the Environmental Studies office and/or web site (www.temple.edu/cla/es) for details on Special Topics courses.

Course Attributes: SF

Repeatability: This course may be repeated for additional credit.

ENST 3001. Earth Ethics. 3 Credit Hours.
What ethical relationship do human beings have to the natural world? What cultural and religious values, conceptions, and assumptions have shaped human interactions with the environment? Through also examining practical issues such as sustainability, technology, and urban living, students will assess individual life-styles and alternative visions of the good life on planet Earth. Note: This course is cross-listed with Religion 3001 and Asian Studies 3001. Students may only receive credit once for these courses: ASST 3001, ASST 3904, ENST 3001, ENST 3904, REL 3001, or REL 3904.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3004. Geography of Natural Resources. 3 Credit Hours.
The material goods you use on a daily basis (e.g. food, phones, furniture) are linked to the production of natural resources. This course helps us to understand how our everyday consumption patterns are connected to resource production and distribution on a global scale and what the social, environmental, and economic impacts of natural resource production are. To explore the complicated intersection of resource management, economics, and development, we examine the literature on natural resource development, allocation, management, and geopolitics as they relate to economic systems and "development." We draw on case studies that include production for the global market, as well as local subsistence systems. Through these cases, we examine the geography of resource flows, from the sites of extraction to the sites of consumption. We consider the role of technology and capital investment in the production of resources, property institutions and regulatory regimes, commodity chains, and sustainability concerns associated with resource production. The production of and competition for the control of key natural resources, by corporations, societies, and states, are critical processes in constructing the global economy. These processes materially transform the conditions of societies, as well as, contribute to the shaping of those societies, politically and economically.

Course Attributes: SE, SI, SP, SS

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in ENST 2001.

ENST 3015. The Geographic Basis of Land Use Planning. 3 Credit Hours.
An examination of the forces that influence land use planning in and around American metropolitan regions. Considers economic perspectives (land values), public interest perspectives (zoning subdivision, housing and building codes, redevelopment and renewal programs, etc.), and social perspectives of land use. Also examines separately housing, commercial locations, and industrial development. Duplicate credit warning: This course was previously taught under GUS and ENST 4015. Students who have earned credit under the prior number(s) will not earn additional credit if the course is repeated.

Repeatability: This course may not be repeated for additional credits.

ENST 3023. Police, Prisons, and Pollution. 3 Credit Hours.
In 2001, a group of farmworkers, environmental justice activists, and anti-prison organizers in California held a conference called "Joining Forces: Environmental Justice and the Fight against Prison Expansion." The goal was to interrogate prisons as forms of environmental racism and injustice and to build coalitions between the anti-prison and environmental justice movements. This course takes as a starting point an insight made by a group of youth participants at that conference: that the greatest threats to their communities constituted "three Ps," police, prisons, and pollution. We will explore critical texts and organizing surrounding police, prisons, and pollution. How do struggles for environmental justice intersect with organizing against police and prisons? How are racial and class disparities heightened through overlapping geographies of policing, incarceration, and environmental pollution? How do policing and imprisonment operate as environmental toxins themselves, much like pesticides and greenhouse gas emissions? As a major component of the course, students will work on group projects examining the intersections of policing, incarceration, and pollution.

Course Attributes: SE, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3051. Environmental Policy Issues. 3 Credit Hours.
How are environmental policies formulated and implemented in the U.S.? Topics include the role of citizen participation in decision-making, the place of environmental impact assessment, environmental justice and equity, intergovernmental relations, and environmental obligations of the U.S. toward less developed countries.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3052. Environmental Problems in Asia. 3 Credit Hours.
Japan is used as an introduction and model for examining environmental issues in several East and Southeast Asian countries. Emphasis is on deforestation, river basin development, urban planning, ecotourism, and the role of non-governmental organizations. Note: This course is cross-listed with Geography and Urban Studies 3052 and Asian Studies 3052. Students may only receive credit once for these courses: ASST 3052, ENST 3052, or GUS 3052.

