Carleton College (Northfield, MN)
Sustainability Course Identification Worksheet

Sustainability-focused courses concentrate on the concept of sustainability, including its social, economic, and environmental dimensions, or examine an issue or topic using sustainability as a lens.

Sustainability-related courses incorporate sustainability as a distinct course component or module or concentrate on a single sustinability principle or issue.

Dept	Course ID	Course	Sustainability-focused?	Sustianability-related?
17			32	52
Department: American Studies				
	AMST 230	The American Sublime: Landscape, Character & National Destiny in Nineteenth Century America		X
	AMST 240	The Midwest and the American Imagination		X
Department: Art & Art History				
	ARTH 267	Asian Studies - Her Gardens of China and Japan		X
	ARTS 113	Field Drawing		X

ARTS 140	The Digital Landscape		X
ARTS 212	Studio Art Seminar in the South Pacific: Mixed-Media Drawing		X
ARTS 275	Studio Art Seminar in the South Pacific: Physical & Cultural Environment of Australia & New Zealand		X

Department: Biology

BIOL 126	Energy Flow in Biological Systems		X
BIOL 210	Global Change Biology	X	
BIOL 221	Ecosystem Ecology		X

BIOL 238	Entomology		X
BIOL 250	Australia Program: Marine Biology		X
BIOL 252	Environmental Animal Physiology	X	
BIOL 308:			
	Biology in Australia and New Zealand: Ecology and Conservation in Ecology and New Zealand	X	
BIOL 350	Evolution		X
BIOL 352	Population Ecology		X
BIOL 374	Seminar: Grassland Ecology		X
BIOL 375	Natural History of Minnesota		X

Department: Cinema & Media Studies

CAMS 270	Cinema & Media Studies Nonfiction		X

Department: Chemistry

CHEM 128	Principles of Environmental Chemistry	X	

Department: English

ENGL 236	American Nature Writing		X
ENGL 247	The American West		X
ENGL 248	Visions of California		X

Department: Economics

ECON 120	Introduction to Geospatial Analysis		**X**

ECON 240	Microeconomics of Development		X
ECON 268	Economics of Cost Benefit Analysis	X	
ECON 269	Economics of Climate Change		
ECON 270	Economics of the Public Sector		X
ECON 271	Economics of Natural Resources and the Environment	X	
ECON 273	Water and Western Economic Development	X	

Department: ENTS

ENTS 100	Science, technology and Public Policy	X	
ENTS 110	Environment and Society	X	

ENTS 120	Introduction to Geospatial Analysis		X
ENTS 209	Public Rhetoric and Environmental Science	X	
ENTS 212	Global Food Systems	X	
ENTS 215	Environmental Ethics	X	
ENTS 232	Research Methods in Environmental Studies	X	
ENTS 244	Biodiversity Conservation and Development	X	
ENTS 248	Sustainable Development		X

ENTS 254	Topics in Landscape Ecology		X
ENTS 260	Comparative Agroecology	X	
ENTS 261	Field Investigation in Comparative Agroecology	X	
ENTS 262	Materials Science, Energy, Environment	X	
ENTS 264	Tanzania and Ethiopia Program: Agriculture and Rural Livelihoods in Sub-Sah	X	
ENTS 272	Remote Sensing of the Environment		X

ENTS 288	Abrupt Climate Change	X	
ENTS 395	Senior Seminar	X	
ENTS 400	Integrative Exercise	X	

Department: Geology

GEO 110	**Introduction to Geology and Lab**		**X**
	Climate change geology		
GEO 115			X
GEO 120	Introduction to Environmental Geology	X	
GEO 205	Geology of energy and mineral resources		X
GEO 210	Geomorphology		X

GEO 258	Geology of Soils		X
GEO 340	Hydrology		X
GEO 379	Geochemistry of Natural Waters		X

Department: History

HIST 205	American Environmental History	X	
HIST 227	History of the American West		X
HIST 306	American Wilderness		X
HIST 307	Wilderness Field studies: grand canyon		X

HIST 308	American Cities and Nature	X	
HIST 316	History, Nature and Smart Phones		X

Department: Mathematics

MATH 215	Introduction to Statistics		X

Department: Philosophy

PHIL 214	Ecology, Ethics, and Economics		**X**
PHIL 243	Animal Ethics: the moral status of animals		X

Department: Physics

PHYS 152	Introduction to Physics: Environmental Physics	X	

Department: Political Science

POSC 180	Global Politics and Local Communities		
POSC 209	Place, politics and citizen mobilization		X
POSC 211	Environment and the Evolution of Rules: Designing Institutions to Solve Political Problems		X
POSC 212	Environmental Justice	X	
POSC 222	The Politics of Food: Producers, Consumers and Citizenship	X	
POSC 223	Food Justice		X
POSC 224	Measuring and Evaluating Social and Ecological Systems		X
POSC 225	Global-Local Commons: Sustainability, Diversity, and Self Govt in Complex Sc	X	

POSC 268	International Environmental Political and Policies	X	
POSC 333	Global Soc Changes and Sustainability	X	
	Political Economy & Ecology of Southeast Asia: Diversity of Social Ecological Systems in Southeast A		
POSC 379.0			X

Department: Religion

RELG 243	Native American Religious Freedom		X

Department: Sociology and Anthropology

SOAN 203	Anthropology of good intentions		X
SOAN 233	Anthropology of Food		X
	Guatemala Prog: Resource Mgmt, Community Develpmnt & Soc Change in Guatemala & Chiapas		
SOAN 251			X

SOAN 302	Anthropology and Indigenous Rights		X
SOAN 323	Mother Earth: Women, Development and the Environment		X
SOAN 333	Environmental Anthropology	X	

Department: Spanish

SPAN 260	Forces of Nature		X
SPAN 219	Envisioning a Sustainable Future and an Equitable and Fair World	X	

