

Welcome to UC Berkeley's inventory of sustainability courses.

The courses are from the 2015-2016, 2016-2017 and 2017-2018 school years.

This is the sustainability course list UC Berkeley developed for the Sustainability, Tracking, Assessment & Rating System in 2018.

This list is split into three tabs based on the categories STARS uses for defining sustainability courses:

Courses that only address environmental sustainability issues (386 total). Examples include the study of climate systems.

Begins on page 2.

Courses that address social and economic sustainability issues (148 total). Examples include the history of labor unions.

Begins on page 62.

Courses that address social, economic & environmental sustainability (73 total). Examples include climate-related migration studies.

Begins on page 85.

Some courses are Sustainability Focused (SF), meaning their central theme involves sustainability issues.

Other courses are not sustainability focused but contain Sustainability Material (SM), with one or more modules on sustainability.

The course categories are noted SF or SM in a dedicated column.

UC Berkeley Office of Sustainability; Jan. 2019

Courses that address environmental sustainability issues (386 total). The courses are from the 2015-2016, 2016-2017 and 2017-2018 school years.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Anthropology 126M	Undergraduate	SF	Geoarchaeology	Humans have always been affected by changes in their landscape and, in turn, had an influence on their physical surroundings. The contexts that archaeological material and features are found within yield invaluable clues as to how sites form, what types of activities people performed in them, and what kinds of natural and cultural processes altered the archaeological record from deposition to excavation. This course introduces the methods of studying archaeological remains from an environmental context in order to reconstruct the relationships between people and the environment, drawing on case studies from different areas of the world.
Anthropology 137	Undergraduate	SF	Energy, Culture and Social Organization	This course will consider the human dimensions of particular energy production and consumption patterns. It will examine the influence of culture and social organization on energy use, energy policy, and quality of life issues in both the domestic and international setting. Specific treatment will be given to mind-sets, ideas of progress, cultural variation in time perspectives and resource use, equity issues, and the role of power holders in energy related questions.
Anthropology 140	Undergraduate	SF	The Anthropology of Food	This course examines the place of food in society and includes discussions of identity, taste, taboos, ritual, traditions, nationalism, health, alcohol use, civilizing society, globalism, and the global politics of food.
Architecture 100C	Undergraduate	SM	Architectural Design III	This is a studio course in architectural design. Students work on individual and group design projects that build on topics from Architecture 100B with additional integration of conditions pertinent to architectural production that may include architectural precedents, context, landscape and urban issues, envelope, performance, structure, and tectonics in the design of buildings.
Architecture 100D	Undergraduate	SM	Architectural Design IV	Students work on individual and/or group design projects that build on topics from previous studios with additional integration of conditions pertinent to architectural production that may include architectural precedents, context, landscape and urban issues, envelope, structure, and tectonics in the design of buildings. It may also include relevant and pertinent social, cultural, and technological issues facing architecture and design.
Architecture 102A	Undergraduate	SM	Capstone Project Preparation Seminar	This course is a course in architectural research methods with an emphasis on collaborative work. Students will work on individual facets of a collective topic of critical importance to the contemporary discipline of architecture within areas of faculty expertise. These include: architectural history and theory, structures, materials and methods of construction, building performance, energy and environment, and social factors and human behavior in architecture and the environment. The goal of Capstone Preparation is to develop a coherent research proposal that will be used as a topic for the Capstone Project course taken the following semester.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Architecture 102B	Undergraduate	SM	Architecture Capstone Project	Through individual and collective efforts, students will address topics selected in the previous semester under the guidance of faculty mentors. Topics in the field which may serve as a basis for capstone projects include: the history and theory of architecture; structures; the materials and methods of construction; building performance; energy and the environment; and social factors and human behavior. This course is aimed at students who wish to strengthen their understanding of the research methods used by the discipline of architecture and related disciplines (e.g., engineering or history), and is not solely design oriented.
Architecture 140	Undergraduate	SF	Energy and Environment	This course provides undergraduates and graduates with an introduction to issues of physical building performance including building thermodynamics, daylighting, and solar control. The course presents the fundamentals of building science while recognizing the evolving nature of building technologies, energy efficiency, ecology, and responsible design. The course begins with a detailed explication of the thermal properties of materials, heat transfer through building assemblies, balance point temperature, solar geometry, and shading analysis. Students apply these principles later in the course to a design project. The latter part of the course also provides a survey of broader building science topics including mechanical system design, microclimate, and current developments in energy-efficient design.
Architecture 149	Undergraduate	SF	Special Topics in Energy and Environment	Special topics include climatic design, heating, ventilating, air-conditioning systems, lighting, and acoustics. For current offerings, see department website.
Architecture 240	Graduate	SF	Advanced Study of Energy and Environment	Minimizing energy use is a cornerstone of designing and operating sustainable buildings, and attention to energy issues can often lead to greatly improved indoor environmental quality. For designers, using computer-based energy analysis tools are important not only to qualify for sustainability ratings and meet energy codes, but also to develop intuition about what makes buildings perform well. This course will present quantitative and qualitative methods for assessing energy performance during design of both residential and commercial buildings. Students will get hands-on experience with state-of-the-art software -- ranging from simple to complex -- to assess the performance of building components and whole-building designs.
Architecture 241	Graduate	SF	Research Methods in Building Sciences	Required for doctoral students in the area of environmental physics.
Architecture 243	Graduate	SF	Natural Cooling: Sustainable Design for a Warming Planet	Course focuses on zero- and no-energy climate responsive cooling strategies for both residential and commercial scale buildings. The course reviews designs and technologies that include low- and high-tech solutions, dynamic high performance facades, natural ventilation, and a range of other innovative cooling strategies. The course also explores the relationship between building design and operation, energy use, and climate change.
Ag & Resource Econ & Pol 202	Graduate	SF	Issues and Concepts in Agricultural Economics	History, institutions, and policies affecting agriculture markets and environmental quality. Producer behavior over time and under uncertainty. Asset fixity and agricultural supply models.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Ag & Resource Econ & Pol 219A	Graduate	SF	Econometric Project Workshop	Techniques for preparing econometric studies, including finding data sources, the reporting of results, and standards for placing research questions with existent literature. With faculty guidance, students prepare approved econometric projects, present projects to the class, provide comments on other student projects, and revise projects in response to faculty and student comments.
Ag & Resource Econ & Pol 219B	Graduate	SF	Econometric Project Workshop	Techniques for preparing econometric studies, including finding data sources, the reporting of results, and standards for placing research questions with existent literature. With faculty guidance, students prepare approved econometric projects, present projects to the class, provide comments on other student projects, and revise projects in response to faculty and student comments.
Ag & Resource Econ & Pol 241	Graduate	SF	Economics and Policy of Production, Technology and Risk in Agricultural and Natural Resources	This course covers alternative models of production, resource and environmental risk management; family production function; adoption and diffusion; innovation and intellectual property rights; agricultural and environmental policies and their impact on production and the environment; water resources; pest control; biotechnology; and optimal control over space and time.
Ag & Resource Econ & Pol 242	Graduate	SF	Quantitative Policy Analysis	Production versus predatory government behavior, rent seeking, social waste, and their trade-offs with the provision of growth-promoting public goods. Three failure types are distinguished: market, government, and organizational. The roles of public versus special interests are modeled to determine degree and extent of organizational failures in collective group behavior. Alternative frameworks are used to evaluate various types of policy reform.
Ag & Resource Econ & Pol 261	Graduate	SF	Environmental and Resource Economics	Theory of renewable and nonrenewable natural resource use, with applications to forests, fisheries, energy, and climate change. Resources, growth, and sustainability. Economic theory of environmental policy. Externality; the Coasian critique; tax incidence and anomalies; indirect taxes; the double dividend; environmental standards; environmental regulation; impact of uncertainty on taxes and standards; mechanism design; monitoring, penalties, and regulatory strategy; emissions markets.
Ag & Resource Econ & Pol 263	Graduate	SF	Dynamic Methods in Environmental and Resource Economics	This course studies methods of analysis and optimal control of dynamic systems, emphasizing applications in environmental and natural resource economics. Continuous-time deterministic models are studied using phase plane analysis, the calculus of variations, the Maximum Principle, and dynamic programming. Numerical methods are applied to discrete time stochastic and deterministic dynamic models.
Ag & Resource Econ & Pol 264	Graduate	SF	Empirical Energy and Environmental Economics	This course is designed to help prepare graduate students to conduct empirical research in energy and environmental economics. The course has two broad objectives. The first is to develop an in-depth understanding of specific empirical methods and research designs that are routinely used in the field of energy and environmental economics. The second is to familiarize students with some of the economic theories and institutions that are most relevant to empirical work in this area.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Ag & Resource Econ & Pol 265	Graduate	SF	Advanced Topics in Environmental and Resource Economics	Advanced topics in environmental and resource economics. Topics vary and include the economics of land, water, fisheries, forestry, pesticides, endangered species, policy instruments for environmental policy, and empirical evaluations of environmental and resource policy.
Ag & Resource Econ & Pol 269	Graduate	SF	Natural Resource Economics Workshop	Presentation and criticism of ongoing research by faculty, staff, and students. Not necessarily offered every semester.
Bioengineering 148	Undergraduate	SF	Bioenergy and Sustainable Chemical Synthesis: Metabolic Engineering and Synthetic Biology Approaches	This course will cover metabolic engineering and the various synthetic biology approaches for optimizing pathway performance. Use of metabolic engineering to produce biofuels and general "green technology" will be emphasized since these aims are currently pushing these fields. The course is meant to be a practical guide for metabolic engineering and the related advances in synthetic biology as well the related industrial research and opportunities.
Bioengineering 248	Graduate	SF	Bioenergy and Sustainable Chemical Synthesis: Metabolic Engineering and Synthetic Biology Approaches	This course will cover metabolic engineering and the various synthetic biology approaches for optimizing pathway performance. Use of metabolic engineering to produce biofuels and general "green technology" will be emphasized since these aims are currently pushing these fields. The course is meant to be a practical guide for metabolic engineering and the related advances in synthetic biology as well the related industrial research and opportunities.
Bioengineering C181	Undergraduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-the-art research.
Bioengineering C281	Graduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be places on the integration of the biological aspects (crop selection, harvesting, storage, and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-art research.
Chemistry 4B	Undergraduate	SM	General Chemistry and Quantitative Analysis	Series is intended for majors in physical and biological sciences and engineering. It presents the foundation principles of chemistry, including stoichiometry, ideal and real gases, acid-base and solubility equilibria, oxidation-reduction reactions, thermochemistry, entropy, nuclear chemistry and radioactivity, the atoms and elements, the periodic table, quantum theory, chemical bonding, molecular structure, chemical kinetics, and descriptive chemistry. Examples and applications are drawn from diverse areas of special interest such as atmospheric, environmental, materials, polymer and computational chemistry, and biochemistry. Laboratory emphasizes quantitative work. Equivalent to 1A-1B plus 15 as prerequisite for future chemistry courses.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Chemistry C138	Undergraduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-the-art research.
Chemistry C234	Graduate	SF	Green Chemistry: An Interdisciplinary Approach to Sustainability	Meeting the challenge of global sustainability will require interdisciplinary approaches to research and education, as well as the integration of this new knowledge into society, policymaking, and business. Green Chemistry is an intellectual framework created to meet these challenges and guide technological development. It encourages the design and production of safer and more sustainable chemicals and products.
Chemistry C236	Graduate	SF	Energy Solutions: Carbon Capture and Sequestration	After a brief overview of the chemistry of carbon dioxide in the land, ocean, and atmosphere, the course will survey the capture and sequestration of CO ₂ from anthropogenic sources. Emphasis will be placed on the integration of materials synthesis and unit operation design, including the chemistry and engineering aspects of sequestration. The course primarily addresses scientific and engineering challenges and aims to engage students in state-of-the-art research in global energy challenges.
Chemistry C238	Graduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage, and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-art research.
Chemical Engineering 40	Undergraduate	SM	Introduction to Chemical Engineering Design	Design and analysis of processes involving chemical change. Strategies for design, such as creative thinking and (re)definition of the design goal. Methods for analyzing designs, such as mathematical modeling, empirical analysis by graphics, and dynamic scaling by dimensional analysis. Design choices in light of process efficiency, product quality, economics, safety, and environmental issues.
Chemical Engineering 90	Undergraduate	SF	Science and Engineering of Sustainable Energy	An introduction is given to the science and technologies of producing electricity and transportation fuels from renewable energy resources (biomass, geothermal, solar, wind, and wave). Students will be introduced to quantitative calculations and comparisons of energy technologies together with the economic and political factors affecting the transition from nonrenewable to sustainable energy resources. Mass and energy balances are used to analyze the conversion of energy resources.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Chemical Engineering C195A	Undergraduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-the-art research.
Chemical Engineering C295A	Graduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage, and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-art research.
Civil & Environmental Eng 105	Undergraduate	SF	Environmental Fluid Mechanics and Hydrology	Hands-on design course in applied fluid mechanics, hydrology and water resources. Course goes beyond basic examples of fluid flow to develop environmental engineering solutions to real-world problems. A class team project is used to 1) explore the design process and project management, mirroring a workplace setting; and (ii) to integrate concepts from hydrology and fluid mechanics with structural, geotechnical and transportation engineering for a holistic design approach. Specific project topics vary with offering. Example topics include: engineering for air quality, design for sea-level rise mitigation, and development of alternative water supplies to address scarcity and post-disaster management.
Civil & Environmental Eng 107	Undergraduate	SF	Climate Change Mitigation	Assessment of technological options for responding to climate change. Overview of climate-change science; sources, sinks, and atmospheric dynamics of greenhouse gases. Current systems for energy supply and use. Renewable energy resources, transport, storage, and transformation technologies. Technological opportunities for improving end-use energy efficiency. Recovery, sequestration, and disposal of greenhouse gases. Societal context for implementing engineered responses.
Civil & Environmental Eng 11	Undergraduate	SF	Engineered Systems and Sustainability	An introduction to key engineered systems (e.g., energy, water supply, buildings, transportation) and their environmental impacts. Basic principles of environmental science needed to understand natural processes as they are influenced by human activities. Overview of concepts and methods of sustainability analysis. Critical evaluation of engineering approaches to address sustainability.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Civil & Environmental Eng 110	Undergraduate	SF	Water Systems and Society	This course will familiarize students with the complex infrastructure used to meet human water demands; competing uses and demands; water and wastewater infrastructure; technologies to enable recovery of water, energy, and other resources from wastewater; supply planning; trends and forecasting; costs, pricing and financing; environmental justice; methods to assess sustainability; regulatory, policy and institutional challenges; and water's contribution to other sectors (e.g., energy, food, buildings). Innovation, both barriers and opportunities, will be highlighted. California and the U.S. will be emphasized but global challenges will be discussed. Students will study, critique, and recommend improvements for a real-world system.
Civil & Environmental Eng 111	Undergraduate	SF	Environmental Engineering	Quantitative overview of air and water contaminants and their engineering control. Elementary environmental chemistry and transport. Reactor models. Applications of fundamentals to selected current issues in water quality engineering, air quality engineering, air quality engineering, and hazardous waste management.
Civil & Environmental Eng 111L	Undergraduate	SF	Water and Air Quality Laboratory	This laboratory course is designed to accompany the lecture topics in Civil Engineering 111. Each laboratory activity will provide an opportunity to understand key concepts in water and air quality through hands-on experimentation. Laboratory topics include phase partitioning, acid/base reactions, redox reactions, biochemical oxygen demand, absorption, gas transfer, reactor hydraulics, particle destabilization, disinfection, and combustion emissions.
Civil & Environmental Eng 112	Undergraduate	SF	Environmental Engineering Design	Engineering design and project management of environmental systems. Students will complete a design project focusing on pollution control in a selected environmental system. Lectures and project activities will address process design, economic optimization, legal and institutional constraints on design, and project management. Additional components of design (e.g., hydraulics, engineering sustainability, plant structures) will be included.
Civil & Environmental Eng 113	Undergraduate	SF	Ecological Engineering for Water Quality Improvement	Ecological engineering approaches for treating contaminated water using natural processes to improve water quality. Emphasis on combining basic science and engineering approaches to understand the fundamental processes that govern the effectiveness of complex natural treatment systems. Applications include constructed wetlands, waste stabilization ponds, stormwater bioretention, decentralized wastewater management, ecological sanitation. Laboratory sessions will consist of design and monitoring of laboratory and full-scale natural treatment systems, including a range of water quality measurements.
Civil & Environmental Eng 114	Undergraduate	SF	Environmental Microbiology	The scope of modern environmental engineering requires a fundamental knowledge of microbial processes with specific application to water, wastewater and the environmental fate of pollutants. This course will cover basic microbial physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics for application to both engineered and natural environmental systems.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Civil & Environmental Eng 115	Undergraduate	SF	Water Chemistry	The application of principles of inorganic, physical, and dilute solution equilibrium chemistry to aquatic systems, both in the aquatic environment and in water and wastewater treatment processes.
Civil & Environmental Eng 155	Undergraduate	SM	Transportation Systems Engineering	Operation, management, control, design, and evaluation of passenger and freight transportation systems. Their economic role. Demand analysis. Overall logistical structure. Performance models and modeling techniques: time-space diagrams, queuing theory, network analysis, and simulation. Design of control strategies for simple systems. Feedback effects. Paradoxes. Transportation impact modeling; noise; air pollution. Multi-criteria evaluation and decision making. Financing and politics.
Civil & Environmental Eng 175	Undergraduate	SF	Geotechnical and Geoenvironmental Engineering	Soil formation and identification. Engineering properties of soils. Fundamental aspects of soil characterization and response, including soil mineralogy, soil-water movement, effective stress, consolidation, soil strength, and soil compaction. Use of soils and geosynsynthetics in geotechnical and geoenvironmental applications. Introduction to site investigation techniques. Laboratory testing and evaluation of soil composition and properties.
Civil & Environmental Eng 176	Undergraduate	SF	Environmental Geotechnics	Principles of environmental geotechnics applied to waste encapsulation and remediation of contaminated sites. Characterization of soils and wastes, engineering properties of soils and geosynthetics and their use in typical applications. Fate and transport of contaminants. Fundamental principles and practices in groundwater remediation. Application of environmental geotechnics in the design and construction of waste containment systems. Discussion of soil remediation and emerging technologies.
Civil & Environmental Eng 179	Undergraduate	SF	Geosystems Engineering Design	Geosystem engineering design principles and concepts. Fundamental aspects of the geomechanical and geoenvironmental responses of soil are applied to analyze and design civil systems, such as earth dams and levees, earth retention systems, building and bridge foundations, solid-waste fills, and tailings dams. Students form teams to design geotechnical aspects of a civil project and prepare/present a design document. Field trip to a project site.
Civil & Environmental Eng 180	Undergraduate	SM	Cee Systems Design	Course encompasses two design aspects of a civil and environmental engineering system: 1) Design of whole system, component, or life-cycle phase, subject to engineering standards and constraints, and 2) production system design (e.g., cost estimation and control, scheduling, commercial and legal terms, site layout design). Students form teams to address real-life projects and prepare project documentation and a final presentation.
Civil & Environmental Eng 186	Undergraduate	SM	Design of Cyber-Physical Systems	Design and prototype of large-scale technology intensive systems. Design project incorporating infrastructure systems and areas such as transportation and hydrology; for example, watershed sensor networks, robot networks for environmental management, mobile Internet monitoring, open societal scale systems, crowd-sources applications, traffic management. Design of sensing and control systems, prototyping systems, and measures of system performance. Modeling, software and hardware implementation.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Civil & Environmental Eng 191	Undergraduate	SM	Civil and Environmental Engineering Systems Analysis	This course is organized around five real-world large-scale CEE systems problems. The problems provide the motivation for the study of quantitative tools that are used for planning or managing these systems. The problems include design of a public transportation system for an urban area, resource allocation for the maintenance of a water supply system, development of repair and replacement policies for reinforced concrete bridge decks, traffic signal control for an arterial street, scheduling in a large-scale construction project.