Course Attributes: SE, SF, SP, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3053. Climatology. 3 Credit Hours.
In this course, we study global climate patterns and the underlying processes that shape them. Among the specific topics we examine are: global distribution of individual climate elements, upper-atmospheric waves and jet streams, use of web-based maps and data, construction of climate models, U.S. climate regions, and major global climatic regions. In the course's final weeks, we consider historic climates, climate change mechanisms, and forecasted future climates.

Course Attributes: SE, SI

Repeatability: This course may not be repeated for additional credits.

ENST 3054. Energy, Resources and Society. 3 Credit Hours.
Vital nonrenewable resources are identified and their global and North American distribution, character, and utilization studied. Special attention to energy sources now in short supply and to benign renewable sources for future needs. NOTE: This course was previously titled "Energy, Resources, and Conservation" and students can receive credit only once for GUS 3054 or ENST 3054.

Course Attributes: SE, SF

Repeatability: This course may not be repeated for additional credits.

ENST 3055. Environmental Hazards and Disasters. 3 Credit Hours.
This course provides a synthesis of the social and natural dimensions of disasters. Students become familiar with the concept that disasters emerge when the specific characteristics of hazards (e.g. volcanoes, droughts, floods, tsunamis) intersect with social vulnerability (e.g. class, race, gender). Case studies from around the world are used to elaborate and explore this concept. Duplicate credit warning: This course was previously taught under GUS and ENST 4051 and was previously titled "Geography of Hazards." Students who have earned credit under the prior number(s)/title will not earn additional credit if the course is repeated.

Repeatability: This course may not be repeated for additional credits.

ENST 3056. Political Ecology. 3 Credit Hours.
This course addresses the broad themes of political ecology as an academic discipline as well as a set of theoretical and methodological tools. Historically political ecology has focused on the rural developing world, but more recent work has branched out into environmental justice and resource use in industrialized societies. The course covers the concepts that have distinguished political ecology from other types of analysis like cultural and human ecology. It also introduces students to the construction of theory including a consideration of space, scale, justice, feminism, property, and nature. Finally, the course presents students with diverse case studies that may include topics like resource use, mining, bio-prospecting, forestry, conservation, fisheries, "sustainable" development, and eco-tourism. Duplicate credit warning: This course was previously taught under GUS and ENST 4056. Students who have earned credit under the prior number(s) will not earn additional credit if the course is repeated.

Course Attributes: SE, SI, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3057. Sustainable Cities. 3 Credit Hours.
This course introduces the concept of urban sustainability and explores environmental problems linked to urbanization, drawing on historical analysis, social theory, landscape ecology, and city planning/design practice. Can we make cities sustainable places to live? If so, how? The goal of this course is to provide students with an opportunity to learn about the major environmental challenges facing cities in the developed and developing world and to learn about innovative solutions that cities are adopting to address them. We will also explore how the political, social, and environmental context affects a city's ability to implement sustainable policies. The course will cover topics such as sustainable city strategies, ecological footprints, urban metabolism, mega-cities, urban ecology, cities and climate change adaptation and mitigation, water management, urban gardening/farming, measuring sustainability, planning strategies, smart growth, carbon neutral cities, metropolitan governance, green buildings, environmental justice, green infrastructure, and green investment strategies, etc.

Course Attributes: SE, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3058. Environment and Development. 3 Credit Hours.
Is capitalism at the heart of environmental change? What does it mean to divide nations into "developed" and "developing" countries? Whose definition of progress guides policy promoting sustainable urbanization and development? How do we create parks and green infrastructure without displacing people? This course will contextualize these and related questions to understand and think critically about environment and development. By the end of the semester, you will be able to speak, read and write with fluency about contemporary nature-society relations using concrete examples drawn from historical and contemporary contexts. This course is cross-listed with GUS 3058. Duplicate Credit Warning: This course was previously offered as ENST 3097. Students may receive credit for one of the following course numbers: ENST 3097, GUS 3097, ENST 3058 or GUS 3058.

Course Attributes: SE, SF, SP

Repeatability: This course may not be repeated for additional credits.

ENST 3061. Fundamentals of Cartography. 3 Credit Hours.
This course is designed to introduce students to cartography and computer mapping. Through hands-on exercises, students will manipulate data, compare map projections, design, execute, and reproduce small-scale thematic maps suitable for publication using computer software. A final project involves the production of maps in color. NOTE: No prior computer knowledge is necessary.