Course ID	brief description where applicable
AMST 230	The American Sublime: Landscape, Character & National Destiny in Nineteenth Century AmericaFocusing on the early nineteenth century struggle to create an American nation and a national culture, we will look at the ways Americans adopted and adapted European ideas, particularly the aesthetic idea of the Sublime, in their attempt to come to terms with the conquest of the new land and its native inhabitants and with the nature of their national enterprise. Writers Irving, Cooper, Emerson, Thoreau, Hawthorne, Melville, Whitman, and Dickinson and painters Cole, Bierstadt, Church, Kensett, and Lane will be included. Major themes will include attitudes towards landscape and settlement, a distinctively American character, the nature and utility of art, and ideas of American empire. 6 credits; LA, WR2; Not offered 2017-18
AMST 240	The Midwest and the American Imagination The history of American culture has always been shaped by a dialectic between the local and the universal, the regional and the national. The particular geography and history of the Midwest (the prairie, the plains, the old Northwest, Native Americans and white adventurers, settlers and immigrants) have shaped its livelihoods, its identities, its meanings. Focusing on the late nineteenth and early twentieth centuries, this course will explore literature, art history, and the social and cultural history of the Midwest. 6 credits; HI, WR2; Not offered 2017-18
ARTH 267	Gardens in China and Japan A garden is usually defined as a piece of land that is cultivated or manipulated in some way by man for one or more purposes. Gardens often take the form of an aestheticized space that miniaturizes the natural landscape. This course will explore the historical phenomenon of garden building in China and Japan with a special emphasis on how cultural and religious attitudes towards nature contribute to the development of gardens in urban and suburban environments. In addition to studying historical source material, students will be required to apply their knowledge by building both virtual and physical re-creations of gardens. 6 credits; ARP, IS; Not offered 2017-18
ARTS 113	Field Drawing A beginning drawing course for students who are interested in developing their skills in drawing from nature. Much of the classwork will be done outdoors and deal directly with drawing from plant forms, geological sources, and the landscape as subjects. Emphasis will be placed on the development of the technical skills needed for visual note-taking and development of journals. Problems will deal with the analysis of space and objects through line, shape, volume, and tone. 6 credits; ARP; Spring; David Lefkowitz, Eleanor M Jensen

ARTS 140	The Digital Landscape Study nature aesthetics and examine your assumptions about the landscape photograph. Question the formal, moral and biological implications of your "framed view-point," as you move your lens across the prairies, woods and farmer's fields of Northfield. Reflect on the ways in which nature has been visually represented in the classroom, creating a three-way intersection between art, science and technology. In particular, what are the effects of two-dimensional representation on our estrangement from nature itself? Demonstrations, readings, discussions and field trips will help the student create a final portfolio of digital prints and text. Student must provide their own digital camera. 6 credits; ARP; Spring; Linda K Rossi
ARTS 212	Studio Art Seminar in the South Pacific: Mixed-Media Drawing This course involves directed drawing in bound sketchbooks, using a variety of drawing media, and requires on-going, self-directed drawing in visual journals. Subjects will include landscape, figure, portraits, and nature study. The course will require some hiking in rugged areas. Prerequisite: Studio Art 110 or 113. 6 credits; ARP; Not offered 2017-18
ARTS 275	Studio Art Seminar in the South Pacific: The Physical and Cultural Environment This course examines how Australia and New Zealand have changed since colonization. Students study the physical and environmental beginnings of these countries and learn about the history of their indigenous people, noting how the physical landscape has been changed through agriculture, mining, and the importation of non-native species. This course will include readings, meetings with visiting artists and lecturers, and visits to cultural centers. Prerequisite: Studio Art 110 or 113 and acceptance to Carleton OCS program. 6 credits; SI, IS; Not offered 2017-18
BIOL 126	Energy Flow in Biological Systems and Lab Follow the pathways through which energy and matter are acquired, stored, and utilized within cells, organisms, and ecosystems. The focus moves among the different levels of organization from protein function to nutrient movement through ecosystems. Prerequisite:Chemistry 123 or 128. 6 credits; LS, QRE; Winter, Spring; Daniel L Hernández, Rou-Jia Sung, David Hougen-Eitzman, Annie Bosacker, Rika E Anderson, Matt Rand, Sarah Deel
BIOL 210	Global Change BiologyEnvironmental problems are caused by a complex mix of physical, biological, social, economic, political, and technological factors. This course explores how these environmental problems affect life on Earth by examining the biological processes underlying natural ecological systems and the effects of global environmental changes such as resources consumption and overharvesting, land-use change, climate warming, pollution, extinction and biodiversity loss, and invasive species. Prerequisite:One introductory science lab course (Biology 125, 126, Chemistry 123, 128, Geology 110, 115 or 120). 6 credits; QRE, NE; Fall; Marta P Lyons
BIOL 221	Ecosystem Ecology Ecosystem ecology involves the study of energy and material flow through systems, including both the biotic (animals, plants, microbes) and abiotic (soil, water, atmosphere) components. Topics include the major elemental cycles (carbon, nitrogen, phosphorous), patterns of energy flow, and the controls of these fluxes for different ecosystems. Current environmental issues are emphasized as case studies, including climate change, land use change, human alterations of nutrient cycles, and biodiversity effects on ecosystems. Concurrent registration in Biology 322 required. Prerequisite: Biology 126 and one 200 level course in Biology or Geology 230, 258, 285 or Environmental Studies 244, 254, 260, 265, 272, 287, 288. 6 credits; WR2, QRE, NE; Fall; Daniel L Hernández