Civil & Environmental Eng 200A	Graduate	SF	Environmental Fluid Mechanics	Fluid mechanics of the natural water and air environment. Flux equation analyses; unsteady free surface flow; stratified flow; Navier-Stokes equations; boundary layers, jets and plumes; turbulence, Reynolds equations, turbulence modeling; mixing, diffusion, dispersion, and contaminant transport; geophysical flows in atmosphere and ocean; steady and unsteady flow in porous media. Application to environmentally sensitive flows in surface and groundwater and in lower atmosphere.
Civil & Environmental Eng 200B	Graduate	SF	Numerical Methods for Environmental Flow Modeling	Introduction to numerical methods with application to environmental flows (atmospheric, surface water, and subsurface flows). Scalar advection/ diffusion equations used to study finite difference schemes, numerical errors and stability. Methods introduced for solving Navier-Stokes equations and for turbulence modeling with Reynolds-averaging and large-eddy simulation. Basic programming skills required for hands-on exercises.
Civil & Environmental Eng 200C	Graduate	SF	Transport and Mixing in the Environment	Application of fluid mechanics to transport and mixing in the environment. Fundamentals of turbulence, turbulent diffusion, and shear dispersion in steady and oscillatory flows and the effects of stratification. Application to rivers, wetlands, lakes, estuaries, the coastal ocean, and the lower atmosphere.
Civil & Environmental Eng 203N	Graduate	SF	Surface Water Hydrology	Course addresses topics of surface water hydrology, such as processes of water in the atmosphere, over land surface, and within soil; advanced representation and models for infiltration and evapotranspiration processes; partition of water and energy budgets at the land surface; snow and snowmelt processes; applications of remote sensing; flood and drought, and issues related to advanced hydrological modeling. Students will address practical problems and will learn how to use the current operational hydrologic forecasting model, and build hydrological models.
Civil & Environmental Eng 206	Graduate	SF	Water Resources Management	The course provides a framework to address contemporary water-resources problems, and to achieve water security for local areas and broader regions. Students will become aware of critical water-resources issues at local, national and global scales, and learn to formulate solutions for water-resources problems using engineering, natural-science and social-science tools. The main focus is on California and the Western United States, with comparative analysis for other regions.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Civil & Environmental Eng 209	Graduate	SF	Design for Sustainable Communities	This course provides conceptual and hands-on experience in design and implementation of innovative products or processes for improving the sustainability of resource-constrained communities (mostly poor ones in the developing countries). Teams of students will take on practical projects, with guidance from subject experts.
Civil & Environmental Eng 211B	Graduate	SF	Environmental Biological Processes	Fundamental concepts of biological processes that are important in natural and engineered environmental systems, especially those affecting water quality. Incorporates basic fundamentals of microbiology into a quantifiable engineering context to describe, predict, and control behavior of environmental biological systems. Topics include the stoichiometry, energetics and kinetics of microbial reactions, suspended and biofilm processes, carbon and nutrient cycling, and bioremediation applications.
Civil & Environmental Eng 217	Graduate	SF	Environmental Chemical Kinetics	Kinetic aspects of chemical fate and transport in aquatic systems. Quantitative descriptions of the kinetics of intermedia transport and pollutant transformation by abiotic, photochemical, and biological reactions. Techniques for the estimation of environmental reaction rates. Development of models of pollutant behavior in complex natural systems.
Civil & Environmental Eng 218A	Graduate	SF	Air Quality Engineering	Quantitative overview of the characterization and control of air pollution problems. Summary of fundamental chemical and physical processes governing pollutant behavior. Analysis of key elements of the air pollution system: sources and control techniques, atmospheric transformation, atmospheric transport, modeling, and air quality management.
Civil & Environmental Eng 219	Graduate	SF	Fluid Flow in Environmental Processes	Transport and mixing of solutes in water. Focus on rivers, lakes, estuaries, and wetlands, with some discussion of groundwater and the atmosphere. Basic equations of fluid motion will be used to contextualize and/or derive applied empirical equations for use in specific cases of applied environmental engineering practice. Example applications include outfalls, total maximum daily loads, residence time, and longitudinal dispersion.
Civil & Environmental Eng 256	Graduate	SF	Transportation Sustainability	This multi-disciplinary course is intended to introduce students to the fundamentals of sustainable transportation, with an emphasis on: 1) current trends, climate and energy science, and the policy context; 2) methodological and analysis techniques; 3) vehicle technology, fuels, and intelligent transportation systems (ITS) solutions (supply side); and 4) land use, public transportation, and demand management.
Civil & Environmental Eng 264	Graduate	SM	Behavioral Modeling for Engineering, Planning, and Policy Analysis	Many aspects of engineering, planning, and policy involve a human element, be it consumers, businesses, governments, or other organizations. Effective design and management requires understanding this human response. This course focuses on behavioral theories and the use of quantitative methods to analyze human response. A mix of theory and practical tools are covered, with applications drawn from infrastructure investment and use, urban growth and design, health, and sustainability.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Civil & Environmental Eng 268E	Graduate	SF	Civil Systems and the Environment	Methods and tools for economic and environmental analysis of civil engineering systems. Focus on construction, transportation, and operation, and maintenance of the built infrastructure. Life-cycle planning, design, costing, financing, and environmental assessment. Industrial ecology, design for environment, pollution prevention, external costs. Models and software tools for life-cycle economic and environmental inventory, impact, and improvement analysis of civil engineering systems.
Civil & Environmental Eng 268S	Graduate	SF	Buildings and Sustainability	Overview of what makes buildings and their systems "green" and "sustainable," and analysis throughout their life cycle (design, materials, construction, operation, maintenance, renovation, end of life) and in interaction with infrastructure systems (energy, transportation, water, waste management), the economy, natural environment, society. Innovative approaches, expectations for future developments. Cost-benefit analysis. Life-cycle management. Net-zero buildings. Case studies.
Civil & Environmental Eng 292A	Graduate	SF	Technologies for Sustainable Societies	Exploration of selected important technologies that serve major societal needs, such as shelter, water, food, energy, and transportation, and waste management. How specific technologies or technological systems do or do not contribute to a move toward sustainability. Specific topics vary from year to year according to student and faculty interests.
Civil & Environmental Eng 295	Graduate	SF	Energy Systems and Control	Introduction to energy system management and the underlying control system tools. Applications of interest include batteries, electric vehicles, renewable energy, power systems, and smart buildings/homes. Technical tools include system modeling, state-space representations, stability, parameter identification, state observers, feedback control, and optimization
Civil & Environmental Eng C106	Undergraduate	SF	Air Pollution	This course is an introduction to air pollution and the chemistry of earth's atmosphere. We will focus on the fundamental natural processes controlling trace gas and aerosol concentrations in the atmosphere, and how anthropogenic activity has affected those processes at the local, regional, and global scales. Specific topics include stratospheric ozone depletion, increasing concentrations of green house gasses, smog, and changes in the oxidation capacity of the troposphere.
Civil & Environmental Eng C116	Undergraduate	SF	Chemistry of Soils	Chemical mechanisms of reactions controlling the fate and mobility of nutrients and pollutants in soils. Role of soil minerals and humus in geochemical pathways of nutrient bioavailability and pollutant detoxification. Chemical modeling of nutrient and pollutant soil chemistry. Applications to soil acidity and salinity.
College Writing Programs 150AC	Undergraduate	SF	Researching Water in the West: Its Presence, Its Absence, and Its Consequences for the Peoples of Ca	Examines the subject of water in California, drawing upon scholarly articles, essays, memoir, film, photographs, legislation. In collaboration with the Teaching Library, 50 explores techniques for conducting online archival research and using primary sources. Considers a variety of players in the story of water rights in California, including federal and state representatives, conservationists, Native Americans, and Japanese Americans.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
College Writing Programs 50AC	Undergraduate	SF	Researching Water in the West: Its Presence, Its Absence, and Its Consequences for the Peoples of Ca	Examines the subject of water in California, drawing upon scholarly articles, essays, memoir, film, photographs, legislation. In collaboration with the Teaching Library, 50 explores techniques for conducting online archival research and using primary sources. Considers a variety of players in the story of water rights in California, including federal and state representatives, conservationists, Native Americans, and Japanese Americans.
College Writing Programs 5H	Undergraduate	SF	English, Research, and Sustainability	In this course, students analyze critical issues and conflicts that arise related to sustainability. Course goals include improving academic English reading and research skills through completing a research review and proposal; and oral skills through engagement with video, interviews, panel discussions, and presentations. Course includes a fieldwork component.
College Writing Programs 7E	Undergraduate	SF	American Language and Culture: The Environment	This course challenges students to use their English language reading, listening/speaking, note taking, and research skills while focusing on environmental issues. Students will listen to lectures, watch and critique video and film clips, conduct research, and examine conflicting beliefs based on articles in the media and journals. The course requires students to participate in discussions and debates while reflecting on personal views.
College Writing Programs 9Z	Undergraduate	SF	English, Research, and Sustainability	In this course, students analyze critical issues and conflicts that arise related to sustainability. Course goals include improving academic English reading and research skills through completing a research review and proposal; and oral skills through engagement with video, interviews, panel discussions, and presentations. Course includes a fieldwork component.
City & Regional Planning 119	Undergraduate	SF	Planning for Sustainability	This course examines how the concept of sustainable development applies to cities and urban regions and gives students insight into a variety of contemporary urban planning issues through the sustainability lens. The course combines lectures, discussions, student projects, and guest appearances by leading practitioners in Bay Area sustainability efforts. Ways to coordinate goals of environment, economy, and equity at different scales of planning are addressed, including the region, the city, the neighborhood, and the site.
City & Regional Planning 205	Graduate	SF	Introduction to Planning and Environmental Law	An introduction to the American legal process and legal framework within which public policy and planning problems are addressed. The course stresses legal methodology, the basics of legal research, and the common-law decisional method. Statutory analysis, administrative law, and constitutional interpretation are also covered. Case topics focus on the law of planning, property rights, land use regulation, and access to housing.
City & Regional Planning 249	Graduate	SF	Urban Design in Planning	This seminar will focus on urban design in the planning process, the role of environmental surveys, methods of community involvement, problem identification, goal formulation and alternatives generation, environmental media and presentation, design guidelines and review, environmental evaluation and impact assessment. Case studies.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
City & Regional Planning 252	Graduate	SF	Land Use Controls	An advanced course in implementation of land use and environmental controls. The theory, practice and impacts of zoning, growth management, land banking, development systems, and other techniques of land use control. Objective is to acquaint student with a range of regulatory techniques and the legal, administrative-political equity aspects of their implementation.
City & Regional Planning 254	Graduate	SF	Sustainable Communities	This course examines and explores the concept of sustainable development at the community level. The course has three sections: (1) an introduction to the discourse on sustainable development; (2) an exploration of several leading attempts to incorporate sustainability principles into plans, planning, and urban design; (3) a comparative examination of several attempts to modify urban form and address the multiple goals (social, economic, environmental) of sustainable urbanism.
City & Regional Planning C241	Graduate	SF	Research Methods in Environmental Design	The components, structure, and meaning of the urban environment. Environmental problems, attitudes, and criteria. Environmental survey, analysis, and interview techniques. Methods of addressing environmental quality. Environmental simulation.
Development Practice 222	Graduate	SF	Economics of Sustainable Resource Development	This course will introduce the basic concepts including economic welfare, externality, public good, global commons, policy approaches for dealing with externality, and techniques for quality analysis. It will include case studies where groups will design economic incentives and policy solutions to major problems. It will have sections on particular problems including climate change, water and air quality, animal waste, toxic contamination, forestry and fishery policy.
Development Practice 227	Graduate	SF	Principles of Natural Resource Management	This course will introduce concepts in natural resource management. Segment 1 will cover basic modeling, techniques, and methodology in natural resource management and sustainability. Segment 2 will address genetic resources and agriculture. Segment 3 will cover principles of natural resource management, namely water and air, in the development context. Segment 4 provides an overview of major concepts in the conservation of biodiversity. Students are expected to present research reports based on case studies.
Development Practice 237	Graduate	SM	Leadership, Conflict Resolution, and Community Development	This three-segment course starts with critical evaluation of literature and methods for communal natural resource management, followed by a segment that emphasizes leadership skills and conflict resolution approaches for development. The third segment will address issues of conflict and policymaking in a global context and provide the institutional perspective of development organizations and strategies.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Development Practice C221	Graduate	SF	Climate, Energy and Development	Graduate seminar examining the role of energy science, technology, and policy in international development. The course will look at how changes in the theory and practice of energy systems and of international development have co-evolved over the past half-century, and what opportunities exist going forward. A focus will be on rural and decentralized energy use, and the issues of technology, culture, and politics that are raised by both current trajectories, and potential alternative energy choices. We will explore the frequently divergent ideas about energy and development that have emerged from civil society, academia, multinational development agencies, and the private and industrial sector.
Economics C102	Undergraduate	SF	Natural Resource Economics	Introduction to the economics of natural resources. Land and the concept of economic rent. Models of optimal depletion of nonrenewable resources and optimal use of renewable resources. Application to energy, forests, fisheries, water, and climate change. Resources, growth, and sustainability.
Economics C125	Undergraduate	SF	Environmental Economics	Theories of externalities and public goods applied to pollution and environmental policy. Trade-off between production and environmental amenities. Assessing nonmarket value of environmental amenities. Remediation and clean-up policies. Environment and development. Biodiversity management.
Economics C3	Undergraduate	SF	Introduction to Environmental Economics and Policy	Introduction to microeconomics with emphasis on resource, agricultural, and environmental issues.
Electrical Engineering 134	Undergraduate	SF	Fundamentals of Photovoltaic Devices	This course is designed to give an introduction to, and overview of, the fundamentals of photovoltaic devices. Students will learn how solar cells work, understand the concepts and models of solar cell device physics, and formulate and solve relevant physical problems related to photovoltaic devices. Monocrystalline, thin film and third generation solar cells will be discussed and analyzed. Light management and economic considerations in a solar cell system will also be covered.
Electrical Engineering 137A	Undergraduate	SF	Introduction to Electric Power Systems	Overview of conventional electric power conversion and delivery, emphasizing a systemic understanding of the electric grid with primary focus at the transmission level, aimed toward recognizing needs and opportunities for technological innovation. Topics include aspects of a.c. system design, electric generators, components of transmission and distribution systems, power flow analysis, system planning and operation, performance measures, and limitations of legacy technologies.
Electrical Engineering 137B	Undergraduate	SF	Introduction to Electric Power Systems	Overview of recent and potential future evolution of electric power systems with focus on new and emerging technologies for power conversion and delivery, primarily at the distribution level. Topics include power electronics applications, solar and wind generation, distribution system design and operation, electric energy storage, information management and communications, demand response, and microgrids.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Electrical Engineering 213A	Graduate	SF	Power Electronics	Power conversion circuits and techniques. Characterization and design of magnetic devices including transformers, inductors, and electromagnetic actuators. Characteristics of power semiconductor devices, including power diodes, SCRs, MOSFETs, IGBTs, and emerging wide bandgap devices. Applications to renewable energy systems, high-efficiency lighting, power management in mobile electronics, and electric machine drives. Simulation based laboratory and design project.
Electrical Engineering 49	Undergraduate	SM	Electronics for the Internet of Things	Electronics has become pervasive in our lives as a powerful technology with applications in a wide range of fields including healthcare, environmental monitoring, robotics, or entertainment. This course teaches how to build electronic circuits that interact with the environment through sensors and actuators and how to communicate wirelessly with the internet to cooperate with other devices and with humans. In the laboratory students design and build representative samples such as solar harvesters, robots, that exchange information with or are controlled from the cloud.
Energy and Resources 102	Undergraduate	SF	Quantitative Aspects of Global Environmental Problems	Human disruption of biogeochemical and hydrological cycles; causes and consequences of climate change and acid deposition; transport and health impacts of pollutants; loss of species; radioactivity in the environment; epidemics.
Energy and Resources 175	Undergraduate	SF	Water and Development	This course introduces students to water policy in developing countries. It is a course motivated by the fact that over one billion people in developing countries have no access to safe drinking water, three billion do not have sanitation facilities, and many millions of small farmers do not have reliable water supplies to ensure a healthy crop. Readings and discussions will cover: the problems of water access and use in developing countries; the potential for technological, social, and economic solutions to these problems; the role of institutions in access to water and sanitation; and the pitfalls of the assumptions behind some of today's popular "solutions."
Energy and Resources 180	Undergraduate	SF	Ecological Economics in Historical Context	Economists through history have explored economic and environmental interactions, physical limits to growth, what constitutes the good life, and how economic justice can be assured. Yet economists continue to use measures and models that simplify these issues and promote bad outcomes. Ecological economics responds to this tension between the desire for simplicity and the multiple perspectives needed to understand complexity in order to move toward sustainable, fulfilling, and just economies.
Energy and Resources 190	Undergraduate	SF	Seminar in Energy, Environment, Development and Security Issues	Critical, cross disciplinary analysis of specific issues or general problems of how people interact with environmental and resource systems. More than one section may be given each semester on different topics depending on faculty and student interest.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Energy and Resources 201	Graduate	SF	Interdisciplinary Analysis in Energy and Resources	Introduction to interdisciplinary analysis as it is practiced in the ERG. Most of the course consists of important perspectives on energy and resource issues, introduced through a particularly influential book or set of papers. The course also provides an introduction to the current research activities of the ERG faculty as well as practical knowledge and skills necessary to successfully complete graduate school in an interdisciplinary program.
Energy and Resources 254	Graduate	SF	Electric Power Systems	Provides an understanding of concepts in the design and operation of electric power systems, including generation, transmission, and consumption. Covers basic electromechanical physics, reactive power, circuit and load analysis, reliability, planning, dispatch, organizational design, regulations, environment, end-use efficiency, and new technologies.
Energy and Resources 275	Graduate	SF	Water and Development	This class is an interdisciplinary graduate seminar for students of water policy in developing countries. It is not a seminar on theories and practices of development through the "lens" of water. Rather, it is a seminar motivated by the fact that over 1 billion people in developing countries have no access to safe drinking water, 3 billion don't have sanitation facilities and many millions of small farmers do not have reliable water supplies to ensure a healthy crop. Readings and discussions will cover: the problems of water access and use in developing countries; the potential for technological, social, and economic solutions to these problems; the role of institutions in access to water and sanitation; and the pitfalls of and assumptions behind some of today's popular "solutions."
Energy and Resources 276	Graduate	SF	Climate Change Economics	This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens. The graduate-level version of this course requires additional assignments.
Energy and Resources 280	Graduate	SF	Energy Economics	Input-output and cost benefit analysis applied to energy; exhaustion theory and economics of energy supply; patterns of energy use; trade-offs in energy conservation; the effect of energy policy on supply and demand; projecting future energy and resource supply and use.
Energy and Resources 290	Graduate	SF	Seminar in Energy and Resources	Graduate student presentations and faculty-student discussions of advanced topics in energy and resources. Specific topics vary according to faculty and student interest.
Energy and Resources 292A	Graduate	SF	Tools of the Trade	Quantitative methods for energy and resource analysis. Topics include linear algebra, differential equations, statistical methods, chemical equilibrium theory, and thermodynamics.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Energy and Resources 292B	Graduate	SF	Master's Project Seminar	Required of second-semester Energy and Resources Master's candidates. Topics include the adoption of a research project, research design, presentation of work, and statistical analyses. Introduction to research skills, including Human Subject Research Protocols, research ethics and methodologies. Critical reading and analysis of research papers; development and discussion of project ideas. Students begin to identify and solicit faculty readers for their projects. Students will apply the interdisciplinary methods, approaches, and perspectives learned in the core curriculum.