Repeatability: This course may not be repeated for additional credits.

ENST 3062. Fundamentals of Geographic Information Systems. 3 Credit Hours.
This course teaches the theory and practical use of Geographic Information Systems (GIS). Major components of the course include vector and raster spatial data models and operations, including vector overlay and raster map algebra. At the end of the course students are expected to have an understanding of elementary GIS theory, working knowledge of a GIS software package, and the ability to develop GIS-based solutions to geographic modeling and analysis tasks. Note that students who take GUS 3062 will not receive duplicate credit if they register for ENST 3062.

Repeatability: This course may not be repeated for additional credits.

ENST 3063. Environmental Remote Sensing. 3 Credit Hours.
This course will teach the basic principles of environmental remote sensing using aerial photography and satellite imagery. Topics covered include the mechanics of aerial photography and satellite remote sensing systems, photointerpretation, image rectification, and image processing and classification. Emphasis will be on urban and environmental applications.

Course Attributes: SF

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (ENST 3062 or GUS 3062)

ENST 3064. Qualitative Methods. 3 Credit Hours.
This class is designed to expose students to the purpose, scope and procedures of qualitative research, applied in different disciplines but especially in environmental studies, geography, and urban planning. It provides an opportunity for students to create qualitative research design schemes, and critically analyze research using these methods. Note: This course is equivalent to GUS 3064; students may receive credit for either ENST 3064 or GUS 3064.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 2197 or ENST 2097)

ENST 3065. Census Analysis with GIS. 3 Credit Hours.
Introduction to analysis with Census data products for the US, including Decennial Census and American Community Survey. Methods for analyzing segregation, environmental justice, migration and mobility, commuting trends, etc. Students will learn how to combine Census data with data from other sources using incommensurate geographies. Heavy emphasis on open source tools. Note: Formerly offered as GUS/ENST 4068. Students who have received credit for GUS 4068, ENST 4068 or GUS 3065 will not receive additional credits for this course.

Repeatability: This course may not be repeated for additional credits.

ENST 3067. GIS and Location Analysis. 3 Credit Hours.
This course examines the concepts and techniques of location analysis - how to 1) describe the spatial arrangements of features on the earth's surface and 2) prescribe the best location or spatial arrangement of features for a particular activity - for economic and social service applications. The course introduces concepts in Geographic Information Systems (GIS) and spatial statistics to address issues of location. NOTE: Students who have already earned credit for GUS 3067 will not earn additional credit for ENST 3067.

Repeatability: This course may not be repeated for additional credits.

ENST 3068. Environmental Impact Assessment. 3 Credit Hours.
This course addresses the methods of environmental impact assessment (EIA). During the course of your environmental careers, most of you will be expected to conduct, reference, evaluate, or otherwise incorporate EIA into your work. Most EIA's incorporate a diverse set of research methods - and an understanding of a wide-ranging set of research methodologies, and when and how to deploy them - is a central objective for this course.

Repeatability: This course may not be repeated for additional credits.

ENST 3069. GIS for Health Data Analysis. 3 Credit Hours.
Geographic Information Systems (GIS) has emerged as an essential tool for health researchers and practitioners. This course provides an introduction to the most common geographic methods utilized in health research and spatial epidemiology for mapping and analyzing health disparities, disease risk factors, health services and geographic variation in health outcomes and disease. Through lecture and laboratory exercises students will learn how to create and edit spatial data, create disease maps, develop neighborhood-based measures, conduct geographic cluster detection and point pattern analysis, map geographic health disparities, measure access to health services, and critically assess potential study bias introduced from missing geographic data or positional accuracy. Selected case studies will be presented in order to highlight methods and techniques and hands-on experience will be gained through laboratory exercises and real-world applications. Guest speakers will be invited to share their real-world examples of GIS in health research and practice.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3161, ENST 3161, SOC 3201, STAT 2103, PBHL 2219, CJ 2602, or ANTH 3771)