BIOL 238	Entomology Insects are one of the most successful groups of organisms on the planet, playing major roles in all terrestrial and freshwater ecosystems. In addition, since insects are ubiquitous they affect human endeavors on many fronts, both positively (e.g., crop pollination) and negatively (damage to crops and transmitting disease). This class will focus on the biology of insects, including physiology, behavior, and ecology. Many examples will highlight current environmental issues. Prerequisite:Biology 125 and 126 and concurrent registration in Biology 239. 6 credits; QRE, NE; Not offered 2017-18
BIOL 250	Australia/New Zealand Program: Marine Ecology This course will explore the population, community, and evolutionary ecology of marine organisms, with a focus on the Great Barrier Reef. Major topics will include coral reef structure and function, diversity of fauna and flora, as well as impacts of climate change and fisheries on reef ecology. Prerequisite: Biology 125 and 126 and one upper-level Biology course related to ecology, evolution or organismal Biology. 6 credits; NE, QRE; Not offered 2017-18
BIOL 252	Environmental Animal PhysiologyThis course explores the physiological adaptations animals employ to survive in a wide variety of environments. Animals maintain physiological functions in the face of environmental extremes in heat, cold, aridity, deep ocean pressure, salinity, and the lack of oxygen in water or at high altitude, to name a few. An organism's ability to cope with environmental extremes has a large impact on the geographic distribution of many species. Prerequisite: Biology 125 and 126. 6 credits; QRE, NE; Fall; Matt Rand
BIOL 308:	Australia/New Zealand Program: Marine Ecology This course will explore the population, community, and evolutionary ecology of marine organisms, with a focus on the Great Barrier Reef. Major topics will include coral reef structure and function, diversity of fauna and flora, as well as impacts of climate change and fisheries on reef ecology. Prerequisite: Biology 125 and 126 and one upper-level Biology course related to ecology, evolution or organismal Biology. 6 credits; NE, QRE; Not offered 2017-18
BIOL 350	Evolution Principles and history of evolutionary change in wild populations, with consideration of both microevolutionary and macroevolutionary time scales. Topics covered include causes of change in gene frequency, the nature of adaptation, constraints on evolutionary change, the evolution of genes and proteins, rates of speciation and extinction, and the major events in evolutionary history. Prerequisite:Biology 125 and 126. 6 credits; QRE, NE; Fall; Mark McKone
BIOL 352	Population Ecology An investigation of the properties of populations and communities. Topics include population growth and regulation, life tables, interspecific and intraspecific competition, predation, parasitism, mutualism, the nature of communities, and biogeography. Prerequisite: Biology 125 and 126, and Mathematics 111 or other previous calculus course. Recommended course: Mathematics 215 or equivalent exposure to statistical analysis. Concurrent registration in Biology 353. 6 credits; QRE, NE; Spring; Mark McKone
BIOL 374	Seminar: Grassland EcologyGrassland ecosystems cover one third of the Earth's surface and occur on every continent except Antarctica. Grasslands provide habitat for millions of species, play a major role in global carbon and nutrient cycles, and are the primary source of agricultural land, making them an important ecosystem both ecologically and economically. This course will utilize scientific literature to explore the environmental and biological characteristics of the world's grasslands from population dynamics to ecosystem processes. Topics include competition and succession, plant-animal interactions, carbon and nutrient cycling, the role of disturbances such as fire and land use change, and grassland management and restoration. Enrollment by application. Waitlist only. Prerequisite: Biology 125 and 126, and one of Biology 210, 238, 248, 250, 308, 321 or 352 and instructor permission. 6 credits; WR2, QRE, NE; Not offered 2017-18
BIOL 375	This course will explore the ecology of the ecosystems and organisms of Minnesota-- including lakes and rivers, grasslands, and deciduous and boreal forest--through the reading and analysis of the primary literature and independent field research projects.

CAMS 270	This course addresses nonfiction media as both art form and historical practice by exploring the expressive, rhetorical, and political possibilities of nonfiction production.
CHEM 128	Principles of Environmental Chemistry & Lab The core topics of chemistry (i.e. thermodynamics, kinetics, equilibrium, and bonding) are central to understanding major environmental topics such as greenhouse warming, ozone depletion, acid-rain deposition, and general chemical contamination in air, water, and soil. These topics and the chemical principles behind them are addressed through an emphasis on the earth's atmosphere. One four-hour laboratory per week. Because this course covers the major topics of Chemistry 123 (but with an environmental emphasis), students cannot receive credit for both Chemistry 123 and 128. Prerequisite: Adequate secondary school preparation as indicated by the self-administered Chemistry Placement Exam (Chemistry Home Page) or Chemistry 122. 6 credits; LS, QRE; Spring; Will Hollingsworth
ENGL 236	American Nature Writing A study of the environmental imagination in American literature. We will explore the relationship between literature and the natural sciences and examine questions of style, narrative, and representation in the light of larger social, ethical, and political concerns about the environment. Authors read will include Thoreau, Muir, Jeffers, Abbey, and Leopold. Students will write a creative Natural History essay as part of the course requirements. 6 credits; LA, WR2; Fall; Michael J Kowalewski
ENGL 247	The American West Wallace Stegner once described the West as "the geography of hope" in the American imagination. Despite various dystopian urban pressures, the region still conjures up images of wide vistas and sunburned optimism. We will explore this paradox by examining both popular mythic conceptions of the West (primarily in film) and more searching literary treatments of the same area. We will explore how writers such as Twain, Cather, Stegner and Cormac McCarthy have dealt with the geographical diversity and multi-ethnic history of the West. Weekly film showings will include *The Searchers, McCabe and Mrs. Miller*, *Unforgiven*, and *Lone Star*. Extra Time Required, evening screenings. 6 credits; LA, WR2; Not offered 2017-18
ENGL 248	Visions of California An interdisciplinary exploration of the ways in which California has been imagined in literature, art, film and popular culture from pre-contact to the present. We will explore the state both as a *place* (or rather, a mosaic of places) and as a continuing metaphor--whether of promise or disintegration--for the rest of the country. Authors read will include Muir, Steinbeck, Chandler, West, and Didion. Weekly film showings will include *Sunset Boulevard*, *Chinatown* and *Blade Runner.* 6 credits; LA, WR2, IDS; Winter; Michael J Kowalewski
ECON 120	Introduction to Geospatial Analysis & Lab Spatial data analysis using Geographic Information Systems (GIS), remote sensing, global positioning, and related technologies are increasingly important for understanding and analyzing a wide range of biophysical, social, and economic phenomena. This course serves as an overview and introduction to the concepts, algorithms, issues, and methods in describing, analyzing, and modeling geospatial data over a range of application areas. 6 credits; QRE, SI; Winter; Papia F Rozario