Energy and Resources 292C	Graduate	SF	Master's Project Seminar	Required for ERG Master's students in the semester previous to the one in which they plan to file their Project. Development of Master's Project outline and research plan. Identification and solicitation of faculty readers. Evaluation and integration of critical feedback from readers and cohort on project. Topics include the adoption of a research project, research design, presentation of work, and statistical analyses. Students will apply the interdisciplinary methods, approaches, and perspectives learned in the core curriculum. Course requirements include: Attendance and active participation in the sharing and critique of the cohort's final master's projects (50%); draft project outline and final readers confirmed by end of term (50%).
Energy and Resources 292D	Graduate	SF	Master's Project Seminar	Required of all ERG Master's students in the semester during which they plan to file their Final Master's Project. This course is intended to assist students in completing their required Master's Projects, and to provide constructive feedback to students on their Final Master's Project oral presentations. The goal is to improve the quality of the research for the ERG Master's Projects and to learn and refine presentation skills for an academic/professional audience.
Energy and Resources C176	Undergraduate	SF	Climate Change Economics	This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens.
Energy and Resources C180	Undergraduate	SF	Ecological Economics in Historical Context	Economists through history have explored economic and environmental interactions, physical limits to growth, what constitutes the good life, and how economic justice can be assured. Yet economists continue to use measures and models that simplify these issues and promote bad outcomes. Ecological economics responds to this tension between the desire for simplicity and the multiple perspectives needed to understand complexity in order to move toward sustainable, fulfilling, just economies.
Energy and Resources C200	Graduate	SF	Energy and Society	Energy sources, uses, and impacts; an introduction to the technology, politics, economics, and environmental effects of energy in contemporary society. Energy and well-being; energy international perspective, origins, and character of energy crisis.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Energy and Resources C202	Graduate	SF	Modeling Ecological and Meteorological Phenomena	Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic stress on natural systems. Offered alternate years.
Energy and Resources C221	Graduate	SF	Climate, Energy and Development	Graduate seminar examining the role of energy science, technology, and policy in international development. The course will look at how changes in the theory and practice of energy systems and of international development have co-evolved over the past half-century, and what opportunities exist going forward. A focus will be on rural and decentralized energy use, and the issues of technology, culture, and politics that are raised by both current trajectories, and potential alternative energy choices. We will explore the frequently divergent ideas about energy and development that have emerged from civil society, academia, multinational development agencies, and the private and industrial sector.
Energy and Resources C271	Graduate	SF	Energy and Development	This advanced graduate seminar will examine the theoretical frames and models used to examine the linkages between energy and development, and the impacts of one on the other.
Engineering 157AC	Undergraduate	SF	Engineering, The Environment, and Society	This course engages students at the intersection of environmental justice, social justice, and engineering to explore how problems that are commonly defined in technical terms are at their roots deeply socially embedded. Through partnerships with community-based organizations, students are trained to recognize the socio-political nature of technical problems so that they may approach solutions in ways that prioritize social justice. Topics covered include environmental engineering as it relates to air, water, and soil contamination; race, class, and privilege; expertise; ethics; and engaged citizenship. This course cannot be used to complete any engineering technical or unit requirements.
Environmental Design 1	Undergraduate	SF	Introduction to Environmental Design	This course will teach anyone how to start to be a designer, not just of drawings and objects, but also buildings, landscapes, and urban spaces. And not just in isolation, but in the complex web of ecological and man-made systems which makes up our shifting environment. You will take from the course first-hand experience of drawing, measuring, and design which form the basis of the professions of architecture, landscape architecture, and urban planning and which culminate in a final design project in the course. The course is open to all undergraduate students.
Environmental Design 106	Undergraduate	SF	Sustainable Environmental Design Workshop	This course asks students to reflect back, reviewing the various disciplinary approaches introduced toward sustainability and to look forward by proposing interdisciplinary ways to affect the environment. Each year will be organized around a theme and project advanced by the faculty of the College. The workshop will require independent as well as collaborative research often in partnership with an external 'client' organization.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Environmental Design 2	Undergraduate	SF	Summer [IN]STITUTE in Environmental Design	The Summer [IN]STITUTE consists of four cohorts, each an introductory course for participants with no previous experience in environmental design: [IN]ARCH, [IN]ARCH ADV, [IN]CITY and [IN]LAND. Institute participants explore the methods and theories of the environmental design disciplines, experience the culture of design and planning studios, connect to faculty and practitioners, and build a portfolio for graduate school application. Each program includes a lecture series, a design or planning studio, a media seminar, and site visits. For more information, visit http://ced.berkeley.edu/academics/summer-programs/summer-institute/ .
Environmental Design 4C	Undergraduate	SF	Future Ecologies: Urban Design, Climate Adaptation, and Thermodynamics	This course is intended to provide students with an overview of current thinking about cities and their components (buildings, parks, streets) as ecological and cultural systems. It will provide an introduction to methods for investigating the dynamics of flows and relationships in the built environment and students will gain experience constructing their own narratives as ways of asking and answering questions about human habitat that could shape the future.
Environmental Design 8	Undergraduate	SF	Summer DIScovery Program: Design & Innovation for Sustainable Cities (DISC)	Guided by UC Berkeley faculty, Bay Area urbanists, designers, makers, and entrepreneurs, Disc* students learn how to confront the most pressing challenges of global urbanization using innovative people-centered design. Through design and digital fabrication studio sessions, lectures and talks, demos and workshops, field work and site visits, students have the opportunity to develop and test their own creative ideas while working with some of the most forward-thinking researchers and practitioners from the Bay Area design community. Disc* graduates have a strong understanding of the present and future of global urbanization processes and a broad toolkit with which to tackle its most urgent demands.
Environmental Design 9	Undergraduate	SF	Introduction to Environmental Design: embARC	embARC is a four week summer design intensive that brings together high school students from diverse backgrounds to explore architecture, urban design and sustainable city planning through three components: an Architecture & Urban Design Studio, a Sustainable City Planning Workshop and a Design-Build project. For more information, visit http://ced.berkeley.edu/academics/summer-programs/embarc-design-academy/
Environmental Design R3B	Undergraduate	SF	Reading and Composition in Energy, Society, and Environmental Design	This course will expose students to key literature that examines, primarily, the relationship between sustainability and environmental design disciplines. Our goal will be not only to investigate the central ideas that inform the design of sustainable landscapes, cities, and buildings, but also to understand how competing arguments are presented in writing. Satisfies the second half of the Reading and Composition Requirement.
Environ Econ & Policy 100	Undergraduate	SF	Microeconomic Theory with Application to Natural Resources	Covers the basic microeconomic tools for further study of natural resource problems. Theory of consumption, production, theory of the firm, industrial organization, general equilibrium, public goods and externalities. Applications to agriculture and natural resources.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Environ Econ & Policy 141	Undergraduate	SF	Agricultural and Environmental Policy	This course considers the formation, implementation, and impact of public policies affecting agriculture and the environment. Economic approaches to public lawmaking, including theories of legislation, interest group activity, and congressional control of bureaucracies. Case studies include water allocation, endangered species protection, water quality, food safety, drainage, wetlands, pesticides, and farmworker safety. Emphasis on examples from California.
Environ Econ & Policy 145	Undergraduate	SF	Health and Environmental Economic Policy	This course introduces students to key issues and findings in the field of health and environmental economics. The first half of the course focuses on the theoretical and statistical frameworks used to analyze instances of market failure in the provision of health and environmental goods. The second half focuses on policy-relevant empirical findings in the field.
Environ Econ & Policy 147	Undergraduate	SF	Regulation of Energy and the Environment	This is an applied economics course on government regulation of energy with an emphasis on policies that seek to mitigate the impact of energy production and consumption on the environment. The course is designed to help students make connections between economic concepts and real world regulatory policy questions and issues.
Environ Econ & Policy 162	Undergraduate	SF	Economics of Water Resources	Urban demand for water; water supply and economic growth; water utility economics; irrigation demand; large water projects; economic impacts of surface water law and institutions; economics of salinity and drainage; economics of groundwater management.
Environ Econ & Policy C115	Undergraduate	SF	Modeling and Management of Biological Resources	Models of population growth, chaos, life tables, and Leslie matrix theory. Harvesting and exploitation theory. Methods for analyzing population interactions, predation, competition. Fisheries, forest stands, and insect pest management. Genetic aspects of population management. Mathematical theory based on simple difference and ordinary differential equations. Use of simulation packages on microcomputers (previous experience with computers not required).
Environ Econ & Policy C175	Undergraduate	SF	The Economics of Climate Change	The course will start with a brief introduction and evaluation of the scientific aspects behind climate change. Economic models will be developed to analyze the impacts of climate change and provide and critique existing and proposed policy tools. Specific topics studied are impacts on water resources and agriculture, economic evaluation of impacts, optimal control of greenhouse gases, benefit cost analysis, international treaty formation, discounting, uncertainty, irreversibility, and extreme events.
Environ Econ & Policy C176	Undergraduate	SF	Climate Change Economics	This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Environ Econ & Policy C180	Undergraduate	SF	Ecological Economics in Historical Context	Economists through history have explored economic and environmental interactions, physical limits to growth, what constitutes the good life, and how economic justice can be assured. Yet economists continue to use measures and models that simplify these issues and promote bad outcomes. Ecological economics responds to this tension between the desire for simplicity and the multiple perspectives needed to understand complexity in order to move toward sustainable, fulfilling, just economies.
Environ Econ & Policy C183	Undergraduate	SF	Forest Ecosystem Management	Introduces students to concepts and quantitative tools needed for the sustainable management of multi-use forest ecosystems. Topics covered include: estimation of ecological, economic, and social values; construction of dynamic forest models, methods for optimal decision-making, and development of forest management plans. Application to current issues in temperate and tropical forest management are discussed. Quantitative, analytical, and communication skills are emphasized. Oral presentation required.
Earth & Planetary Science 102	Undergraduate	SF	History and Evolution of Planet Earth	Formation and evolution of the earth. Nucleosynthesis; formation of the solar system; planetary accretion; dating the earth and solar system; formation of the core, mantle, oceans, and atmosphere; plate tectonics; heat transfer and internal dynamics; stratigraphic record of environment, and evolution; climate history and climate change.
Earth & Planetary Science 111	Undergraduate	SF	Petroleum Geology	Basin development related to plate tectonics. Origin of petroleum: quality, quantity, thermal maturation of organic matter in source rock. Primary and secondary migration. Petroleum composition. Reservoir rock: stratigraphy and geometry. Traps: structural, stratigraphic or combination. Reservoir fluids and energy. Oil provinces, individual fields.
Earth & Planetary Science 115	Undergraduate	SM	Stratigraphy and Earth History	Collecting, analyzing, and presenting stratigraphic data; dating and correlating sedimentary rocks; recognizing ancient environments and reconstructing Earth history; seismic and sequence stratigraphy; event stratigraphy and neocatastrophism; applications of stratigraphy to climate change, petroleum geology, and archaeology.
Earth & Planetary Science 229	Graduate	SF	Introduction to Climate Modeling	This course emphasizes the fundamentals of the climate system via a hierarchy of climate models. Topics will include energy balance, numerical techniques, climate observations, atmospheric and oceanic circulation and heat transports, and parameterizations of eddy processes. The model hierarchy will also explore nonlinear and stochastic processes, and biogeochemistry. Students will build computational models to investigate climate feedbacks, climate sensitivity, and response times.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Earth & Planetary Science 230	Graduate	SF	Radiation and Its Interactions with Climate	Introduction to role of radiative processes in structure and evolution of the climate system. Electromagnetism; solar and terrestrial radiation; interactions of radiation with Earth's atmosphere, ocean, and land surface; greenhouse and runaway greenhouse effects; radiative balance of the climate system; energy-balance climate models; effects of clouds and aerosols; interactions of radiation with atmospheric and oceanic dynamics; radiative processes and paleoclimate; radiative processes and anthropogenic global warming.
Earth & Planetary Science 250	Graduate	SF	Advanced Topics in Earth and Environmental Sciences	Review of recent literature and discussion of ongoing research at the interface between earth science and environmental science.
Earth & Planetary Science 251	Graduate	SF	Carbon Cycle Dynamics	In this course, we will focus on the (unsolved) puzzle of the contemporary carbon cycle. Why is the concentration of atmospheric CO ₂ changing at the rate observed? What are the terrestrial and oceanic processes that add and remove carbon from the atmosphere? What are the processes responsible for long-term storage of carbon on land and in the sea? Emphasis will be placed on the observations and modeling needed to evaluate hypotheses about carbon sources and sinks. Past records will be examined for clues about sensitivity of carbon processes to climate variations.
Earth & Planetary Science 3	Undergraduate	SF	The Water Planet	An overview of the processes that control water supply to natural ecosystems and human civilization. Hydrologic cycle, floods, droughts, groundwater. Patterns of water use, threats to water quality, effects of global climate change on future water supplies. Water issues facing California.
Earth & Planetary Science 7	Undergraduate	SF	Introduction to Climate Change	This course covers the physical processes that determine Earth's past, present, and future climate, with a particular focus on the essentially irreversible climate change (a.k.a., global warming) caused by the burning of coal, oil, and natural gas. Topics will also include the estimation of future warming and impacts, the Earth resources that can be used to combat climate change, and the policies being used to shift towards the use of those resources.
Earth & Planetary Science 80	Undergraduate	SF	Environmental Earth Sciences	This course focuses on the processes on and in the earth that shape the environment. Humanity's use of land and oceans is examined based on an understanding of these processes.
Earth & Planetary Science C100	Undergraduate	SF	Communicating Ocean Science	For undergraduates interested in improving their ability to communicate their scientific knowledge by teaching ocean science in elementary schools or science centers/aquariums. The course will combine instruction in inquiry-based teaching methods and learning pedagogy with six weeks of supervised teaching experience in a local school classroom or the Lawrence Hall of Science with a partner. Thus, students will practice communicating scientific knowledge and receive mentoring on how to improve their presentations.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Earth & Planetary Science C12	Undergraduate	SF	The Planets	A tour of the mysteries and inner workings of our solar system. What are planets made of? Why do they orbit the sun the way they do? How do planets form, and what are they made of? Why do some bizarre moons have oceans, volcanoes, and ice floes? What makes the Earth hospitable for life? Is the Earth a common type of planet or some cosmic quirk? This course will introduce basic physics, chemistry, and math to understand planets, moons, rings, comets, asteroids, atmospheres, and oceans. Understanding other worlds will help us save our own planet and help us understand our place in the universe.
Earth & Planetary Science C180	Undergraduate	SF	Air Pollution	This course is an introduction to air pollution and the chemistry of earth's atmosphere. We will focus on the fundamental natural processes controlling trace gas and aerosol concentrations in the atmosphere, and how anthropogenic activity has affected those processes at the local, regional, and global scales. Specific topics include stratospheric ozone depletion, increasing concentrations of green house gasses, smog, and changes in the oxidation capacity of the troposphere.
Earth & Planetary Science C183	Undergraduate	SF	Carbon Cycle Dynamics	The focus is the (unsolved) puzzle of the contemporary carbon cycle. Why is the concentration of atmospheric CO ₂ changing at the rate observed? What are the terrestrial and oceanic processes that add and remove carbon from the atmosphere? What are the carbon management strategies under discussion? How can emission protocols be verified? Students are encouraged to gain hands-on experience with the available data, and learn modeling skills to evaluate hypotheses of carbon sources and sinks.
Earth & Planetary Science C242	Graduate	SF	Glaciology	A review of the mechanics of glacial systems, including formation of ice masses, glacial flow mechanisms, subglacial hydrology, temperature and heat transport, global flow, and response of ice sheets and glaciers. We will use this knowledge to examine glaciers as geomorphologic agents and as participants in climate change.
Earth & Planetary Science C295Z	Graduate	SF	Energy Solutions: Carbon Capture and Sequestration	After a brief overview of the chemistry of carbon dioxide in the land, ocean, and atmosphere, the course will survey the capture and sequestration of CO ₂ from anthropogenic sources. Emphasis will be placed on the integration of materials synthesis and unit operation design, including the chemistry and engineering aspects of sequestration. The course primarily addresses scientific and engineering challenges and aims to engage students in state-of-the-art research in global energy challenges.
Earth & Planetary Science C82	Undergraduate	SF	Oceans	This course offers multidisciplinary approach to begin answering the question "Why are oceans important to us?" Upon a physical, chemical, and geologic base, we introduce the alien world of sea life, the importance of the ocean to the global carbon cycle, and the principles of ecology with a focus on the important concept of energy flow through food webs. Lectures expand beyond science to include current topics as diverse as music, movies, mythology, biomechanics, policy, and trade.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Earth & Planetary Science N82	Undergraduate	SF	Introduction to Oceans	The geology, physics, chemistry, and biology of the world oceans. The application of oceanographic sciences to human problems will be explored through special topics such as energy from the sea, marine pollution, food from the sea, and climate change.
Env Sci, Policy, & Mgmt 100	Undergraduate	SF	Environmental Problem Solving	Analysis of contrasting approaches to understanding and solving environmental and resource management problems. Case studies and hands-on problem solving that integrate concepts, principles, and practices from physical, biological, social, and economic disciplines. Their use in environmental policies and resource and management plans.
Env Sci, Policy, & Mgmt 100ES	Undergraduate	SF	Introduction to the Methods of Environmental Science	Introduction to basic methods used in environmental research by biological, physical, and social scientists; designed to teach skills necessary to conduct independent thesis research in the required senior seminar, 196A-196B/196L. Topics include development of research questions, sampling methods, experimental design, statistical analysis, scientific writing and graphics, and introductions to special techniques for characterizing environmental conditions and features. This course is the prerequisite to 196A.
Env Sci, Policy, & Mgmt 102B	Undergraduate	SF	Natural Resource Sampling	This course is designed to introduce students to the major sampling systems used in natural resources and ecology. It also introduces students to important sampling and measurement concepts in grassland, forest, wildlife, insect, soil, and water resources. May be taken without laboratory course 102BL.
Env Sci, Policy, & Mgmt 102BL	Undergraduate	SF	Laboratory in Natural Resource Sampling	This laboratory course is designed to introduce students to the major sampling systems used in natural resources and ecology. Field data is collected with various important sampling designs and analyzed. Mean values and confidence intervals are constructed from the data collected in this course. This course must be taken in conjunction with lecture course 102B.
Env Sci, Policy, & Mgmt 102C	Undergraduate	SF	Resource Management	Presents concept and practical approaches to public and private natural resource management decision making. The focus is on goals, criteria, data, models, and technology for quantifying and communicating the consequences of planning options. A range of contemporary air, soil, wetland, rangeland, forest, social, economic, and ecosystem management problems is addressed.
Env Sci, Policy, & Mgmt 102D	Undergraduate	SF	Climate and Energy Policy	This intermediate level course engages with both the politics and the design of climate and clean energy policy, with a focus on the United States. Key themes include political strategies to climate change, the choice of policy instruments, the role of various state actors and interest groups in policy making, the interaction of policy and low-carbon technology markets, and the US and global politics. The course combines the study of analytical concepts with in-depth case studies.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 105A	Undergraduate	SF	Sierra Nevada Ecology	Introduction to silvicultural theory, forest operations, and utilization and manufacture of forest products. Evaluation of silviculture for managing forest stands for multiple objectives including regeneration, stand density control, forest growth, genetic improvement, and prescribed burning. Introduction to harvest and access systems, wood structure and quality, and manufacture of forest product. Field trips and lectures to local areas illustrating different approaches to forest problems.
Env Sci, Policy, & Mgmt 105B	Undergraduate	SF	Forest Measurements	This course teaches students how to use common forestry tools, maps, and various sampling methods to collect information about the forest environment. Thirty percent of the time is spent in the classroom learning about the techniques and working up field data. The remaining time is spent in the field applying these techniques in real world settings. Skills taught will include tree and plot measurement procedures, map reading, and simple field orienteering principles.
Env Sci, Policy, & Mgmt 105D	Undergraduate	SF	Forest Management and Assessment	Develop skills in evaluating forests and developing management strategies to meet ownership objectives. Develop integrated forest management plan for 160 acre parcel. During first week, inventory and assess ecological condition of the assigned parcel. During second week, develop comprehensive integrated forest resource plan, integrating water, wood, wildlife, range, fisheries, and recreation. Oral reports in both an office and field setting required and written management plan.