ENST 3071. Health Geography. 3 Credit Hours.
Health geography applies concepts and methods from the discipline of geography to study medical and health related events and topics. Health geography has a close disciplinary tie with epidemiology, biostatistics, medical ecology and medical anthropology, but it is differentiated by its focus on the spatial distributions of health/medical related events. By focusing on geographic scale and the location of health events we can more accurately account for data variability and provide a more accurate representation of a population's health. Throughout the course, we will examine numerous examples of how geographic scale and measurement can influence study results or how health resources or events appear to be distributed. The class will provide a broad introduction to medical geography touching on the topics of disease ecology, geographical information systems for public health, disparities in health and healthcare, and various methods and data sources for analyzing health/medical data. Duplicate credit warning: This course was previously taught under ENST and GUS 4071. Students who have earned credit under the prior number(s) will not earn additional credit if the course is repeated. NOTE: This course was previously titled "Medical Geography." Students who completed the course under the prior title will not earn additional credit if the course is repeated.

Repeatability: This course may not be repeated for additional credits.

ENST 3085. Internship in Environmental Studies. 3 Credit Hours.
This course is offered in both fall and spring semesters to accompany on-the-job training with local consulting firms, planning agencies, private companies, non-profits, and various state, local and federal agencies of government, mostly but not exclusively in the Philadelphia metro area. Students will apply the knowledge and skills they have acquired in an array of both natural and social science courses to address some of the major environmental challenges on local, regional, and international scales. Students need to arrange their own positions, usually after consulting with the department's internship coordinator. The search for a placement should start several months in advance of the semester or summer session when the internship will take place. The course is available to GUS/ES majors only. NOTE: The student's advisor and/or Environmental Studies Internship Coordinator arrange internship placement and evaluation. Duplicate credit warning: This course was previously taught under GUS 4085/ENST 4085. Students who have earned credit under the prior number(s) will not earn additional credit if the course is repeated.

Repeatability: This course may not be repeated for additional credits.

ENST 3152. U.S. Environmental Policy. 3 Credit Hours.
An analytical examination of the development and execution of governmental policies in such areas as air and water pollution control, control of atomic energy, and planning of space exploration program.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3161. Spatial Statistics. 3 Credit Hours.
This course provides an introduction to statistical analysis with an emphasis on urban applications. The course covers basic statistical principles of sampling, probability, and tests of significance, measures of association; ordinary least squares regression; factor, principal component and cluster analysis and an introduction to spatial applications of these tools. The course is focused on the practical application of these techniques through exposure to the rationale and principles underpinning them. Students will attend lectures and complete problem sets that provide practical experience in the application of the theoretical concepts and methodologies. Note: This course is equivalent to GUS 3161; students may receive credit for either ENST 3161 or GUS 3161.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (MATH 0701, MATH 0702, MATH 1021, MATH 1022, MATH 1041, MATH 1941, 'Y' in MC3, any course with attribute "QA", any course with attribute "QB", 'Y' in MC3A, 'Y' in MC3S, 'Y' in MC4, 'Y' in MC5, 'Y' in MC6, 'Y' in MC6A, 'Y' in MATW, 'Y' in MC3D, 'Y' in MC3O, 'Y' in MC3T, or 'Y' in MC6T)

ENST 3170. Methods in Archaeology. 3 Credit Hours.
A series of practical, topical courses which deal with aspects of archaeological fieldwork and laboratory analysis. The topic or focus of the course varies by semester and includes: field methods; ceramic analysis; lithic analysis; soils and stratigraphy.

Repeatability: This course may be repeated for additional credit.

ENST 3175. Heritage Management in Archaeology. 3 Credit Hours.
The United States and other governments of the world have legal mandates to manage cultural resources on behalf of the public. This course focuses on the archaeological component of cultural resources management in the United States and its linkage with environmental and developmental planning. Participants are given a working knowledge of how the system works, and how to work within it as a professional through a series of readings, classroom discussions, and hands-on exercises. Topic coverage includes: relevant legislation; the phased approach to archaeological and historical research; state and federal review procedures; proposal writing; interacting with clients, native peoples, and the public; professional ethics and standards. The nature of heritage management in other countries is considered for comparative purposes and as a way of illuminating the historical, socio-economic, and legal factors that have shaped the practice in the United States. NOTE: This course helps to satisfy topical requirements in the Anthropology major and the Environmental Studies major.