ECON 240	Microeconomics of DevelopmentThis course explores household behavior in developing countries. We will cover areas including fertility decisions, health and mortality, investment in education, the intra-household allocation of resources, household structure, and the marriage market. We will also look at the characteristics of land, labor, and credit markets, particularly technology adoption; land tenure and tenancy arrangements; the role of agrarian institutions in the development process; and the impacts of alternative politics and strategies in developing countries. The course complements Economics 241. Prerequisite: Economics 110 and 111. 6 credits; SI, QRE, IS; Fall; Faress Bhuiyan
ECON 268	Economics of Cost Benefit AnalysisCost-benefit analysis is a tool commonly used by economists and policy makers to compare and choose among competing policy options. This course will cover the basic theory and empirical techniques necessary to quantify and aggregate the impacts of government policy, especially as related to the environment. Topics covered include the time value of money; uncertainty; sensitivity analysis; option value; contingent valuation; hedonic estimation; basic research design. Throughout the course case studies will be used to elucidate and bring life to the theoretical concepts. Prerequisite: ECON 110 and 111. Some statistics background will be useful. 6 credits; SI, QRE; Not offered 2017-18
ECON 269	Economics of Climate Change This course studies economic models of climate change and their implications for policy design. Covered topics include: the relationship between climate change and the macroeconomy, the performance of different climate policy instruments such as carbon taxes and cap and trade systems, the potential effects of innovation, and the economics surrounding the use of different types of energy. Prerequisite:Economics 110 and 111. 6 credits; SI, QRE; Spring; Aaron M Swoboda
ECON 270	Emphasis is placed on policy analysis using the criteria of efficiency and equity.
ECON 271	Economics of Natural Resources and the Environment This course focuses on environmental economics, energy economics, and the relationship between them. Economic incentives for pollution abatement, the industrial organization of energy production, optimal depletion rates of energy sources, and the environmental and economic consequences of alternate energy sources are analyzed. Prerequisite: Economics 111. 6 credits; SI, QRE; Winter; Aaron M Swoboda
ECON 273	Water and Western Economic Development This course examines a number of important aspects of water as a legal/political/economic factor in the development of the western United States. The topics include western water law, the evolution of water supply institutions, state and local water planning, the role of the federal government, and a number of current water problems, including surface and groundwater pollution, impediments to market transfers of water, and state/regional/international conflicts over water. Prerequisite:Economics 110 and 111. 6 credits; SI, QRE; Fall; Mark T Kanazawa
ENTS 100	Science and technology have led to profound effects upon public life over the past century. This course will study the social and political impacts of scientific and technological developments on modern life. We will investigate particular cases drawn from across the sciences, such as genetics, energy production and consumption, nuclear weapons, and the information revolution. The relationship between government, the public, and the science/technology enterprise will be examined. What is, and what should be the role of the practitioners themselves? 6 credits; WR1, AI, QRE; *Fall*; **Joel M Weisberg**
ENTS 110	This course offers an interdisciplinary introduction to a number of the pressing environmental changes currently facing human societies around the world.

ENTS 120	Spatial data analysis using Geographic Information Systems (GIS), remote sensing, global positioning, and related technologies are increasingly important for understanding and analyzing a wide range of biophysical, social, and economic phenomena. This course serves as an overview and introduction to the concepts, algorithms, issues, and methods in describing, analyzing, and modeling geospatial data over a range of application areas. 6 credits; QRE, SI; *Winter*; **Papia F Rozario**
ENTS 209	In this course, students will pursue projects based in environmental science and aimed at public audiences. Forms may include grant proposals, articles for the popular press, talks aimed at peer scientists, the general public, or school groups, and posters for various audiences. In all cases, purpose, audience, and form will be carefully considered for effective communication of science. Students can expect frequent revision, assiduous peer review responsibilities, and presentation of individual projects orally and in more than one form of writing. 6 credits; NE, WR2, QRE; *Not offered 2017-18*
ENTS 212	The course offers a survey of the world's food systems--and its critics--from the initial domestication of plants and animals to our day. We will begin by examining the critical theoretical and foundational issues on the subject, and then turn to a series of case studies that illuminate major themes around the world. Topics will include land and animal husbandry, the problem of food security, food politics, the Green Revolution, biotechnology, and the implications of global climate change. Throughout the course, students will assess and seek to integrate differing disciplinary and methodological approaches. The class will include field experiences. 6 credits; SI, QRE, IS; *Not offered 2017-18*
ENTS 215	Environmental Ethics This course is an introduction to the central ethical debates in environmental policy and practice, as well as some of the major traditions of environmental thought. It investigates such questions as whether we can have moral duties towards animals, ecosystems, or future generations; what is the ethical basis for wilderness preservation; and what is the relationship between environmentalism and social justice. 6 credits; HI; Fall; Kimberly K Smith
ENTS 232	Research Methods in Environmental Studies This course covers various methodologies that are used to prosecute interdisciplinary academic research relating to the environment. Among the topics covered are: identification of a research question, methods of analysis, hypothesis testing, and effective rhetorical methods, both oral and written. 3 credits; FSR; Spring; Kimberly K Smith
ENTS 244	Biodiversity Conservation and Development How can the need for intensive human social and economic development be reconciled with the conservation of biodiversity? This course explores the wide range of actions that people take at a local, national, and international level to address this question. We will use political ecology and conservation biology as theoretical frameworks to examine the role of traditional and indigenous approaches to biodiversity conservation as well as contemporary debates about integrated conservation development across a spectrum of cultures in North America, Africa, Latin America, and Asia. 6 credits; SI, QRE, IS; Not offered 2017-18; Tsegaye H Nega
ENTS 248	Sustainable DevelopmentSustainable development is the internationally and nationally recognized framework for reconciling development (economic development, social wellbeing, and peace and security) with environmental protection and restoration. This course will examine the historical origin of this framework, its meaning, the enormous environmental and poverty challenges that sustainable development is intended to overcome, and its actual and potential effect at the international, national, state, and local levels. It is designed to give students the ability to recognize and address sustainable development issues in any context. There are no prerequisites. 6 credits; SI; Spring; John C Dernbach