Env Sci, Policy, & Mgmt 106	Undergraduate	SF	American Wildlife: Identification and Conservation	Identification and life histories of wildlife in North America, with emphasis on species with important ecological and recreational value. The conservation of rare and endangered species is highlighted.
Env Sci, Policy, & Mgmt 108A	Undergraduate	SF	Trees: Taxonomy, Growth, and Structures	Study of trees and associated woody species including their taxonomy and distribution, modes of shoot growth and diameter growth, and stem structure. Modes of stem structure and growth will be considered in relation to habitat and life cycles, and to suitability for timber value. Instruction in oral communication. Oral presentation required.
Env Sci, Policy, & Mgmt 108B	Undergraduate	SF	Environmental Change Genetics	This course will examine the consequences of environmental change on the levels and distribution of genetic diversity within species. Students will be introduced to methods of analysis and their application to organisms from a range of ecosystems. The fate of populations under rapid environmental change will be assessed in the light of dispersal and adaptation (genetic and epigenetic) potential. Students will learn to use population genetics freeware to evaluate molecular data.
Env Sci, Policy, & Mgmt 111	Undergraduate	SF	Ecosystem Ecology	This course will develop principles of ecosystems ecology, emphasizing terrestrial ecosystems, and will consider how these principles apply to ecosystem recovery and to regional and global fluxes of carbon and nutrients.
Env Sci, Policy, & Mgmt 112	Undergraduate	SF	Microbial Ecology	Introduction to the ecology of microorganisms. Topics include the ecology and evolution of microbes and their relationship with each other and the environment. The role and function of microbes in several ecosystems is also discussed.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 112L	Undergraduate	SF	Microbial Ecology Lab	Laboratory introduction to the ecology of microorganisms. Topics include the ecology and evolution of microbes and their relationship with each other and the environment. The role and function of microbes in several ecosystems is also discussed.
Env Sci, Policy, & Mgmt 113	Undergraduate	SF	Insect Ecology	Ecology of insects: interactions with the physical environment; structure and functioning of insect populations and communities; behavioral ecology of predator-prey interactions; plant-insect interactions; social insects; pollination biology; applied insect ecology.
Env Sci, Policy, & Mgmt 114	Undergraduate	SF	Wildlife Ecology	Introduction to wildlife ecology and its relationship to management programs. Includes population, community, and ecosystem levels of organization, followed by selected case studies.
Env Sci, Policy, & Mgmt 116B	Undergraduate	SF	Range Ecology, Improvements, and Management	The ecological basis for range management activities, considered in the context of western range ecosystem types. Specific range improvement and range management practices are discussed in the context of ecosystem processes.
Env Sci, Policy, & Mgmt 117	Undergraduate	SF	Urban Garden Ecosystems	An ecosystem approach to the study of urban gardens with an organic perspective. Topics include fundamentals of horticulture, soil properties and fertility, pest and disease management, and food preservation. Laboratories include methods in garden design, plant propagation, compost technique, soil preparation, irrigation systems, pest management, individual or group projects, demonstrations, and discussions. Enrollment may be limited.
Env Sci, Policy, & Mgmt 118	Undergraduate	SF	Agricultural Ecology	Examines in a holistic framework fundamental biological, technical, socio-economic, and political processes that govern agroecosystem productivity and stability. Management techniques and farming systems' designs that sustain longterm production are emphasized. One Saturday field trip and one optional field trip.
Env Sci, Policy, & Mgmt 120	Undergraduate	SF	Soil Characteristics	Introduction to physical, engineering, chemical, and biological properties of soil; methods of soil description, identification, geographic distribution and uses; the role of soil in supplying water and nutrients to plants; and soil organisms. Soil management for agriculture, forestry, and urban uses will also be discussed. Includes a Saturday field trip.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 130A	Undergraduate	SF	Environmental Hydrology	This course introduces the fundamental physical principles that are necessary to understand the distribution and dynamics of water near the Earth's surface. A quantitative approach will provide mathematical descriptions of hydrological phenomena that will be used for a variety of hydrological applications to river flow hydraulics, flood frequency analysis, evapotranspiration from terrestrial ecosystems, groundwater flow, and ecohydrological dynamics. The course will provide an introduction to hydrological processes and data analysis. The purpose of the laboratory is to illustrate in an experimental setting the principles and applications introduced in lecture.
Env Sci, Policy, & Mgmt 131	Undergraduate	SF	Soil Microbial Ecology	Introduction to the organisms that live in the soil and their activities in the soil ecosystem. Lectures will cover the physical and chemical properties of soils and the soil as a habitat for microorganisms, the diversity and ecology of soil microorganisms, and their activity in the context of biogeochemical cycling, plant-microbe interactions, global environmental change and bioremediation. Goals: To gain fundamental knowledge of the occurrence and activities of soil microorganisms and their influence on soil productivity and environmental quality as well as potential applications of soil microbiology.
Env Sci, Policy, & Mgmt 132	Undergraduate	SF	Spider Biology	Covers topics ranging from mythological ideas about spiders and their importance in traditional cultures and folklore, to diversity patterns, ecology, behavior, and general biology of spiders. In the laboratory section, students learn to identify local spiders and to prepare a collection.
Env Sci, Policy, & Mgmt 134	Undergraduate	SF	Fire, Insects, and Diseases in Forest Ecosystems	Study of the influence of fire, insects, and diseases on species diversity, succession, and the survival of North American forests including the evolution of these interactions due to modern human policies of preservation and management and exploitation.
Env Sci, Policy, & Mgmt 137	Undergraduate	SF	Landscape Ecology	This course will cover broad topics in landscape ecology with the goal of answering the core questions of how patterns develop on landscapes, how these patterns relate to biotic and abiotic processes, and how these patterns and processes change through time. Lab exercises will focus on practical aspects of landscape ecological analysis using modern tools like remote sensing, GIS, population modeling, and landscape genetics.
Env Sci, Policy, & Mgmt 139	Undergraduate	SF	THE ENVIRONMENT AND THE SELF: AN ECO PRACTICUM	This course will provide a practical exploration of how to engage effectively with contemporary environmental issues using discussion of scientific and philosophical texts, activities, and group work. We will evaluate how different worldviews influence how humans relate to the natural world and how our own worldview shapes our way of engaging in environmental problem solving.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 15	Undergraduate	SF	Introduction to Environmental Sciences	Introduction to the science underlying biological and physical environmental problems, including water and air quality, global change, energy, ecosystem services, introduced and endangered species, water supply, solid waste, human population, and interaction of technical, social, and political approaches to environmental management.
Env Sci, Policy, & Mgmt 151	Undergraduate	SF	Society, Environment, and Culture	Issues, concepts, and processes pertaining to the diverse approaches to understanding the relationship between human society, culture, and the environment. Core ideas in and approaches to science, nature, culture, feminism, indigeneity, and postcolonialism as they pertain to the environment and society. Critical analysis and discussion of fundamental and contemporary issues and texts in the field.
Env Sci, Policy, & Mgmt 152	Undergraduate	SF	Global Change Biology	The course will focus on understanding how anthropogenic changes to the global environment (e.g., climate change, habitat destruction, global trade) impact organisms. We will evaluate responses to global change in a wide diversity of organisms (from microbes to mammals) and ecosystems (from arctic to temperate to tropical). We will also explore conservation and mitigation strategies in the face of global change. Discussions will draw on recent primary research and case studies.
Env Sci, Policy, & Mgmt 158	Undergraduate	SF	Biodiversity Conservation in Working Landscapes	Most of the world's lands and seas occur outside of protected areas, so this course examines biodiversity conservation in "working landscapes" like farms, ranches, and urban areas. Students will study fundamental concepts in ecology and conservation biology, and evaluate case studies to assess how conservation approaches have evolved and which are working. Students will gain skills in evaluating and summarizing scientific literature, and in-depth knowledge of conservation in practice.
Env Sci, Policy, & Mgmt 160AC	Undergraduate	SF	American Environmental and Cultural History	History of the American environment and the ways in which different cultural groups have perceived, used, managed, and conserved it from colonial times to the present. Cultures include American Indians and European and African Americans. Natural resources development includes gathering-hunting-fishing; farming, mining, ranching, forestry, and urbanization. Changes in attitudes and behaviors toward nature and past and present conservation and environmental movements are also examined.
Env Sci, Policy, & Mgmt 161	Undergraduate	SF	Environmental Philosophy and Ethics	A critical analysis of human environments as physical, social-economic, and technocultural ecosystems with emphasis on the role of ideologies, beliefs, attitudes, and behavior. An examination of contemporary environmental literature and the philosophies embodied therein.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 163AC	Undergraduate	SF	Environmental Justice: Race, Class, Equity, and the Environment	Overview of the field of environmental justice, analyzing the implications of race, class, labor, and equity on environmental degradation and regulation. Environmental justice movements and struggles within poor and people of color communities in the U.S., including: African Americans, Latino Americans, and Native American Indians. Frameworks and methods for analyzing race, class, and labor. Cases of environmental injustice, community and government responses, and future strategies for achieving environmental and labor justice.
Env Sci, Policy, & Mgmt 164	Undergraduate	SF	GIS and Environmental Science	The objectives of the course are 1) review the GIS workflow (acquisition, representation, validation, analysis, and output), 2) to understand the issues surrounding, and algorithms used in a particular GIS application, 3) to learn about advanced topics in geospatial science across environmental and social sciences, and 4) to develop an operational GIS project in a chosen area.
Env Sci, Policy, & Mgmt 174	Undergraduate	SF	Design and Analysis of Ecological Research	Surveys major designs and analyses for biological field and laboratory studies. Topics include data distributions; regression; analysis of variance; fixed and random effects; blocking, split plots, and repeated measures; maximum likelihood; Generalized Linear Models; basic computer programming. Relies on math to interpret and manipulate equations supported by computer simulations. Examples include population, ecosystem, behavioral, and evolutionary ecology.
Env Sci, Policy, & Mgmt 175A	Undergraduate	SF	Senior Research Seminar in Environmental Sciences	Students design and conduct a senior thesis project, which requires identifying a testable question or problem, designing and executing a research protocol, analyzing data, deriving conclusions, and presenting the research in a scientific paper and an oral presentation. Lectures and assignments emphasize research design, data analysis, scientific writing, and scientific communication.
Env Sci, Policy, & Mgmt 175B	Undergraduate	SF	Senior Research Seminar in Environmental Sciences	Students design and conduct a senior thesis project, which requires identifying a testable question or problem, designing and executing a research protocol, analyzing data, deriving conclusions, and presenting the research in a scientific paper and an oral presentation. Lectures and assignments emphasize research design, data analysis, scientific writing, and scientific communication.
Env Sci, Policy, & Mgmt 175L	Undergraduate	SF	Senior Research Laboratory in Environmental Sciences	Independent laboratory or field research in support of the required senior seminar project.
Env Sci, Policy, & Mgmt 177	Undergraduate	SF	Sustainable Water and Food Security	In this class we will study basic principles of environmental sustainability from the perspective of water and food security, and apply them to human use of land and land based resources. An analysis of major mechanisms of land degradation and of the major technological advances that are expected to burst food production worldwide will be used as the basis for a discussion on the extent to which the Earth can sustainably feed humanity.
Env Sci, Policy, & Mgmt 181A	Undergraduate	SF	Fire Ecology	Fundamentals of wildland fire including fire behavior modeling, fire history methods, prescribed fire techniques, fire ecology, fire management, fire in the urban-wildland intermix, wildland fire, and ecosystem sustainability. Laboratories on inventory methods, fire history, modeling of fire behavior and risk, and prescribed burning.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 182	Undergraduate	SF	Forest Operations Management	Examination of "on the ground" activities necessary to manage forests. Planning, design, and implementation of activities such as road building, forest harvesting, erosion control, and fire suppression are the central focus of the course. Aspects of timber harvest planning, archaeological surveys related to forest management, road closure, stream bank stabilization, and legislative control of forest operations will also be explored.
Env Sci, Policy, & Mgmt 183	Undergraduate	SF	Forest Ecosystem Management	Introduces students to concepts and quantitative tools needed for the sustainable management of multi-use forest ecosystems. Topics covered include: estimation of ecological, economic, and social values; construction of dynamic forest models, methods for optimal decision-making, and development of forest management plans. Application to current issues in temperate and tropical forest management are discussed. Quantitative, analytical, and communication skills are emphasized. Oral presentation required.
Env Sci, Policy, & Mgmt 185	Undergraduate	SF	Applied Forest Ecology	Concepts and applications of silviculture for the establishment, growth, composition, and quality of forest trees and stands. Silviculture is presented as a tool to meet multiple resource and ecosystem management objectives related to wildlife habitat, watershed resources, forest health, or timber production. Two weekend field trips will be scheduled in lieu of several laboratories.
Env Sci, Policy, & Mgmt 186	Undergraduate	SF	Management and Conservation of Rangeland Ecosystems	Begins with the evolution and domestication of grazing animals, continues through ranching and rangeland stewardship practices, and explores new institutional arrangements for conservation and restoration. Woodlands, grasslands, and shrublands provide biodiversity, wildlife habitat, watershed, recreation, open space, and forage. Human practices and ecosystem dynamics meet in rangeland management. Methods for changing, predicting, or assessing the results.
Env Sci, Policy, & Mgmt 190	Undergraduate	SF	Seminar in Environmental Issues	Interdisciplinary study of issues for advanced students. Designed to develop skills in critical analysis of specific issues. Different topics will be available each semester reflecting faculty and student interest. Major research project required.
Env Sci, Policy, & Mgmt 201A	Graduate	SF	Research Approaches in Environmental Science, Policy, and Management	Research projects and approaches in environmental science, policy, and management. An introduction to the diverse ways environmental problems are researched, comparing the approaches and methods of various disciplines represented among faculty and students. This course is the first of the core course sequence required for all ESPM graduate students.
Env Sci, Policy, & Mgmt 201C	Graduate	SF	Environmental Forum	Presentation and analysis of current topics in environmental science, policy, and management. This course is required for all ESPM doctoral students.
Env Sci, Policy, & Mgmt 201S	Graduate	SF	Environmental Science, Policy, and Management Colloquium	Seminars for the presentation and discussion of original work by faculty, visiting scholars, and graduate students. Core course for the ESPM graduate program.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 217	Graduate	SF	Political Economy of Climate Change	This course examines the comparative and global political economy of climate change, with a focus on the politics of climate change mitigation in the energy sector. Key themes are the choice of policy strategies and policy instruments, industry and climate policy, global institutions and collective action, markets and technological change, and economic and geo-political transformations in response to climate change. The courses combines theoretical readings with in-depth case studies.
Env Sci, Policy, & Mgmt 226	Graduate	SF	Interdisciplinary Food and Agriculture Studies	A graduate seminar exploring the ecological, social, and economic risks inherent in different forms of agriculture, from highly diversified, agroecological farming systems to industrialized agriculture. We will examine how different farm management techniques, government policies, supply chains, R&D, technology, and science may influence various risks and uncertainties, including climate change, agrobiodiversity, farmer livelihoods, food safety, public health, and nutrition.
Env Sci, Policy, & Mgmt 228	Graduate	SF	Advanced Topics in Biometeorology and Micrometeorology	Measurement and modeling of trace gases and energy between the terrestrial biosphere and atmosphere. Micrometeorological flux measurement methods, including eddy covariance, profile, and eddy accumulation methods. A hierarchy of biophysical models are discussed for interpreting flux measurements. Information and theory on big-leaf, two-layer, and multi-layer models that couple energy, water, and carbon to predict trace gas fluxes are presented. How models integrate information from leaf to canopy to landscape scales is discussed.
Env Sci, Policy, & Mgmt 259	Graduate	SF	Transnational Environmental Politics and Movements	Contemporary issues in international environmental politics; impacts of globalization on the environment; comparative transnational environmental movements. Study of current and historical texts. Case studies drawn from around the world with a focus on methods and research techniques.
Env Sci, Policy, & Mgmt 261	Graduate	SF	Sustainability and Society	Science-based technologies that are central to the search for sustainability in contemporary societies and their environmental impacts. Theoretical approaches to investigating how science, technology, and environment intersect. How societies move closer to sustainable technological systems. Redesign of existing technologies and the introduction of new technologies. How adverse impacts can be prevented through policy. Case studies of contemporary developments.
Env Sci, Policy, & Mgmt 265	Graduate	SF	Seminar on Fire as an Ecological Factor	Effect of fire on ecology of forest and rangeland.
Env Sci, Policy, & Mgmt 268	Graduate	SF	Seminar in Range Ecology	A seminar course dealing with selected topics in ecology of rangelands.
Env Sci, Policy, & Mgmt 276	Graduate	SF	Advanced Silviculture	Advanced topics related to the dynamics and management of forest stands such as competition effects, mixed-species interactions, managed stand silviculture, pruning, thinning regimes, management for old growth features, wood quality effects, and others. Field trips may be included.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 277	Graduate	SF	Advanced Topics in Conservation Biology	A graduate level seminar covering advanced topics in conservation of biodiversity, focused on designing protected area networks. We will first lay the groundwork for the course by exploring the fundamental papers in ecology and conservation biology that led to systematic conservation planning. Then, we will study various issues at the current frontiers of the discipline, such as incorporating threats, costs, evolutionary processes, and ecosystem services into reserve network design. The class will encourage student engagement through discussions, group projects, peer instruction and peer review of essays.
Env Sci, Policy, & Mgmt 280	Graduate	SF	Seminar in Range Ecosystem Planning and Policy	A seminar course dealing with selected current topics in range ecosystem planning and policy.
Env Sci, Policy, & Mgmt 281	Graduate	SF	Seminar in Wildlife Biology and Management	Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments.
Env Sci, Policy, & Mgmt 50AC	Undergraduate	SF	Introduction to Culture and Natural Resource Management	An introduction to how culture affects the way we use and manage fire, wildland and urban forests, rangelands, parks and preserves, and croplands in America. The basic concepts and tools for evaluating the role of culture in resource use and management are introduced and used to examine the experience of American cultural groups in the development and management of western natural resources.
Env Sci, Policy, & Mgmt 6	Undergraduate	SF	Environmental Biology	Basic biological and ecological principles discussed in relation to environmental disruptions. Human interactions with the environment; their meaning for animals and plants. Discussion of basic ecological processes as a basis for understanding environmental problems and formulating strategies for their solution.
Env Sci, Policy, & Mgmt 60	Undergraduate	SF	Environmental Policy, Administration, and Law	Introduction to U.S. environmental policy process focuses on history and evolution of political institutions, importance of property, federal and state roles in decision making, and challenges of environmental policy. Emphasis is on use of science in decision making, choices between regulations and incentives, and role of bureaucracy in resource policy. Case studies on natural resource management, risk management, environmental regulation, and environmental justice.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 88B	Undergraduate	SF	Data Sciences in Ecology and the Environment	Many of the greatest challenges we face today come from understanding and interacting with the natural world: from global climate change to the sudden collapse of fisheries and forests, from the spread of disease and invasive species to the unknown wealth of medical, cultural, and technological value we derive from nature. Advances in satellites and micro sensors, computation, informatics and the Internet have made available unprecedented amounts of data about the natural world, and with it, new challenges of sifting, processing and synthesizing large and diverse sources of information. In this course, students will apply methods and understanding they gain in the Foundations course to real world ecological and environmental data
Env Sci, Policy, & Mgmt 90	Undergraduate	SF	Introduction to Conservation and Resource Studies Major	Introduction to the major, emphasizing each student's educational goals. Overview of ecological problems and contrasting approaches to solutions through institutional and community-based efforts. Required of all CRS sophomore majors and all entering off-campus transfer students to CRS major. Restricted to CRS majors. One field trip is normally required.
Env Sci, Policy, & Mgmt C10	Undergraduate	SF	Environmental Issues	Relationship between human society and the natural environment; case studies of ecosystem maintenance and disruption. Issues of economic development, population, energy, resources, technology, and alternative systems.
Env Sci, Policy, & Mgmt C103	Undergraduate	SF	Principles of Conservation Biology	A survey of the principles and practices of conservation biology. Factors that affect the creation, destruction, and distribution of biological diversity at the level of the gene, species, and ecosystem are examined. Tools and management options derived from ecology and evolutionary biology that can recover or prevent the loss of biological diversity are explored.
Env Sci, Policy, & Mgmt C104	Undergraduate	SF	Modeling and Management of Biological Resources	Models of population growth, chaos, life tables, and Leslie matrix theory. Harvesting and exploitation theory. Methods for analyzing population interactions, predation, competition. Fisheries, forest stands, and insect pest management. Genetic aspects of population management. Mathematical theory based on simple difference and ordinary differential equations. Use of simulation packages on microcomputers (previous experience with computers not required).
Env Sci, Policy, & Mgmt C107	Undergraduate	SF	Biology and Geomorphology of Tropical Islands	Natural history and evolutionary biology of island terrestrial and freshwater organisms, and of marine organisms in the coral reef and lagoon systems will be studied, and the geomorphology of volcanic islands, coral reefs, and reef islands will be discussed. Features of island biogeography will be illustrated with topics linked to subsequent field studies on the island of Moorea (French Polynesia).