Course Attributes: SI

Repeatability: This course may not be repeated for additional credits.

ENST 3189. Field Session in Archaeology. 3 Credit Hours.
Techniques and concepts of field archaeology. Students will be expected to spend the greatest part of the session in the field during the excavation of prehistoric and historic sites.

Repeatability: This course may be repeated for additional credit.

ENST 3214. North American Environmental History. 3 Credit Hours.
This course examines the interactions between human societies and the natural world in North America. That relationship is complex: the environment both reflects people's influences and affects human history. Through lectures, readings, and discussion, participants in this course will examine this reciprocal relationship. Issues to be discussed in the course include Native American management of the environment; the effects of the European ecological invasion; resource exploitation in the industrial era; the foundations of the preservationist and conservationist movements at the beginning of the 20th century; the evolution of 20th century environmentalism; and the historical context of current environmental problems.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3221. Land System Science. 3 Credit Hours.
This course will provide scientific and theoretical foundations and practical applications of land system science. The course will include a description of the main theories and conceptual frameworks used to understand complex interactions between human decisions and ecological processes that derive into changes in the land system. The course also explores the sustainability implications of such changes for biodiversity conservation and people's wellbeing across different locations and scales. Students will become familiar with available technologies for monitoring, modeling and predicting land system change. The course will also draw on concepts and techniques from landscape ecology, land system modeling and scenario building to teach students how to assess social and ecological consequences of land system change and to inform land use decisions. This course is cross-listed with GUS 3221.

Repeatability: This course may not be repeated for additional credits.

ENST 3265. International Environmental Policy. 3 Credit Hours.
International negotiations and agreements on environmental problems, and comparisons of domestic environmental policymaking among selected countries. Special attention to negotiations on atmospheric and oceanic policies, international regulation of nuclear materials, and environmental aspects of international trade agreements. NOTE: Students will receive credit only once for either POLS 3265 or ENST 3265.

Course Attributes: SE, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3307. Transportation and Culture. 3 Credit Hours.
Students will learn to approach the modern geography of transportative possibility from a critical standpoint. Rather than accepting this contemporary geography as being the outcome of supposedly "superior" transport technologies' rendering marginalized technologies obsolete, students will examine how processes of cultural, political, and environmental struggle have shaped, opened up, and in some cases limited the modern array of possibilities for human mobility. Waterborne, animal-based, and human-powered modes of transportation will receive special attention, as will ongoing debates and struggles over automobile planning and mass transit. The history of transportation will be presented as necessarily entangled with parallel histories of public protest, working-class knowledge, emergency logistics, human-animal relations, guerilla warfare, unrealized technologies, and political oppression. The course readings will look at many parts of the world: the United States, Canada, Southeast Asia, North Africa, the Middle East, China, Western Europe, the Caribbean, and Polynesia.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3314. Food Studies: A Geographical Perspective. 3 Credit Hours.
This course introduces students to key issues in food studies from a geographical and environmental perspective. The course includes an overview of the agricultural transitions, and examines issues of food security, access and control, ultimately focusing attention on the question of how to produce more just food systems. A major goal of this course is to give students a basic foundation from which to understand and interpret food systems as well as to familiarize students with today's major issues in research on food. Note: This course is equivalent to GUS 3314; students may receive credit for either ENST 3314 or GUS 3314.

Course Attributes: SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 3511. Sociology of the Environment. 3 Credit Hours.
In the first half of the course, we will focus on the interaction among four components: population size, social organization, environmental conditions and available technology. We will consider issues such as the relationships among the technology of farming, the volume of agricultural production and the availability of labor for economic development. We will also learn about "input-output" models focusing on the intensity of resource use as well as problems of waste management. In the second half of the course, we will concentrate on issues of social organization. What kinds of political arrangements do we see for the management of waste? How does the transfer of natural resources from resource-rich but economically underdeveloped countries to the United States and other industrial societies affect the social, economic and political arrangements of both groups of countries? Finally, we will address the question of whether the social will can be organized in such a way as to reduce the pressure on the environment and remaining natural resources.

Repeatability: This course may not be repeated for additional credits.