ENTS 254	Topics in Landscape EcologyLandscape ecology is an interdisciplinary field that combines the spatial approach of the geographer with the functional approach of the ecologist to understand the ways in which landscape composition and structure affects ecological processes, species abundance, and distribution. Topics include collecting and referencing spatial data at broad scales, Geographic Information Systems (GIS), landscape metrics, simulating change in landscape pattern, landscape connectivity and meta-population dynamics, and reserve design. Prerequisite: Biology 125 and 126. 6 credits; QRE, SI, IS; Not offered 2017-18
ENTS 260	Comparative Agroecology As the world human population continues to expand, while at the same time the arable land base and fossil fuel supply shrink, the need for a sustainable food system is imperative. This course explores factors influencing food production and distribution at both local and national levels, with an eye towards how these factors affect choices made by the ultimate stewards of the land--the farmers. While the course focuses on the scientific aspects of agroecosystem sustainability, comparisons will be made among various production models both in the U.S. and China, bringing in social, economic and policy issues. This course is part of the OCS winter break China program, involving two linked courses in fall and winter terms, this class is the first class in the sequence. Prerequisite: Biology 125 or 126 or Chemistry 123 or 128 or Geology 110 or 120 and instructor permission. 6 credits; NE, QRE; Fall; David Hougen-Eitzman
ENTS 261	Field Investigation in Comparative Agroecology This course is the second part of a two-term course sequence beginning with Environmental and Technology Studies 260. The course begins with a two-week visit in December to Beijing and Sichuan province. Field work will include visits to Chinese farms at the forefront of an incipient sustainable agriculture movement in China, as well as discussions with Chinese sustainable agriculture researchers. In regular weekly meetings during the winter term on campus, data will be analyzed and presented in oral and written reports. Prerequisite:Environmental and Technology Studies 260. 6 credits; NE, IS; Winter; David Hougen-Eitzman
ENTS 262	Materials Science, Energy, and the Environment Drawing on chemistry and physics principles, this course will focus on the relationship between the structure and physical properties of materials, how materials science can address environmental and energy challenges, and the technological and societal impacts of materials development. Topics to be covered will vary from year to year, but may include material life cycle assessment, traditional plastics and biodegradable alternatives, materials and technologies for solar energy conversion, and the role of materials in developing energy efficient buildings. Students who have taken Physics 260 may not take Environmental and Technology Studies 262. Prerequisite: Two five-week or one ten-week Physics course numbered 151-165 or Chemistry 123 or 128.6 credits; NE, WR2; Not offered 2017-18
ENTS 264	Ethiopia and Tanzania Program: Cultural Studies The course is intended to expose students to the cultural heritages of Tanzania and Ethiopia. Among the cultural activities involved in the course include visits to historical cultural sites and museums, guest lectures, and lessons in local cuisines. 2 credits; NE; Not offered 2017-18; Tsegaye H Nega
ENTS 272	This course provides an introduction to the use of remotely sensed imagery and the application of remote sensing in environmental and natural resources management. Topics include raster-vector integration, geometric and atmospheric correction, spatial and spectral enhancement, image classification, change detection, and spatial modeling. This course will involve both lecture classes that will be used for presentation of fundamental topics and theory and sessions devoted to providing hands-on experience in the processing and interpretation of remotely sensed imagery. Prerequisite: Environmental Studies 120 is recommended not required. 6 credits; NE; *Not offered 2017-18*