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt C115A	Undergraduate	SF	Freshwater Ecology	Lakes, rivers, wetlands, and estuaries are biologically rich, dynamic, and among the most vital and the most vulnerable of Earth's ecosystems. Lectures will introduce general topics including the natural history of freshwater biota and habitats, ecological interactions, and ecosystem linkages and dynamics. Broad principles will be illustrated with results from selected recent research publications. Factors affecting resilience or vulnerability of freshwater ecosystems to change will be examined. Course requirements: two exams and a short synthesis paper projecting the future states of a freshwater or estuarine ecosystem of the student's choice under plausible scenarios of local, regional, or global change.
Env Sci, Policy, & Mgmt C115C	Undergraduate	SF	Fish Ecology	Introduction to fish ecology, with particular emphasis on the identification and ecology of California's inland fishes. This course will expose students to the diversity of fishes found in California, emphasizing the physical (e.g., temperature, flow), biotic (e.g., predation, competition), and human-related (e.g., dams, fisheries) factors that affect the distribution, diversity, and abundance of these fishes.
Env Sci, Policy, & Mgmt C12	Undergraduate	SF	Introduction to Environmental Studies	This integrative course, taught by a humanities professor and a science professor, surveys current global environmental issues; introduces the basic intellectual tools of environmental science; investigates ways the human relationship to nature has been imagined in literary and philosophical traditions; and examines how tools of scientific and literary analysis; scientific method, and imaginative thinking can clarify what is at stake in environmental issues and ecological citizenship.
Env Sci, Policy, & Mgmt C128	Undergraduate	SF	Chemistry of Soils	Chemical mechanisms of reactions controlling the fate and mobility of nutrients and pollutants in soils. Role of soil minerals and humus in geochemical pathways of nutrient bioavailability and pollutant detoxification. Chemical modeling of nutrient and pollutant soil chemistry. Applications to soil acidity and salinity.
Env Sci, Policy, & Mgmt C129	Undergraduate	SF	Biometeorology	This course describes how the physical environment (light, wind, temperature, humidity) of plants and soil affects the physiological status of plants and how plants affect their physical environment. Using experimental data and theory, it examines physical, biological, and chemical processes affecting transfer of momentum, energy, and material (water, CO ₂ , atmospheric trace gases) between vegetation and the atmosphere. Plant biometeorology instrumentation and measurements are also discussed.
Env Sci, Policy, & Mgmt C133	Undergraduate	SF	Water Resources and the Environment	Distribution, dynamics, and use of water resources in the global environment. Water scarcity, water rights, and water wars. The terrestrial hydrologic cycle. Contemporary environmental issues in water resource management, including droughts, floods, saltwater intrusion, water contamination and remediation, river restoration, hydraulic fracturing, dams, and engineering of waterways. The role of water in ecosystem processes and geomorphology. How water resources are measured and monitored. Basic water resource calculations. Effects of climate change on water quantity, quality, and timing.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt C148	Undergraduate	SF	Pesticide Chemistry and Toxicology	Chemical composition of pesticides and related compounds, their mode of action, resistance mechanisms, and methods of evaluating their safety and activity.
Env Sci, Policy, & Mgmt C159	Undergraduate	SF	Human Diet	Since we eat every day, wouldn't it be useful to learn more about human dietary practices? A broad overview of the complex interrelationship between humans and their foods. Topics include the human dietary niche, biological variation related to diet, diet and disease, domestication of staple crops, food processing techniques and development of regional cuisines, modern diets and their problems, food taboos, human attitudes toward foods, and dietary politics.
Env Sci, Policy, & Mgmt C167	Undergraduate	SF	Environmental Health and Development	The health effects of environmental alterations caused by development programs and other human activities in both developing and developed areas. Case studies will contextualize methodological information and incorporate a global perspective on environmentally mediated diseases in diverse populations. Topics include water management; population change; toxics; energy development; air pollution; climate change; chemical use, etc.
Env Sci, Policy, & Mgmt C170	Undergraduate	SF	Carbon Cycle Dynamics	The focus is the (unsolved) puzzle of the contemporary carbon cycle. Why is the concentration of atmospheric CO ₂ changing at the rate observed? What are the terrestrial and oceanic processes that add and remove carbon from the atmosphere? What are the carbon management strategies under discussion? How can emission protocols be verified? Students are encouraged to gain hands-on experience with the available data, and learn modeling skills to evaluate hypotheses of carbon sources and sinks.
Env Sci, Policy, & Mgmt C177	Undergraduate	SF	GIS and Environmental Spatial Data Analysis	This course offers an introduction to spatial data analysis. It integrates ArcGIS analysis with spatial statistical analysis for the study of pattern and process applicable to a wide variety of fields. Major topics covered include: spatial sampling, processing data with ARC Info, exploratory GIS analysis, spatial decomposition, spatial point patterns and Ripley's K function, spatial autocorrelation, geostatistics, spatially weighted regression, spatial autoregression, generalized linear models and generalized linear mixed models.
Env Sci, Policy, & Mgmt C180	Undergraduate	SF	Air Pollution	This course is an introduction to air pollution and the chemistry of earth's atmosphere. We will focus on the fundamental natural processes controlling trace gas and aerosol concentrations in the atmosphere, and how anthropogenic activity has affected those processes at the local, regional, and global scales. Specific topics include stratospheric ozone depletion, increasing concentrations of green house gasses, smog, and changes in the oxidation capacity of the troposphere.
Env Sci, Policy, & Mgmt C192	Undergraduate	SF	Molecular Approaches to Environmental Problem Solving	Seminar in which students consider how modern biotechnological approaches, including recombinant DNA methods, can be used to recognize and solve problems in the area of conservation, habitat and endangered species preservation, agriculture and environmental pollution. Students will also develop and present case studies of environmental problems solving using modern molecular methods.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt C225	Graduate	SF	Isotopics	This seminar will explore current topics that employ the use of stable isotopes. Discussion topics include the areas of biology, paleontology, biogeochemistry, soil science, and atmospheric science. Students will be required to lead at least one discussion of relevant literature in the topic area.
Env Sci, Policy, & Mgmt C234	Graduate	SF	Green Chemistry: An Interdisciplinary Approach to Sustainability	Meeting the challenge of global sustainability will require interdisciplinary approaches to research and education, as well as the integration of this new knowledge into society, policymaking, and business. Green Chemistry is an intellectual framework created to meet these challenges and guide technological development. It encourages the design and production of safer and more sustainable chemicals and products.
Env Sci, Policy, & Mgmt C252	Graduate	SF	Topics in Science and Technology Studies	This course provides a strong foundation for graduate work in STS, a multidisciplinary field with a signature capacity to rethink the relationship among science, technology, and political and social life. From climate change to population genomics, access to medicines and the impact of new media, the problems of our time are simultaneously scientific and social, technological and political, ethical and economic.
Env Sci, Policy, & Mgmt C282	Graduate	SF	Health Implications of Climate Change	The course will provide a basic foundation in the physical mechanisms of, responses to, and health implications of climate change. We will explore the variety of epidemiologic, risk assessment, and statistical methods used to understand the impacts of climate change on health across diverse demographic groups. The public health implications, positive and negative, of efforts to mitigate and adapt to climate change will be elaborated, including discussions of ethical, political, and economic aspects of these efforts. Students will be responsible for leading class discussions and presenting a poster on their choice of a topic related to climate change and health.
Env Sci, Policy, & Mgmt C46	Undergraduate	SF	Climate Change and the Future of California	Introduction to California geography, environment, and society, past and future climates, and the potential impacts of 21st-century climate change on ecosystems and human well-being. Topics include fundamentals of climate science and the carbon cycle; relationships between human and natural systems, including water supplies, agriculture, public health, and biodiversity; and the science, law, and politics of possible solutions that can reduce the magnitude and impacts of climate change.
Env Sci, Policy, & Mgmt H175A	Undergraduate	SF	Senior Research Seminar in Environmental Sciences	ESPM H175A and H175B are honors courses that eligible Environmental Sciences students may substitute for ESPM 175A and 175B. Students design and conduct a senior thesis project, which requires identifying a research question or problem, designing and executing a research protocol, analyzing data, deriving conclusions, and presenting the research in a scientific paper and an oral presentation. Lectures and assignments emphasize research design, data analysis, scientific writing, and scientific communication.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt H175B	Undergraduate	SF	Senior Research Seminar in Environmental Sciences	ESPM H175A and H175B are honors courses that eligible Environmental Sciences students may substitute for ESPM 175A and 175B. Students design and conduct a senior thesis project, which requires identifying a research question or problem, designing and executing a research protocol, analyzing data, deriving conclusions, and presenting the research in a scientific paper and an oral presentation. Lectures and assignments emphasize research design, data analysis, scientific writing, and scientific communication.
Env Sci, Policy, & Mgmt H175L	Undergraduate	SF	Senior Research Laboratory in Environmental Sciences	ESPM H175L is an honors course that eligible Environmental Sciences students may substitute for ESPM 175L. Independent laboratory or field research in support of the required senior seminar project.
Evening & Weekend MBA 212	Graduate	SF	Energy and Environmental Markets	Business strategy and public issues in energy and environmental markets. Topics include development and effect of organized spot, futures, and derivative energy markets; political economy of regulation and deregulation; climate change and environmental policies related to energy production and use; cartels, market power and competition policy; pricing of exhaustible resources; competitiveness of alternative energy sources; and transportation and storage of energy commodities.
Evening & Weekend MBA 212A	Graduate	SF	Cleantech to Market	In this course, interdisciplinary teams of graduate students work with scientists from the Lawrence Berkeley National Laboratory and across the UCB campus to commercialize new solar, biofuel, battery, and smart grid/energy management technologies. Students are drawn from Business, Engineering, Science, Law, and the Energy and Resources Group. Students explore topics such as: Potential application in multiple markets; alignment with target or desired market(s); distinguishing advantages and disadvantages; customer and user profiles; top competitors; commercialization and scale-up challenges; relevant government policies; revenue potential and cost sensitivities; intellectual property issues; and multiple other related topics.
Evening & Weekend MBA 212B	Graduate	SF	Legal and Regulatory Frameworks for Energy and Infrastructure Project Finance	This course will explore the key commercial, legal, economic and policy issues affecting the development and financing of infrastructure projects, with special emphasis on practical concerns related to investments in alternative energy and other power generation facilities. These topics will be raised in the context of comparative, real-world case studies of different types of energy and infrastructure projects.
Evening & Weekend MBA 212C	Graduate	SF	Modeling for Energy and Infrastructure Project Finance	This course compliments the course "Legal and Regulatory Frameworks for Energy and Infrastructure Project Finance". Where the former focuses on the legal and risk framework for project financings, this course is devoted to the financial and quantitative aspects of project finance. The course focuses on the application of project finance to the power generation industry with a particular emphasis on examples from gas-fired, wind and solar technologies.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Evening & Weekend MBA 285	Graduate	SF	Land Development and Investment	This course is designed as an interdisciplinary approach for students to learn about every aspect of deal making in the land development process. Although it focuses on real estate and land investment, the thrust of the course is on deal making, whether it be on acquisition, financing, environmental review, entitlement, obtaining community support, or ultimate disposition of a successful project. The course introduces the use of green technology and the inclusion of affordable housing issues in the development process.
Geography 130	Undergraduate	SF	Food and the Environment	How do human populations organize and alter natural resources and ecosystems to produce food? The role of agriculture in the world economy, national development, and environmental degradation in the Global North and the Global South. The origins of scarcity and abundance, population growth, hunger and obesity, and poverty.
Geography 137	Undergraduate	SF	Top Ten Global Environmental Problems	Conceptualizing global environmental problems is difficult because of the complexity of the issues, the magnitude of the problems, and the different time scales of action versus reaction. These issues apply both to the natural earth system as well as human societies. This course will examine the scientific basis underlying the largest environmental threats, and then reframe the issues to explore the societal basis of those problems. Class is not open to freshmen.
Geography 138	Undergraduate	SF	Global Environmental Politics	Political factors affecting ecological conditions in the Third World. Topics include environmental degradation, migrations, agricultural production, role of international aid, divergence in standard of living, political power, participation and decision making, access to resources, global environmental policies and treaties, political strife and war.
Geography 140A	Undergraduate	SF	Physical Landscapes: Process and Form	Understanding the physical characteristics of the Earth's surface, and the processes active on it, is essential for maintaining the long-term health of the environment, and for appreciating the unique, defining qualities of geographic regions. In this course, we build an understanding of global tectonics, rivers, hillslopes, and coastlines and discover how these act in concert with the underlying geologic framework to produce the magnificent landscapes of our planet. Through our review of formative processes, we learn how physical landscapes change and are susceptible to human modifications, which are often unintentional.
Geography 142	Undergraduate	SF	Climate Dynamics	This course examines how various components of the climate system--the atmosphere, ocean, land, and cryosphere--interact in determining its observed state. Covered topics: observations of the climate system; the earth's energy balance; atmospheric radiative transfer; the surface energy balance; the hydrologic cycle; atmospheric circulation and its relation to the energy balance; the role of the ocean and the cryosphere. Additional topics, as time permits, will cover climate change, natural and anthropogenic; and computer modeling of climate.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Geography 143	Undergraduate	SF	Global Change Biogeochemistry	How does the chemical makeup of Earth make it suitable for life? And how does life in turn alter the chemistry of our planet? Biogeochemistry is the field of science that explores the imprint of biota (including humans) on the chemistry of the ocean, land and atmosphere. This interdisciplinary field addresses global problems, including climate change feedbacks, air quality, land use change, and marine ecosystem health. We will provide an overview of the major biogeochemical cycles, discuss the biogeochemistry of major ecosystems, and introduce the major biogeochemical questions being asked today. We also cover measurement techniques, including hands-on activities to introduce students to experimental methods and data analysis.
Geography 157	Undergraduate	SF	The Politics of the Anthropocene	This course seeks to trace the rise of the anthropogenic epoch as a political epistemology, changing material milieu, and amorphous and contested political signifier. The notion of the Anthropocene challenges the very boundaries of nature and culture that have plagued and defined modernity. Natural forces and inanimate objects from storms and bodies, ocean flows and river currents, soil layers and chemical reactions are more and more commonly understood as always already natural/cultural. What are the differential ways that the universal categories of the human at the heart of the concept of the Anthropocene mask the differential responsibility and liability for these epochal changes?
Geography 185	Undergraduate	SF	Earth System Remote Sensing	This lecture-lab course is focused on Earth system remote sensing applications, including a survey of methods and an accompanying lab. This first part of the course will cover general principles, image acquisition and interpretation, and analytical approaches. The second part will cover global change remote sensing applications that will include terrestrial ecosystems, Earth sciences, the hydrosphere, and human land-use.
Geography 203	Graduate	SF	Nature and Culture: Social Theory, Social Practice, and the Environment	The relationship between societies and natural environments lies at the heart of geographical inquiry and has gained urgency as the rate and scale of human transformation of nature have grown, often outstripping our understanding of causes and effects. The physical side of environmental science has received most of the emphasis in university research, but the social basis of environmental change must be studied as well. Recent developments in social theory have much to offer environmental studies, while the latter has, in turn, exploded many formerly safe assumptions about how and what the social sciences and humanities ought to be preoccupied with. This seminar allows students to explore some classics in environmental thought as well as recent contributions that put the field on the forefront of social knowledge today.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Geography 244	Graduate	SF	Complex Environmental Systems	Applying a complex-systems approach to environmental problems can yield valuable insight into risk, potential drivers of change, likely outcomes of perturbation, and whether it is even possible to forecast or manage system behavior. This course explores complex-systems theory and applications in geography, ecology, and earth science. Case studies include climate change, coupled human-environmental systems, vegetation community change, river networks, forest fires, earthquakes, and peatlands.
Geography 40	Undergraduate	SF	Introduction to Earth System Science	The goals of this introductory Earth System Science course are to achieve a scientific understanding of important problems in global environmental change and to learn how to analyze a complex system using scientific methods. Earth System Science is an interdisciplinary field that describes the cycling of energy and matter between the different spheres (atmosphere, hydrosphere, biosphere, cryosphere, and lithosphere) of the earth system. Under the overarching themes of human-induced climate change, stratospheric ozone depletion, and biodiversity loss, we will explore key concepts of solar radiation, plate tectonics, atmospheric and oceanic circulation, and the history of life on Earth.
Geography C135	Undergraduate	SF	Water Resources and the Environment	Distribution, dynamics, and use of water resources in the global environment. Water scarcity, water rights, and water wars. The terrestrial hydrologic cycle. Contemporary environmental issues in water resource management, including droughts, floods, saltwater intrusion, water contamination and remediation, river restoration, hydraulic fracturing, dams, and engineering of waterways. The role of water in ecosystem processes and geomorphology. How water resources are measured and monitored. Basic water resource calculations. Effects of climate change on water quantity, quality, and timing.
Geography C136	Undergraduate	SF	Terrestrial Hydrology	A quantitative introduction to the hydrology of the terrestrial environment including lower atmosphere, watersheds, lakes, and streams. All aspects of the hydrologic cycle, including precipitation, infiltration, evapotranspiration, overland flow, streamflow, and groundwater flow. Chemistry and dating of groundwater and surface water. Development of quantitative insights through problem solving and use of simple models. This course requires one field experiment and several group computer lab assignments.
Geography C139	Undergraduate	SF	Atmospheric Physics and Dynamics	This course examines the processes that determine the structure and circulation of the Earth's atmosphere. The approach is deductive rather than descriptive: to figure out the properties and behavior of the Earth's atmosphere based on the laws of physics and fluid dynamics. Topics will include interaction between radiation and atmospheric composition; the role of water in the energy and radiation balance; governing equations for atmospheric motion, mass conservation, and thermodynamic energy balance; geostrophic flow, quasigeostrophic motion, baroclinic instability and dynamics of extratropical cyclones.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Geography C82	Undergraduate	SF	Oceans	This course offers multidisciplinary approach to begin answering the question "Why are oceans important to us?" Upon a physical, chemical, and geologic base, we introduce the alien world of sea life, the importance of the ocean to the global carbon cycle, and the principles of ecology with a focus on the important concept of energy flow through food webs. Lectures expand beyond science to include current topics as diverse as music, movies, mythology, biomechanics, policy, and trade.
History 120AC	Undergraduate	SF	American Environmental and Cultural History	History of the American environment and the ways in which different cultural groups have perceived, used, managed, and conserved it from colonial times to the present. Cultures include American Indians and European and African Americans. Natural resources development includes gathering-hunting-fishing; farming, mining, ranching, forestry, and urbanization. Changes in attitudes and behaviors toward nature and past and present conservation and environmental movements are also examined.
International & Area Studs C176	Undergraduate	SF	Climate Change Economics	This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens.
Integrative Biology 117	Undergraduate	SM	Medical Ethnobotany	Biological diversity and ethno-linguistic diversity sustain traditional botanical medicine systems of the world. Major topics covered in this course include cultural origins of medicinal plant knowledge on plant-derived pharmaceuticals and phytomedicines; field research methods in ethnobotany and ethnopharmacology; examples of how traditional botanical medicines provide safe, effective, affordable, and sustainable primary health care to tropical countries; human physiology, human diseases, and mechanisms of action of plant-derived drugs.
Integrative Biology 150	Undergraduate	SF	Evolutionary Environmental Physiology	Evolutionary physiology studies how physiological traits arise and are modified during adaptation to the environment. An integrative understanding of the origin and maintenance of physiological traits, encompassing levels of biological hierarchy from molecular to ecological and biogeographic, is essential for improving human health and stewarding the natural world through the current era of rapid environmental change. This course consists of three parts: 1) big questions in evolutionary physiology and how they are addressed; 2) a student-led exploration of how environmental factors have shaped physiological evolution; and 3) predicting responses to global change using evolutionary physiology.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Integrative Biology 151	Undergraduate	SF	Plant Physiological Ecology	This course focuses on a survey of physiological approaches to understanding plant-environment interactions from the functional perspective. Lectures cover physiological adaptation; limiting factors; resources acquisition/allocation; photosynthesis, carbon, energy balance; water use and relations; nutrient relations; linking physiology; stable isotope applications in ecophysiology; stress physiology; life history and physiology; evolution of physiological performance; physiology population, community, and ecosystem levels.
Integrative Biology 151L	Undergraduate	SF	Plant Physiological Ecology Laboratory	The laboratory is focused on instructing you on observational and experimental approaches and methods used in plant physiological ecology. Students are introduced to a wide range of techniques and will make measurements on different plant species growing in the field or greenhouse (weeks 1-7). A group research project is required (weeks 9-12).
Integrative Biology 153	Undergraduate	SF	Ecology	Principles of microbial, animal, and plant population ecology, illustrated with examples from marine, freshwater, and terrestrial habitats. Consideration of the roles of physical and biological processes in structuring natural communities. Observational, experimental, and theoretical approaches to population and community ecology will be discussed. Topics will include quantitative approaches relying on algebra, graph analysis, and elementary calculus. Discussion section will review recent literature in ecology.
Integrative Biology 154	Undergraduate	SF	Plant Ecology	An introduction to ecology of plants, covering individuals, populations, communities, and global processes. Topics include: form and function, population ecology, life histories, community structure and dynamics, disturbance and succession, diversity and global change.
Integrative Biology 154L	Undergraduate	SF	Plant Ecology Laboratory	Field and laboratory class in plant ecology. Laboratory exercises covering plant functional morphology, dispersal ecology, spatial dispersion in plant populations, environmental gradients and plant distributions, population dynamics simulations, and restoration ecology. Small-group independent projects, with write-ups and presentations. Concurrent enrollment in Integrative Biology 154 is required.
Integrative Biology 157LF	Undergraduate	SF	Ecosystems of California	The ecosystems of California are studied from both an ecological and historical biogeographical perspective with a focus on terrestrial plant communities. Students learn how to identify about 150 species of native plants (mostly trees, but also other dominant plants from the non-forest biomes). Field trips occur each Friday and over several weekends. Students conduct group projects that involve plant inventories and data collection as well as how to collect plant specimens and use the Herbarium.
Integrative Biology 158LF	Undergraduate	SF	Biology and Geomorphology of Tropical Islands	Natural history and evolutionary biology of island terrestrial and freshwater organisms, and of marine organisms in the coral reef and lagoon systems will be studied, and the geomorphology of volcanic islands, coral reefs, and reef islands will be discussed. Features of island biogeography will be illustrated with topics linked to subsequent field studies on the island of Moorea (French Polynesia).