ENST 3596. Energy, Ecology, and Economy. 3 Credit Hours.
After surveying the elements of energy and ecology, and reviewing the basics of economics, this course investigates the interaction of the three. Each of the major nonrenewable and renewable energy sources is examined in light of its "eco-feasibility." The potential of energy conservation is examined, and the need for energy/environmental/economic (3-E) policy is debated. Some speculations about future 3-E scenarios are offered, as the U.S. and the rest of the world face their energy, ecological, and economic problems.

Course Attributes: SE, SF, SP, WI

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (ECON 1101 or ECON 1901) and (ECON 1102 or ECON 1902)

ENST 3900. Honors Special Topics. 3 Credit Hours.
Variable Honors offerings on special topics that are not part of the standard roster of courses. Check with the Environmental Studies office and/or web site (www.temple.edu/cla/es) for details on Special Topics courses.

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR.

Course Attributes: HO

Repeatability: This course may be repeated for additional credit.

ENST 3904. Honors Earth Ethics. 3 Credit Hours.
What is, or should be, our relation to the natural world? Especially since we are presently living in a modern urban environment, have we perhaps outgrown nature? Is it something we have mastered? Is it primarily a luxury of sorts that we can go to for periodic enjoyment or relaxation? On the other hand, why do we seem to be in a burgeoning environmental crisis? Is it just greed? Too many people? Insufficient technology? How did we get to where we are? Or more immediately--and perhaps deeply--what fundamental beliefs, attitudes, and values shape our everyday actions, how we perceive and use (or misuse) the earth? What creative alternatives can we find, and how can we apply them? In addressing these kinds of questions we will explore both Western and Asian ways of conceiving and interacting with the natural world, past and present. Our approach will also be interdisciplinary, including materials from art, film and literature, as well a range of academic disciplines. NOTE: This is an University Honors course.

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR.

Course Attributes: HO, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 4000. Special Topics in Environmental Studies. 3 Credit Hours.
Seminars on special topics vary according to the instructor. Check the course schedule for specific seminar topics.

Repeatability: This course may be repeated for additional credit.

ENST 4017. Health and Environment Seminar. 3 Credit Hours.
This course addresses the relationship between community-level characteristics, such as neighborhood socioeconomic disadvantage, with health outcomes, with an emphasis on health behaviors such as substance use, exercise, and healthy eating. Access to resources such as health services and nutritious food will be examined, as will exposure to harmful or risky environment conditions that can promote disease. A methodological focus will address how environmental influence on health is analyzed, as well as how individual-level characteristics such as age, sex, and race/ethnicity may moderate such influences. The role of community level factors in health disparities will also be examined. NOTE: Students can receive credit only once for either: ENST 4017, GUS 4017, ENST 4917, or GUS 4917.

Course Attributes: SE, SF, SS

Repeatability: This course may not be repeated for additional credits.

ENST 4061. Cartographic Production. 3 Credit Hours.
A course concerned with aspects of storage, retrieval, and display of information within geographic information systems. Emphasis will be placed on computer mapping. NOTE: This course is cross-listed with GUS 4061; students will only receive credit for one course from GUS 4061 and ENST 4061.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (ENST 3061 or GUS 3061)

ENST 4064. Web Mapping and GIS. 3 Credit Hours.
In this course, students will explore theoretical and practical concepts of Web Mapping (GIS and spatial data visualization on the Internet). From a theoretical perspective they will study advantages and techniques for publishing, visualizing and accessing maps and data on the Internet. This entails examining architectures of Web GIS/Web mapping systems, markup languages (e.g. HTML, XML, SVG, and KML), scripting languages, screen cartography, data sharing and geoportals, as well as social and critical perspectives toward web mapping. From a practical perspective they will learn to develop Web mapping applications including static and interactive platforms. They will also learn and work with some well-known open source software and libraries.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3062 or ENST 3062)

ENST 4065. Urban Geographic Information Systems. 3 Credit Hours.
The purpose of this course is to build on the basic principles of the introductory GIS course to demonstrate how GIS may be applied to the analysis of physical and human systems. Topics of the course include vector and raster data integration; address matching, geocoding, and network analysis; terrain and hydrological analysis; and interpolation of environmental and population data. At the end of the course the student is expected to grasp advanced GIS analysis and modeling concepts.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3062 or ENST 3062)

ENST 4066. Environmental GIS. 3 Credit Hours.
Geographic Information Systems are widely used to investigate environmental processes and to develop solutions to environmental issues. This course will build upon concepts introduced in Fundamentals of GIS to investigate how the techniques, data, and interpretations from GIS analysis are applied across a variety of environmental fields. Topics to be covered include natural hazard vulnerabilities, global climate change, renewable energy potential, environmental health, and conservation.