ENTS 288	The field of abrupt climate change seeks to understand very fast changes, or "tipping points," in historical climate records. Course topics include interpretation of historical climate data, methods of measuring abrupt changes in ancient climates, theories for abrupt change, the role of complex earth systems, and the connection to trends in global climate change. The course will directly address our future vulnerability to abrupt climate change through cases studies of past human civilizations. Includes a term-long multimedia team project, with an academic civic engagement component, at the intersection of abrupt climate change and an issue of human concern. Prerequisite: One introductory course in Biology 125 or 126, Chemistry 123 or 128 or any 100-level Geology, or Physics (two five-week courses or one ten week course from 131 through 165). 6 credits; NE, WR2, QRE; *Not offered 2017-18*
ENTS 395	Senior Seminar This seminar will focus on preparing Environmental Studies majors to undertake the senior comprehensive exercise. The seminar will be organized around a topic to-be-determined and will involve intensive discussion and the preparation of a detailed research proposal for the comps experience. The course is required for all Environmental Studies majors choosing the group comps option. Prerequisite:Completion of all other Environmental and Technology Studies core courses except comps. 3 credits; SI; Fall; Aaron M Swoboda
ENTS 400	Integrative Exercise In this course, ENTS majors complete a group-based comprehensive exercise. Each group is expected to research and execute a group project on the topic chosen by the group, under the guidance of an ENTS faculty member. Toward the end of winter term, all groups present their research at a symposium sponsored by ENTS. Prerequisite: Environmental and Technology Studies 395. 1-6 credit; Winter
GEO 110	Introduction to Geology & Lab An introduction to the study of earth systems, physical processes operating on the earth, and the history of the earth. Field trips, including an all-day trip, and laboratories included. Prerequisite:Not open to students who have taken another 100-level Geology course. 6 credits; LS; Fall, Spring; Dan Maxbauer, Clint Cowan, Sarah J Titus
GEO 115	Climate Change in Geology & LabThis course is designed to introduce the study of paleoclimatology broadly, and is based on investigating local deposits that span a broad range of geologic time. We will perform research projects on topics of local interest, which may include: analyzing fossils in 450 million year old rock, scrutinizing reported Cretaceous dinosaur gizzard-stones, researching post-Ice Age climate change using cave or lake deposits, and using dendrochronology (tree rings) and seismic surveys to study disruption of the prairie-big woods landscape by European settlers. Participants should be prepared for outdoor laboratories and one Saturday field trip. Prerequisite: Not open to students who have taken another Geology 100-level course. 6 credits; LS, QRE; Winter; Dan Maxbauer
GEO 120	Introduction to Environmental Geology & Lab An introduction to geology emphasizing environmental health and humankind's use and abuse of soil, water, fuels, and other resources. Field trips and laboratories included. Prerequisite: Not open to students who have taken another Geology 100-level course. 6 credits; LS, QRE, WR2; Fall, Spring; Mary E Savina, Clint Cowan
GEO 205	This course provides a broad overview of the geology of Earth’s finite, non-renewable energy and mineral resources.
GEO 210	Geomorphology & Lab Study of the geological processes and factors which influence the origin and development of the surficial features of the earth, with an emphasis on some or all of the processes in Minnesota. Laboratories and field trips included. Prerequisite: 100 level Geology course or instructor permission. 6 credits; LS, QRE, WR2; Not offered 2017-18

GEO 258	Geology of Soils & Lab The study of soil formation, and physical and chemical properties of soils especially as related to geomorphology and land use. Laboratories and field trips will emphasize how to describe and interpret soils. Prerequisite: One introductory (100-level) geology course. 6 credits; LS, WR2; Spring; Mary E Savina
GEO 340	A seminar on major principles of ground and surface water hydrology and their application to contemporary hydrologic problems. T
GEO 379	Geochemistry of Natural WatersThe main goal of this course is to introduce and tie together the several diverse disciplines that must be brought to bear on hydrogeochemical problems today. This course will explore: principles of geochemistry, applications of chemical thermodynamics to geologic problems, mineral solubility, stability diagrams, chemical aspects of sedimentary rocks, geochemical tracers, radiogenic isotopes and principles of stable isotope fractionation. Laboratories included. Prerequisite: Chemistry 123 or permission of the instructor; Requires concurrent registration in Geology 370L. 6 credits; LS, WR2, QRE; Not offered 2017-18
HIST 205	American Environmental HistoryEnvironmental concerns, conflicts, and change mark the course of American history, from the distant colonial past to our own day. This course will consider the nature of these eco-cultural developments, focusing on the complicated ways that human thought and perception, culture and society, and natural processes and biota have all combined to forge Americans' changing relationship with the natural world. Topics will include Native American subsistence strategies, Euroamerican settlement, industrialization, urbanization, consumption, and the environmental movement. As we explore these issues, one of our overarching goals will be to develop an historical context for thinking deeply about contemporary environmental dilemmas. 6 credits; HI, IDS; Fall; George Vrtis
HIST 227	The West is a place as complex and tangled in dynamic cultural, social, political, and environmental forces as any place on earth. Examines relations with the land, native americans, econ and how it's changed.
HIST 306	American Wilderness This course is part of the off-campus spring break program, involving two-linked courses in winter and spring. To many Americans, wild lands are among the nation's most treasured places. Yosemite, Yellowstone, the Grand Canyon, Joshua Tree--the names alone evoke a sense of awe, naturalness, beauty, even love. But, where do those ideas and feelings come from, and how have they both reflected and shaped American cultural, political and environmental history over the last four centuries? These are the central issues and questions that we will pursue in this seminar. Prerequisite: History 205 or instructor permission. 6 credits; HI, WR2, IDS; Winter; George Vrtis
HIST 307	Wilderness Field Studies: Grand Canyon This course is the second half of a two-course sequence focused on the study of wilderness in American society and culture. The course will begin with a two-week off-campus study program during spring break at the Grand Canyon, where we will learn about the natural and human history of the Grand Canyon, examine contemporary issues facing the park, meet with officials from the National Park Service and other local experts, conduct research, and experience the park through hiking and camping. The course will culminate in the spring term with the completion and presentation of a major research project. Prerequisite: History 306.6 credits; HI, WR2, IDS; Spring; George Vrtis