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Integrative Biology 159	Undergraduate	SF	The Living Planet: Impact of the Biosphere on the Earth System	Earth is a complex dynamic system. Interplay between its components (solid earth, oceans, and atmosphere) governs conditions on the planet's outside that we and other biota inhabit. In turn, life asserts a vast influence on the abiotic components; in fact, the biosphere itself is a crucial system component. We will explore the effect that 3.5 billion years of evolving biosphere had on System Earth and vice versa (e.g., in terms of climate), including the recent human impact on the system.
Integrative Biology 162	Undergraduate	SF	Ecological Genetics	This course integrates ecology, genetics, and evolutionary biology. It presents contemporary approaches to studying evolution in natural populations, including analyzing heritability of ecologically important traits, using molecular techniques to decompose genotypes, documenting and measuring the magnitude of selection in natural systems, and using models to predict evolution in natural populations. Case studies are used to examine evolutionary effects of ecological interactions among organisms, the importance of population size and structure, and interactions among populations through migration and dispersal.
Integrative Biology 172	Undergraduate	SF	Coevolution: From Genes to Ecosystems	The biological world is shaped by interactions among species. These inter-specific interactions, such as between predators and prey, plants and pollinators, or hosts and pathogens, have led to an impressive array of adaptations, helping to explain the incredible organismal and genetic diversity on Earth. Our understanding of coevolution (the responses to reciprocal selection acting on two interacting populations) has been greatly facilitated in the last few years by conceptual advancements, new methods allowing direct tests of theory, next generation sequencing technology, and the advance of 'omics' approaches.
Integrative Biology 181L	Undergraduate	SF	Paleobotany - The 500-Million Year History of a Greening Planet	Introduction to the evolution of plants and terrestrial ecosystems through time. From the invasion of land to the present, we will follow the evolution of major plant groups through important moments of the Phanerozoic eon (the past 540 million years). By studying fossilized plant assemblages, we will interpret how major environmental changes unfolded across landscapes in the past and how plants have influenced the shaping of our planet. Lectures will be complemented by an interactive laboratory covering paleobotanical research techniques, study of fossil and living plant form and function in the lab and field, and analysis of peer-reviewed literature.
Integrative Biology C156	Undergraduate	SF	Principles of Conservation Biology	A survey of the principles and practices of conservation biology. Factors that affect the creation, destruction, and distribution of biological diversity at the level of the gene, species, and ecosystem are examined. Tools and management options derived from ecology and evolutionary biology that can recover or prevent the loss of biological diversity are explored.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Integrative Biology C171	Undergraduate	SF	Freshwater Ecology	Lakes, rivers, wetlands, and estuaries are biologically rich, dynamic, and among the most vital and the most vulnerable of Earth's ecosystems. Lectures will introduce general topics including the natural history of freshwater biota and habitats, ecological interactions, and ecosystem linkages and dynamics. Broad principles will be illustrated with results from selected recent research publications. Factors affecting resilience or vulnerability of freshwater ecosystems to change will be examined. Course requirements: two exams and a short synthesis paper projecting the future states of a freshwater or estuarine ecosystem of the student's choice under plausible scenarios of local, regional, or global change.
Integrative Biology C176L	Undergraduate	SF	Fish Ecology	Introduction to fish ecology, with particular emphasis on the identification and ecology of California's inland fishes. This course will expose students to the diversity of fishes found in California, emphasizing the physical (e.g., temperature, flow), biotic (e.g., predation, competition), and human-related (e.g., dams, fisheries) factors that affect the distribution, diversity, and abundance of these fishes.
Integrative Biology C205	Graduate	SF	Quantitative Methods for Ecological and Environmental Modeling	This course will review the background mathematical and statistical tools necessary for students interested in pursuing ecological and environmental modeling. Topics include linear algebra; difference equation, ordinary differential equation, and partial differential equation models; stochastic processes; parameter estimation; and a number of statistical techniques. This course will be recommended as a prerequisite for advanced modeling courses in Integrative Biology, Energy and Resources Group, and Environmental Science, Policy, and Management.
Integrative Biology C82	Undergraduate	SF	Oceans	This course offers multidisciplinary approach to begin answering the question "Why are oceans important to us?" Upon a physical, chemical, and geologic base, we introduce the alien world of sea life, the importance of the ocean to the global carbon cycle, and the principles of ecology with a focus on the important concept of energy flow through food webs. Lectures expand beyond science to include current topics as diverse as music, movies, mythology, biomechanics, policy, and trade.
Law 270.4	Graduate	SF	Introduction to Energy Law	0
Law 270.6	Graduate	SF	Energy Law and Policy	NONE
Law 270.65	Graduate	SF	Energy Project Development & Finance	NONE
Law 270.7	Graduate	SF	Renewable Energy Law and Policy	NONE
Law 271	Graduate	SF	Environmental Law & Policy	0