Course Attributes: SE, SF

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3062 or ENST 3062)

ENST 4068. Census Analysis with GIS. 3 Credit Hours.
Introduction to analysis with Census data products for the US, including Decennial Census and American Community Survey. Methods for analyzing segregation, environmental justice, migration and mobility, commuting trends, etc. Students will learn how to combine Census data with data from other sources using incommensurate geographies. Heavy emphasis on open source tools.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3062 or ENST 3062)

ENST 4072. Advanced Remote Sensing. 3 Credit Hours.
This hands-on course will provide skills and knowledge for the effective and efficient processing and analysis of satellite data for advanced applications with emphasis in the application of remote sensing for detecting and monitoring social and environmental changes. The course will include a semester-long project where students will apply the concepts and procedures learned to their own research or a particular topic of their interest.

Course Attributes: SF

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3062 or ENST 3062) and (GUS 3063 or ENST 3063)

ENST 4073. Geovisualization. 3 Credit Hours.
Maps can be powerful devices for communication, but also tools for exploration of relationships among social and physical processes manifesting in space. This computer-intensive course will focus on this dual purpose of maps as tools for visual communication and visual thinking. You will create data-driven products that combine geographic and statistical visualizations for static, interactive, and animated display. Previous experience with a programming language will be helpful. A previous course in cartography is recommended but not required. Heavy emphasis on open source tools.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (GUS 3161 or ENST 3161)

ENST 4082. Independent Study: Environmental Studies. 1 to 3 Credit Hour.
Duplicate Course: This course can only be counted one time for Environmental Studies elective credit. Directed reading and research on a specific topic in Environmental Studies agreed to by student and faculty member.

Repeatability: This course may be repeated for additional credit.

ENST 4117. Seminar in Environmental Archaeology. 3 Credit Hours.
This course introduces the student to the techniques and disciplines used in conjunction with archaeology to understand the environmental context and paleo-ecology of prehistoric cultures, as well as the nature of the archaeological record itself. Included in this survey are geology, soil and sediment analysis, geomorphology, palynology, ethnobotany and general floral analysis, phytolith analysis, zooarchaeology, and the analysis of blood and other residues found on artifacts. The range of contributions possible from interdisciplinary research will be explored in addition to how to design such research, how to communicate with specialists in other fields, and how to use existing sources of data to solve archaeological problems.

Repeatability: This course may not be repeated for additional credits.

ENST 4198. Senior Research Seminar. 3 Credit Hours.
Students engage in research projects, either as individuals or part of a team. Seminar meetings are devoted to analysis of a small set of readings, common discussion of research issues, and preparation for life beyond the baccalaureate. NOTE: Open only to Environmental Studies students.

Field of Study Restrictions: Must be enrolled in one of the following Fields of study: Environmental Studies.

Course Attributes: WI

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in ENST 2097.

ENST 4917. Honors Health and Environment Seminar. 3 Credit Hours.
This course addresses the relationship between community-level characteristics, such as neighborhood socioeconomic disadvantage, with health outcomes, with an emphasis on health behaviors such as substance use, exercise, and healthy eating. Access to resources such as health services and nutritious food will be examined, as will exposure to harmful or risky environment conditions that can promote disease. A methodological focus will address how environmental influence on health is analyzed, as well as how individual-level characteristics such as age, sex, and race/ethnicity. The role of community level factors in health disparities will also be examined. NOTE: Students can receive credit only once for either: ENST 4017, GUS 4017, ENST 4917, or GUS 4917.

Cohort Restrictions: Must be enrolled in one of the following Cohorts: UHONORS, UHONORSTR.

Course Attributes: HO, SE, SF, SS

Repeatability: This course may not be repeated for additional credits.