HIST 308	American Cities and Nature Since the nation's founding, the percentage of Americans living in cities has risen nearly sixteenfold, from about five percent to the current eighty-one percent. This massive change has spawned legions of others, and all of them have bearing on the complex ways that American cities and city-dwellers have shaped and reshaped the natural world. This course will consider the nature of cities in American history, giving particular attention to the dynamic linkages binding these cultural epicenters to ecological communities, environmental forces and resource flows, to eco-politics and social values, and to those seemingly far-away places we call farms and wilderness. Prerequisite: History 205 or permission of the instructor. 6 credits; WR2, IDS, HI; Not offered 2017-18
HIST 316	This course will explore the ways that Minnesota's environmental history can be imagined, understood, and expressed in the digital age.
MATH 215	Introduction to StatisticsIntroduction to statistics and data analysis. Practical aspects of statistics, including extensive use of statistical software, interpretation and communication of results, will be emphasized. Topics include: exploratory data analysis, correlation and linear regression, design of experiments, basic probability, the normal distribution, randomization approach to inference, sampling distributions, estimation, hypothesis testing, and two-way tables. Students who have received credit for Mathematics 115 may petition the department to seek approval to register for Mathematics 215. Students who have taken Mathematics 211 are encouraged to consider the more advanced Mathematics 265-275 Probability-Statistics sequence. Prerequisite: Not open to students who have already received credit for Math 115, Psychology 200/201, Sociology/Anthropology 239 or Math 275. 6 credits; FSR, QRE; Fall, Winter, Spring; Katie St. Clair, Laura M Chihara, Andy Poppick, Adam Loy
PHIL 214	Ecology, Ethics, and Economics In this course we will explore the hypothesis that the current ecological crisis is, at least in part, the product of an economic system that champions continual growth (hence ever increasing levels of production and consumption) and that the economic system is in turn supported by a specific set of materialist values. The course thus takes a holistic and interdisciplinary approach to its subject, and will include readings from across the disciplines of environmental science, economics, and ethics. 6 credits; SI, IS; Spring; Allison E Murphy
PHIL 243	In this class we will discuss how views about the relationships of humans to animals have played out in philosophy of mind, ethics, and environmental policy.
PHYS 152	Introduction to Physics: Environmental Physics & Lab An introduction to principles of physics and their application to the environment. Topics include energy and its flows, engines, energy efficiency, energy usage and conservation in vehicles and buildings, the atmosphere, and climate change. Comfort with algebra and the integration and differentiation of elementary functions is assumed. Weekly laboratory work or field trips. Prerequisite: Mathematics 111 (completion or concurrent registration) and Physics 131 (completion or concurrent registration), 132, 141, 142, 143, 144 or 145. 3 credits; LS, QRE; Fall; Arjendu K Pattanayak, Andrés Aragoneses

POSC 180	Global Politics & Local Communities The 1989 fall of the Berlin Wall signaled beginnings of “a new world order,” to use the words of President George HW Bush. With the increased attention to transnational issues like terrorism, climate change, immigration, and a global AIDS epidemic, the cooperative ideal was a welcome turn from Cold War competition. But three decades later we see nuclear arms stalemates, a rise of nationalist politics, exit from global agreements....What happened? How are local communities affected by changing views of globalization? This class examines debates in International Relations and domestic policy that address that question and the practice of global governance. 6 credits; SI, QRE; Fall; Barbara Allen
POSC 209	The class will research a current case study of an environmental controversy that gave rise to citizen mobilization.
POSC 211	How can we design democratic institutions to deal with environmental and social problems?
POSC 212	Environmental Justice The environmental justice movement seeks greater participation by marginalized communities in environmental policy, and equity in the distribution of environmental harms and benefits. This course will examine the meaning of "environmental justice," the history of the movement, the empirical foundation for the movement's claims, and specific policy questions. Our focus is the United States, but students will have the opportunity to research environmental justice in other countries. 6 credits; SI, QRE, IDS; Winter; Kimberly K Smith
POSC 222	Global-Local Commons: Sustainability, Diversity & Self-Gov't in Complex Social-Ecological Systems This course introduces students to the study of commons (common pool resources and common property), particularly natural resources commons. The dilemmas of commons governance often reveal links between "governments" and "governance" as well as the global stakes of bettering local livelihoods. Our focus is on social and ecological systems (SES) linked directly with climate change, including local forest and prairie management sites. Students are *strongly* encouraged to take the five-week accompanying lab, POSC 224 Measuring and Evaluating Social and Ecological Systems, which extends our course content through research in field settings. 6 credits; SI, QRE, IS; Not offered 2017-18; Barbara Allen
POSC 223	Various facets of the political and social climate of food including food access, GMOS and food sovereignty.
POSC 224	Measuring and Evaluating Social and Ecological Systems The Institutional Analysis and Development (IAD) and Social Ecological Systems (SES) Frameworks are designed to provide data on social, economic, and political institutions and the physical environment enabling us to understand the reciprocal effects of institutional and environmental change. We will learn these frameworks and the methods used to measure changes in natural resource systems. We study measurement, monitoring, and management of prairie and forest ecosystems in local agricultural use and restoration projects. Much of the course occurs on site in field trip locations. 3 credits; SI, QRE, IS; Fall; Barbara Allen
POSC 225	Global-Local Commons: Sustainability, Diversity & Self-Gov't in Complex Social-Ecological Systems This course introduces students to the study of commons (common pool resources and common property), particularly natural resources commons. The dilemmas of commons governance often reveal links between "governments" and "governance" as well as the global stakes of bettering local livelihoods. Our focus is on social and ecological systems (SES) linked directly with climate change, including local forest and prairie management sites. Students are *strongly* encouraged to take the five-week accompanying lab, POSC 224 Measuring and Evaluating Social and Ecological Systems, which extends our course content through research in field settings. 6 credits; SI, QRE, IS; Not offered 2017-18; Barbara Allen