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Law 271.4	Graduate	SF	Environmental Transaction Law	NONE
Law 271.5	Graduate	SF	Environmental Law Writing Seminar	0
Law 271.51	Graduate	SF	Environmental Law Writing Seminar II	0
Law 271.71	Graduate	SF	International Environmental Law	0
Law 271S	Graduate	SF	Foundations of Environmental Law	0
Law 272.1	Graduate	SF	Water Law	NONE
Law 272.2	Graduate	SF	Environmental Justice	0
Law 272.2A	Graduate	SF	Introduction to Environmental Justice	0
Law 272.3	Graduate	SF	Climate Change and the Law	0
Law 273.1	Graduate	SF	Land Use Law	0
Law 273.63	Graduate	SF	Public Lands and Natural Resources Law	NONE
Law 274.7	Graduate	SF	Environmental Law Colloquium	NONE
Law 291A	Graduate	SF	Environmental Law Clinic Seminar	0
Law 295.1J	Graduate	SF	Ecology Law Quarterly	NONE
Law 295.3K	Graduate	SF	PACE, Environmental Law	NONE
Law 295.5E	Graduate	SF	Environmental Law Clinic	0
Law 295.5F	Graduate	SF	Advanced Environmental Law Clinic	none
Law 295.5G	Graduate	SF	Environmental Law Clinic- CLEE Module for LL.M.s	0
Law 295.6C	Graduate	SF	Environmental Field Placement	NONE
Landscape Arch & Env Plan 1	Undergraduate	SF	Drawing a Green Future: Fundamentals of Visual Representation and Creativity	This introductory studio course is open to all undergraduate students in the University, who want to investigate the process of drawing as a method to learn how to perceive, observe and represent the environment. This studio will encourage visual thinking as a formative tool for problem solving that provides a means to envision a sustainable future. The focus will be on the critical coordination between hand, mind and idea.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Landscape Arch & Env Plan 103	Undergraduate	SF	Energy, Fantasy, and Form	This is an undergraduate studio with a central focus on climate modification for energy conservation. We will research historical precedents in order to develop new garden forms for passive green designs. We will also explore how past cultures integrated metaphysics into their gardens as an adjunct to microclimate and habitat design. The contemporary landscape should be a balanced interweaving of proportion, function, comfort, energy conservation, and enlightenment. Additionally, we will study the choreography of space and investigate how to animate the landscape through the creative interpretation of text and film. Many new and exciting opportunities lie ahead for the creation of garden forms that not only conserve energy, but are also works of art and places of spiritual renewal.
Landscape Arch & Env Plan 110	Undergraduate	SF	Ecological Analysis	Analysis of environmental factors, ecosystem functions, and ecosystem dynamics, as related to decision-making for landscape planning and design.
Landscape Arch & Env Plan 110L	Undergraduate	SF	Ecological Analysis Laboratory	Introduction to field techniques for assessment of landscape factors. Factors include topography, geology, climate, soil, hydrology, flora, vegetation, and wildlife.
Landscape Arch & Env Plan 12	Undergraduate	SF	Environmental Science for Sustainable Development	The scientific basis of sustainability, explored through study of energy, water, food, natural resources, and built environment. Physical/ecological processes and systems, and human impacts from the global scale to local energy/resource use. Energy and water audits, opportunities to increase sustainability of processes/practices. Discussion/lab section involves field data collection/analysis (e.g., habitat characteristics and macroinvertebrate communities in local streams, measurement of atmospheric particulate matter concentrations, measurement of water savings from updated irrigation technologies) and a final, integrative sustainability assessment project.
Landscape Arch & Env Plan 121	Undergraduate	SF	Design in Detail: Introduction to Landscape Materials and Construction	This course introduces the visual and physical characteristics of landscape construction materials including, but not limited to, stone, brick, concrete, metal, asphalt, and wood. Additionally, lectures cover the production and availability of these materials, any existing evaluations on their sustainability, and their potential impact on the immediate environment. Students also learn to utilize standard sources of information on building materials and the terminology typically utilized when choosing and specifying construction materials. They become familiar with dimensional standards for landscape structures, including pavements, stairs, furnishings, retaining walls, freestanding walls, fences, decks, and small overhead structures.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Landscape Arch & Env Plan 122	Undergraduate	SF	Hydrology for Planners	This course presents an overview of relevant hydrologic, hydraulic, and geomorphic processes, to provide the planner and ecologist with insight to incorporate these processes into the planning process and coordinate with specialists in the field of hydrology. Relevant government regulations and policies are also reviewed. The course is not intended to duplicate more specialized courses offered in such fields as engineering hydrology, coastal engineering, or geology, but rather to provide an integrated understanding. The course takes a process- and field-based approach to hydrology, and emphasizes interdisciplinary perspectives.
Landscape Arch & Env Plan 130	Undergraduate	SF	Sustainable Landscapes and Cities	This course is an introduction to issues of sustainability in the designed landscape and in our cities. It includes environmental history as well as contemporary social, environmental and political issues surrounding sustainable design and activism. The course stresses motives and values expressed through environmental design at various scales - from neighborhood to global and examines problems affecting healthy environments and their solutions. Students study the need for protection and restoration of healthy ecological systems within the design of cities and landscapes and discuss ways to enable these systems to thrive. Readings and discussions focus on means to evaluate, create and advocate for healthy, sustainable environments.
Landscape Arch & Env Plan 140	Undergraduate	SF	Social and Psychological Factors in Open Space Design	User-oriented approach to design. Post-occupancy evaluation as a tool for understanding use of designed open spaces. Design as a communication process. Environmental needs of vulnerable populations--children, elderly, disabled, low-income families. Personal and societal environmental values.
Landscape Arch & Env Plan 170	Undergraduate	SM	History and Literature of Landscape Architecture	This course surveys the history of landscape architecture in four realms: 1) gardens; 2) urban open space, that is, plazas, parks, and recreation systems; 3) urban and suburban design; and 4) regional and environmental planning. The course will review the cultural and social contexts which have shaped and informed landscape architecture practice and aesthetics, as well as the environmental concerns, horticultural practices, and technological innovations of historic landscapes.
Landscape Arch & Env Plan 200A	Graduate	SM	Fundamentals of Landscape Design	This studio introduces students to the programmatic, artistic, and technical aspects of land form and topographic adjustments to accommodate human use. Topics include pedestrian and vehicular circulation, conservation and addition of plant materials, movement of water, recreation use, and creation of views. Sculptural land forms will be emphasized through the use of topographic plans, sections, and contour models.
Landscape Arch & Env Plan 200B	Graduate	SM	Case Studies in Landscape Design	This studio stresses the shaping and coordination of ideas from initial concept to complete design product. A product(s) of intermediate scale and complexity (such as a garden, small park, plaza, or campus courtyard) will be developed in detail including the selection of planting, selection of construction materials, and topographic design. Lecture modules on selected professional topics are integrated into this course.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Landscape Arch & Env Plan 201	Graduate	SF	Ecological Factors in Urban Landscape Design	Through lectures, studio problems, research projects, and discussion, this course will explore the challenge and potential incorporating ecological factors in urban contexts. The course focuses on the interaction of landscape science (hydrology, geology, etc.) with the necessities and mechanisms of the human environment (urban design, transportation, economics, etc.). Lectures and research projects will particularly emphasize innovative and forward thinking solutions to the ecological problems of the human environment. Throughout the semester, reading and discussion sessions will highlight the connections between the broader concerns of the global ecological crisis and landscape design and planning.
Landscape Arch & Env Plan 202	Graduate	SM	Design of Landscape Sites	A site design studio stressing the shaping and coordination of ideas from initial concept to complete design of open space in various contexts. Typical projects will be of an intermediate scale and might include a park, plaza, museum sculpture garden, playground, office park, or housing project. Modules on social factors and planting design are included.
Landscape Arch & Env Plan 204	Graduate	SM	Advanced Project Design	Special topics in the design and planning of the landscape. The focus of the studio varies from semester to semester. Possible topics include community design, educative environments, landscape as art, park design, or energy-conserving design. For current offerings, see department announcement.
Landscape Arch & Env Plan 205	Graduate	SF	Environmental Planning Studio	Application of environmental planning principles to a complex problem involving a variety of environmental criteria and desired land uses in a complex institutional and political setting. Student teams will identify needed data, assess environmental developmental problems, weigh competing uses, and prepare an environmental management plan.
Landscape Arch & Env Plan 221	Graduate	SF	Quantitative Methods in Environmental Planning	Discussion and critique of the application of quantitative methods to environmental assessment, analysis, and evaluation in environmental planning. Topics to include geographical information systems and data bases, remote sensing, and multivariate analysis. This course emphasizes computer applications and data analysis.
Landscape Arch & Env Plan 222	Graduate	SF	Hydrology for Planners	This course presents an overview of relevant hydrologic, hydraulic, and geomorphic processes, to provide the planner and ecologist with insight sufficient to coordinate with technical specialists in the field of hydrology. In addition, relevant regulations and policies are reviewed.
Landscape Arch & Env Plan 226	Graduate	SM	Landscape Design Construction	The course investigates the process of developing schematic landscape design proposals into constructed landscapes. Emphasis will be placed on understanding the durability of materials and design details, the efficient use of materials, and the ability to evaluate how material selection and detailing can impact the environment. Field trips to construction sites, manufacturing facilities, and built landscapes will be included.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Landscape Arch & Env Plan 227	Graduate	SF	Restoration of Rivers and Streams	This course reviews the underlying goals and assumptions of river and stream restoration projects, reviews techniques employed in these efforts, and emphasizes strategies for evaluation of project success. The course focuses on geomorphic and hydrologic analyses relevant to restoration and enhancement of aquatic and riparian habitat in freshwater systems. Format: lectures by instructor, guest lectures, presentation of student independent projects, and field trips. Course requirement: independent term project involving original research.
Landscape Arch & Env Plan 232	Graduate	SF	The Landscape As a Sacred Place	Visual and cultural analysis of landscapes, inventory procedures for "place" values, and problems related to sustainable design development, with special emphasis on highly valued places.
Landscape Arch & Env Plan 237	Graduate	SF	The Process of Environmental Planning	A review of the techniques used in environmental planning, and evaluation of alternate means of implementation in varying environmental and political circumstances. The class will examine and critique a number of well-known environmental planning programs and plans. Lectures and discussion will address recurrent planning problems, such as the limitations of available data, legal and political constraints on plans, conflicts among specialists.
Landscape Arch & Env Plan 251	Graduate	SF	Theories of Landscape Architecture and Environmental Planning	The focus will be on debate and discussion of central ideas in landscape architecture and environmental planning, drawing on primary literature over many decades of thought. This is not a history course, but it will include some literature that goes back to the early years of the field. This course covers the breadth of thinking in the field, including both environmental planning and landscape design as well as other sub disciplines. Each week students will lead a debate on a different theoretical issue.
Landscape Arch & Env Plan 253	Graduate	SF	Landscape Architecture and Environmental Planning Colloquium	Invited lectures on current research, planning practice, and design projects. Out of approximately 14 presentations per term, typically two or three would be by department faculty, two or three by graduating students, the remainder by outside speakers.
Landscape Arch & Env Plan 254	Graduate	SF	Topics in Landscape Architecture and Environmental Planning	Designed to be a forum for presentation of student research, discussions with faculty researchers and practitioners, and examination of topical issues in landscape architecture and environmental planning. Topics will be announced at the beginning of each semester.
Landscape Arch & Env Plan 255	Graduate	SF	Doctoral Seminar in Environmental Planning	Designed to be a forum for presentation of doctoral student research, discussions with faculty researchers and environmental planning practitioners, and examination of topical issues in environmental planning. Topics will be announced at the beginning of each semester.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Landscape Arch & Env Plan 289	Graduate	SM	Applied Remote Sensing	This course consists of one lecture and one computer lab per week introducing fundamental principles and methods of environmental remote sensing and their practical applications. We will explore strategies for working with different types of remote sensing data and extracting image-based landscape information for various environmental research and planning objectives. This course focuses largely on local to regional scale applications of remote sensing in ecology, environmental planning and design, civil & environmental engineering and natural resource management.
Landscape Arch & Env Plan C171	Undergraduate	SF	The American Designed Landscape Since 1850	This course surveys the history of American landscape architecture since 1850 in four realms: 1) urban open spaces--that is squares, plazas, parks, and recreation systems; 2) urban and suburban design; 3) regional and environmental planning; 4) gardens. The course will review the cultural and social contexts which have shaped and informed landscape architecture in the United States since the advent of the public parks movement, as well as, the aesthetic precepts, environmental concerns, horticultural practices, and technological innovations of American landscapes. Students will complete a midterm, final, and a research assignment.
Landscape Arch & Env Plan C241	Graduate	SF	Research Methods in Environmental Design	The components, structure, and meaning of the urban environment. Environmental problems, attitudes, and criteria. Environmental survey, analysis, and interview techniques. Methods of addressing environmental quality. Environmental simulation.
Letters & Science 70C	Undergraduate	SM	Living on the Edge	Introduction to the geologic setting and natural hazards along the Pacific Rim and a general discussion of their impacts current and future development of the coastal zone. Dangers posed by earthquakes, tsunamis, volcanic eruptions, extreme climatic events, landscapes affecting human health, and sea level rise will be discussed using observations of response to past events in the context of analyzing long-term risks to society and options for future development and mitigation.
Letters & Science C30V	Undergraduate	SF	Environmental Issues	Relationship between human society and the natural environment; case studies of ecosystem maintenance and disruption. Issues of economic development, population, energy, resources, technology, and alternative systems.
Letters & Science C46	Undergraduate	SF	Climate Change and the Future of California	Introduction to California geography, environment, and society, past and future climates, and the potential impacts of 21st-century climate change on ecosystems and human well-being. Topics include fundamentals of climate science and the carbon cycle; relationships between human and natural systems, including water supplies, agriculture, public health, and biodiversity; and the science, law, and politics of possible solutions that can reduce the magnitude and impacts of climate change.
Materials Science & Eng 136	Undergraduate	SF	Materials in Energy Technologies	In many, if not all, technologies, it is materials that play a crucial, enabling role. This course examines potentially sustainable technologies, and the materials properties that enable them. The science at the basis of selected energy technologies are examined and considered in case studies.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Business Admin-MBA 212	Graduate	SF	Energy and Environmental Markets	Business strategy and public issues in energy and environmental markets. Topics include development and effect of organized spot, futures, and derivative energy markets; political economy of regulation and deregulation; climate change and environmental policies related to energy production and use; cartels, market power and competition policy; pricing of exhaustible resources; competitiveness of alternative energy sources; and transportation and storage of energy commodities.
Business Admin-MBA 212A	Graduate	SF	Cleantech to Market	In this course, interdisciplinary teams of graduate students work with scientists from the Lawrence Berkeley National Laboratory and across the UCB campus to commercialize new solar, biofuel, battery, and smart grid/energy management technologies. Students are drawn from Business, Engineering, Science, Law, and the Energy and Resources Group. Students explore topics such as: Potential application in multiple markets; alignment with target or desired market(s); distinguishing advantages and disadvantages; customer and user profiles; top competitors; commercialization and scale-up challenges; relevant government policies; revenue potential and cost sensitivities; intellectual property issues; and multiple other related topics.
Business Admin-MBA 212B	Graduate	SF	Legal and Regulatory Frameworks for Energy and Infrastructure Project Finance	This course will explore the key commercial, legal, economic and policy issues affecting the development and financing of infrastructure projects, with special emphasis on practical concerns related to investments in alternative energy and other power generation facilities. These topics will be raised in the context of comparative, real-world case studies of different types of energy and infrastructure projects.
Molecular & Cell Biology C44	Undergraduate	SF	Biology for Voters	This is a Discovery Course for non-Biology majors designed to introduce lower-division college students to biology through the lens of the contemporary problems facing people, the planet and the species of the planet. Modern genetic contributions will be presented on such issues as genetic engineering of plants and animals, the emergence of new pathogens, the role of genetic variation among individuals, and the extent to which DNA is and isn't destiny. Each week will close with the presentation and discussion of a defining biological challenge facing the world.