POSC 268	Global Environmental Politics and Policy Global environmental politics and policy is the most prominent field that challenges traditional state-centric ways of thinking about international problems and solutions. This course examines local-global dynamics of environmental problems. The course will cover five arenas crucial to understanding the nature and origin of global environmental politics and policymaking mechanisms: (1) international environmental law; (2) world political orders; (3) human-environment interactions through politics and markets; (4) paradigms of sustainable development; and (5) dynamics of human values and rules. 6 credits; SI, WR2, QRE, IS; Winter; Tun Myint
POSC 333	Global Social Changes and Sustainability* This course is about the relationship between social changes and ecological changes to understand and to be able to advance analytical concepts, research methods, and theories of society-nature interactions. How do livelihoods of individuals and groups change over time and how do the changes affect ecological sustainability? What are the roles of human institutions in ecological sustainability? What are the roles of ecosystem dynamics in institutional sustainability? Students will learn fundamental theories and concepts that explain linkages between social change and environmental changes and gain methods and skills to measure social changes qualitatively and quantitatively. 6 credits; SI, WR2, QRE, IS; Spring; Tun Myint
POSC 379.07	Political Econ & Ecology of S.E. Asia: Diversity of Social Ecological Systems in Southeast AsiaConnecting the first and the second components, this course examines key actors, issues, and interests in the political economy of and ecology of Southeast Asia. Students will connect economy to ecology in Southeast Asia by connecting field experiences and observation to real data, facts, and cases that illustrate the interaction between economy and ecology. This course requires students to identify a topic of interest based on their field experience, research it using techniques taught in the field research and methods course, and write a research report in the form of a term paper. 6 credits; SI, IS; Not offered 2017-18
RELG 243	Native American Religious FreedomThis course explores historical and legal contexts in which Native Americans have practiced their religions in the United States. Making reference to the cultural background of Native traditions, and the history of First Amendment law, the course explores landmark court cases in Sacred Lands, Peyotism, free exercise in prisons, and sacralized traditional practices (whaling, fishing, hunting) and critically examines the conceptual framework of "religion" as it has been applied to the practice of Native American traditions. Service projects will integrate academic learning and student involvement in matters of particular concern to contemporary native communities.6 credits; HI, IDS; Not offered 2017-18
SOAN 203	Anthropology of Good Intentions Is the environmental movement making progress? Do responsible products actually help local
SOAN 233	Anthropology of Food Food is the way to a person's heart but perhaps even more interesting, the window into a society's soul.
SOAN 251	Guatemala Prog: Resource Management and Sustainable Development in the Maya WorldThis course explores contemporary strategies for survival in Maya lands in the face of the global economy by examining how community groups, entrepreneurs, peasant organizations, niche markets, social movements, government and non-governmental organizations play important roles in promoting economic betterment, social justice, locally based decision making, and more equitable, environmentally sound, sustainable development. Through readings, lectures, interviews, and community engagement with human rights activists, conservation experts, development practitioners, and farmers and foragers in the Maya tropical forest, students will learn about the complex interplay between cultural ecology, resource management, and community revitalization. Prerequisite: Sociology/Anthropology 110 or 111. 4 credits; SI, IS; Not offered 2017-18; Jay Levi

SOAN 302	Anthropology and Indigenous Rights This seminar examines the relationship between culture and human rights from an anthropological perspective. By asking "who are indigenous peoples?" and "what specific rights do they have?" this course introduces students to a comparative framework for understanding cultural rights discourse. Given the history of intolerance to difference, the seminar demonstrates the need to explore the determinants of violence, ethnocide, and exploitation routinely committed against the world's most marginalized peoples. At the same time, it also asks about the limits of tolerance, if human rights abuses are perpetrated under the banner of cultural pluralism. Students will analyze case studies drawn from Africa, Asia, and the Americas, as well as issues that cross-cut these regions.Prerequisite:Sociology/Anthropology 110, 111 or permission of the instructor; upper division coursework in anthropology, sociology, history or philosophy recommended. 6 credits; SI, IS; Not offered 2017-18
SOAN 323	Mother Earth: Women, Development and the EnvironmentWhy are so many sustainable development projects anchored around women's cooperatives? Why is poverty depicted as having a woman's face? Is the solution to the environmental crisis in the hands of women the nurturers? From overly romantic notions of stewardship to the feminization of poverty, this course aims to evaluate women's relationships with local environments and development initiatives. The course uses anthropological frameworks to evaluate case studies from around the world. Prerequisite: The department strongly recommends that Sociology/Anthropology 110 or 111 be taken prior to enrolling in courses numbered 200 or above. 6 credits; SI, WR2, IS; Not offered 2017-18
SOAN 333	Environmental Anthropology Can we learn to use resources sustainably? Are there people in the world that know how to manage their environment appropriately? What are the causes behind environmental degradation? These questions are commonly asked in public and academic forums but what discussions often overlook is the fact that these are fundamentally social questions and thus social analysis is needed to understand them fully. This course aims at exploring key issues of human/nature interactions by using anthropological critiques and frameworks of analysis to show how culture is a critical variable to understanding these interactions in all their complexity. Prerequisite:The department strongly recommends that Sociology/Anthropology 110 or 111 be taken prior to enrolling in courses numbered 200 or above. 6 credits; SI, WR2, IS; Fall; Constanza Ocampo-Raeder
SPAN 260	Forces of Nature This course examines nature and its relationship to Latin American identity across the last two hundred years, but with emphasis on the twentieth century. Paradise regained and lost, monster or endangered habitat, nature plays a central role in Latin American development and its literature. Its literary image has varied greatly in the nineteenth and twentieth centuries, at times suggesting the lost Garden of Eden, at other times mirroring human cruelty, and recently coming center stage in the ecological novel. Among the authors studied in this course are Sarmiento, Quiroga, Gallegos, Rulfo, Seplveda, Belli, and Montero. Prerequisite: Spanish 204 or proficiency. 6 credits; LA, IS; Not offered 2017-18
SPAN 219	Envisioning a Sustainable Future and an Equitable and Fair WorldThinking about the importance of cultivating skills such as envisioning and critical viewing, this course will have two objectives divided into two parts**.** Week one: Classes focusing on both theory and practice will serve as an introduction to the central topic of the environmental crisis and will allow for the evaluation and analysis of popular imagination of climate change. Week two: In the second part, students will be responsible for generating imaginative and sustainable alternatives/visions that will include their own visions. This work will be screened at a public presentation and an exposition of visual media. Prerequisite: Spanish 205 or higher. 2 credits; HI, IDS; Winter; Oscar Clemente

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