Mechanical Engineering 150A	Undergraduate	SF	Solar-Powered Vehicles: Analysis, Design and Fabrication	This course addresses all aspects of design, analysis, construction and economics of solar-powered vehicles. It begins with an examination of the fundamentals of photovoltaic solar power generation, and the capabilities and limitations that exist when using this form of renewable energy. The efficiency of energy conversion and storage will be evaluated across an entire system, from the solar energy that is available to the mechanical power that is ultimately produced. The structural and dynamic stability, as well as the aerodynamics, of vehicles will be studied. Safety and economic concerns will also be considered. Students will work in teams to design, build and test a functioning single-person vehicle capable of street use.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Mechanical Engineering 204	Graduate	SM	Advanced Manufacturing Systems Analysis, AMS	This course is designed to prepare students for technical leadership in industry. The objective is to provide insight and understanding on the main concepts and practices involved in analyzing, managing systems to deliver high quality, cost effectiveness and sustainable advantages. The impact of this class on the Mechanical Engineering program includes delivering core production concepts and advanced skills that blend vision and advanced manufacturing elements. This course is highly recommended for students on the Product Design track in Mechanical Engineering's Master of Engineering program.
Mechanical Engineering 290H	Graduate	SF	Green Product Development: Design for Sustainability	The focus of the course is management of innovation processes for sustainable products, from product definition to sustainable manufacturing and financial models. Using a project in which students will be asked to design and develop a product or service focused on sustainability, we will teach processes for collecting customer and user needs data, prioritizing that data, developing a product specification, sketching and building product prototypes, and interacting with the customer/community during product development. The course is intended as a very hands-on experience in the "green" product development process. The course will be a Management of Technology course offered jointly with the College of Engineering and the Haas School of Business. In addition, it will also receive credit towards the new Certificate on Engineering Sustainability and Environmental Management program. We aim to have half MBA students and half Engineering students (with a few other students, such as from the School of Information) in the class. The instructors will facilitate students to form mixed disciplinary teams for the development of their "green" products.
Mechanical Engineering 290I	Graduate	SF	Sustainable Manufacturing	Sustainable design, manufacturing, and management as exercised by the enterprise is a poorly understood idea and one that is not intuitively connected to business value or engineering practice. This is especially true for the manufacturing aspects of most enterprises (tools, processes, and systems). This course will provide the basis for understanding (1) what comprises sustainable practices in for-profit enterprises, (2) how to practice and measure continuous improvement using sustainability thinking, techniques, and tools for product and manufacturing process design, and (3) the techniques for and value of effective communication of sustainability performance to internal and external audiences. Material in the course will be supplemented by speakers with diverse backgrounds in corporate sustainability, environmental consulting, non-governmental organizations, and academia.
Mechanical Engineering 290KB	Graduate	SF	Life Cycle Thinking in Engineering Design	How do we design and manufacture greener products, and how do we know if they really are? This class both provides tools for sustainable design innovation and metrics to measure success. Students will use both creative and analytical skills, generating new ideas as well as evaluating designs with screening-level life cycle assessment.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Nuclear Engineering 100	Undergraduate	SF	Introduction to Nuclear Engineering	The class provides students with an overview of the contemporary nuclear energy technology with emphasis on nuclear fission as an energy source. Starting with the basic physics of the nuclear fission process, the class includes discussions on reactor control, thermal hydraulics, fuel production, and spent fuel management for various types of reactors in use around the world as well as analysis of safety and other nuclear-related issues. This class is intended for sophomore NE students, but is also open to transfer students and students from other majors.
Nuclear Engineering 124	Undergraduate	SF	Radioactive Waste Management	Components and material flowsheets for nuclear fuel cycle, waste characteristics, sources of radioactive wastes, compositions, radioactivity and heat generation; waste treatment technologies; waste disposal technologies; safety assessment of waste disposal.
Nuclear Engineering 130	Undergraduate	SF	Analytical Methods for Non-proliferation	Use of nuclear measurement techniques to detect clandestine movement and/or possession of nuclear materials by third parties. Nuclear detection, forensics, signatures, and active and passive interrogation methodologies will be explored. Techniques currently deployed for arms control and treaty verification will be discussed. Emphasis will be placed on common elements of detection technology from the viewpoint of resolution of threat signatures from false positives due to naturally occurring radioactive material. Laboratory will involve experiments conducted in the Nucleonics Laboratory featuring passive and active neutron signals, gamma ray detection, fission neutron multiplicity, and U and Pu isotopic identification and age determination. Students should be familiar with alpha, beta, gamma, and neutron radiation and basic concepts of nuclear fission.
Nuclear Engineering 200M	Graduate	SF	Introduction to Nuclear Engineering	Overview of the elements of nuclear technology in use today for the production of energy and other radiation applications. Emphasis is on nuclear fission as an energy source, with a study of the basic physics of the nuclear fission process followed by detailed discussions of issues related to the control, radioactivity management, thermal energy management, fuel production, and spent fuel management. A discussion of the various reactor types in use around the world will include analysis of safety and nuclear proliferation issues surrounding the various technologies. Case studies of some reactor accidents and other nuclear-related incidents will be included.
Nuclear Engineering 230	Graduate	SF	Analytical Methods for Non-Proliferation	Use of nuclear measurement techniques to detect clandestine movement and/or possession of nuclear materials by third parties. Nuclear detection, forensics, signatures, and active passive interrogation methodologies will be explored. Techniques currently deployed for arms control and treaty verification will be discussed. Emphasis will be placed on common elements of detection technology from the viewpoint of resolution of threat signatures from false positives due to naturally occurring radioactive material. Laboratory will involve experiments conducted in the Nucleonics Laboratory featuring passive and active neutron signals, gamma ray detection, fission neutron multiplicity, and U and Pu isotopic identification and age determination. Students should be familiar with alpha, beta, gamma, and neutron radiation and basic concepts of nuclear fission.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Nuclear Engineering 290E	Graduate	SF	Special Topics in Environmental Aspects of Nuclear Energy	Special topics in environmental aspects of nuclear energy. Lectures on special topics of interest in environmental impacts of nuclear power utilizations, including severe accidents. The course content may vary from semester to semester, and will be announced at the beginning of each semester.
Nutritional Science & Tox 104	Undergraduate	SF	Human Food Practices	This nutrition course with an anthropological perspective examines why we eat what we eat by addressing environmental, socio-economic, political, cultural, and personal components of the human diet. Cuisines from a sampling of countries and regions are discussed.
Public Health 101	Undergraduate	SF	A Sustainable World: Challenges and Opportunities	Human activity and human numbers threaten the possibility of irreversible damage to the fragile biosphere on which all life depends. The current generation of students is the first one to face this existential problem and it may be the last one that can solve it. The goal of this course is for faculty with expertise in the many variables involved—energy consumption, food security, population growth and family planning, climate change, governance, migration, resource consumption, etc.—to give one-hour presentations on their specific topic. Teacher Scholars supervised by a GSI will facilitate student discussion groups, who will then prepare brief statements responding to the challenge presented, and suggest ways of ameliorating the problems
Public Health 112	Undergraduate	SF	Global Health: A Multidisciplinary Examination	This course examines health at the individual and community/global level by examining the interplay of many factors, including the legal, social, political, and physical environments; economic forces; access to food, safe water, sanitation, and affordable preventive/medical care; nutrition; cultural beliefs and human behaviors; and religion; among others. Students will be expected to read, understand, and use advanced materials from diverse disciplines. Class accompanied by case-based discussions.
Public Health 150B	Undergraduate	SF	Introduction to Environmental Health Sciences	The course will present the major human and natural activities that lead to release of hazardous materials into the environment as well as the causal links between chemical, physical, and biological hazards in the environment and their impact on human health. The basic principles of toxicology will be presented including dose-response relationships, absorption, distribution, metabolism, and excretion of chemicals. The overall role of environmental risks in the pattern of human disease, both nationally and internationally, will be covered. The engineering and policy strategies, including risk assessment, used to evaluate and control these risks will be introduced.
Public Health 170C	Undergraduate	SF	Drinking Water and Health	The course covers monitoring, control and regulatory policy of microbial, chemical and radiological drinking water contaminants. Additional subjects include history and iconography of safe water, communicating risks to water consumers and a bottled water versus tap water taste test as part of the discussion on aesthetic water quality parameters. A field trip to a local water treatment plant is included.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 200C2	Graduate	SF	Environmental Health Sciences Breadth Course	This course will give an introduction to the major human and natural activities that lead to release of hazardous materials into the environment as well as the causal links between chemical, physical, and biological hazards in the environment and their impact on human health, including those related to climate change. The basic principles of toxicology, exposure assessment, risk assessment, risk perception, and environmental health policy will be presented. The overall role of environmental risks in the pattern of human disease, both nationally and internationally, will be covered.
Public Health 254	Graduate	SF	Occupational and Environmental Epidemiology	Epidemiological methods for designing, conducting, and interpreting epidemiological studies of persons occupationally or environmentally exposed to chemical and physical agents.
Public Health 267B	Graduate	SF	Characterization of Airborne Contaminants	Principles underlying the use of air monitoring methods in industry and the environment. Topics include behavior of gases, vapors, and aerosols; mechanisms of absorption and elimination of inhaled toxicants; methods for measuring of airborne chemicals and particles.
Public Health 269E	Graduate	SF	Current Topics in Environmental Medicine	Topics in environmental medicine will provide students with an overview of the health impacts, disease mechanisms, and public health controversies related to selected environmental exposures. The course will cover established environmental diseases as well as impacts of some emerging exposures of concern. The focus will primarily be on pathophysiology, issues related to exposure pathways, and the susceptibilities of specific human populations. No prior medical knowledge required.
Public Health 270	Graduate	SF	Introduction to Environmental Health Sciences	This survey course covers the breadth of hazards to chemical, biological, and physical agents of concern to environmental health professionals. Lectures are presented by experts on particular topics that emphasize the activities involved in professional practice. Students will also meet twice monthly with the instructor to discuss advanced readings and assignments related to the lecture topics. Students will conduct a project on a topic of current interest in some aspect of environmental health (under the guidance of the instructor). This course is designed for MPH students in Environmental Health Sciences and other graduate-level students interested in an overview course on environmental health.
Public Health 271C	Graduate	SF	Drinking Water and Health	The course covers monitoring, control and regulatory policy of microbial, chemical and radiological drinking water contaminants. Additional subjects include history and iconography of safe water, communicating risks to water consumers and a bottled water versus tap water taste test as part of the discussion on aesthetic water quality parameters.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 271E	Graduate	SF	Science and Policy for Environment and Health	Scientific knowledge and analyses are important to the development of public policies that address the impact of the environment on health. The limits of existing knowledge and uncertainties in research results create significant challenges in applying science to answer critical questions. This course critically examines how scientific information is used in policy decisions. Case studies of current issues address characterization of scientific knowledge, interpretation of science in policy contexts, scientific integrity, and factors in addition to science that influence decisions. Assignments prepare students to effectively translate technical knowledge for multi-disciplinary and lay audiences and to participate in public policy proceedings. Core materials address differences between regulatory and market-based approaches; emerging paradigms including the precautionary principle and environmental justice; and key elements of risk assessment and cost-benefit analysis.
Public Health 271G	Graduate	SF	Global Environmental Change for Health Scientists	The course will first provide a basic foundation in the physical and societal basis of climate change, including atmospheric structure and feedbacks, carbon cycling, and the sources and trends of human and natural greenhouse pollutant emissions. Forecasts of future climate, and their uncertainties, will be discussed, emphasizing parameters of potential relevance to human health. We will explore epidemiologic, risk assessment, and statistical methods appropriate for understanding the impact of climate on health in different populations, including reviews of current burden of disease estimates of avoidable and attributable risk. The public health implications, positive and negative, of society's efforts to mitigate and adapt to climate change will be elaborated, including discussions of ethical, political, and economic aspects. The one-unit version ends before the spring break. Students in the two-unit version will continue and be responsible for formal class presentations summarizing and critiquing the evidence based on a health outcome related to climate change.
Public Health 272B	Graduate	SF	Case Studies in Environmental and Occupational Epidemiology	Using published studies as examples, we will focus on key epidemiologic methods as they arise in the study of environmental hazards in the community and workplace. Selected topics include the validity of exposure assessment for both community-based and workplace-based studies, specific forms of selection bias (e.g., healthy worker survivor effect), measurement error (e.g., exposure misclassification), time varying confounding, and analytical methods to model exposure-reponse (e.g., person-years, causal models, spatial analysis, and nonlinear models) in environmental and occupational epidemiology. Grades will be based on class participation, homework, and final project.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 273	Graduate	SF	Environmental Determinants of Infectious Disease	The course takes a global perspective, examining the environmental phenomena that influence the transmission of infectious diseases. The epidemiological significance of environmental processes are explored, including weather, climate extremes, hydrology, development projects, and land usage change. Analytical tools are discussed and critiqued with respect to their ability to resolve the role of environmental factors in shaping disease distributions and pathogen fate, transport, and persistence.
Public Health C160	Undergraduate	SF	Environmental Health and Development	The health effects of environmental alterations caused by development programs and other human activities in both developing and developed areas. Case studies will contextualize methodological information and incorporate a global perspective on environmentally mediated diseases in diverse populations. Topics include water management; population change; toxics; energy development; air pollution; climate change; chemical use, etc.
Public Health C234	Graduate	SF	Green Chemistry: An Interdisciplinary Approach to Sustainability	Meeting the challenge of global sustainability will require interdisciplinary approaches to research and education, as well as the integration of this new knowledge into society, policymaking, and business. Green Chemistry is an intellectual framework created to meet these challenges and guide technological development. It encourages the design and production of safer and more sustainable chemicals and products.
Public Health C256A	Graduate	SF	Human Genome, Environment and Human Health	This introductory course will cover basic principles of human/population genetics and molecular biology relevant to understanding how data from the human genome are being used to study disease and other health outcomes. The latest designs and methods for genome-wide association studies and other approaches to identify genetic variants, environmental risk factors and the combined effects of gene and environment important to disease and health will be presented. The application of biomarkers to define exposures and outcomes will be explored. The course will cover recent developments in genomics, epigenomics and other 'omics', including applications of the latest sequencing technology and characterization of the human microbiome.
Public Health C271G	Graduate	SF	Health Implications of Climate Change	The course will provide a basic foundation in the physical mechanisms of, responses to, and health implications of climate change. We will explore the variety of epidemiologic, risk assessment, and statistical methods used to understand the impacts of climate change on health across diverse demographic groups. The public health implications, positive and negative, of efforts to mitigate and adapt to climate change will be elaborated, including discussions of ethical, political, and economic aspects of these efforts. Students will be responsible for leading class discussions and presenting a poster on their choice of a topic related to climate change and health.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Plant & Microbial Biology 122	Undergraduate	SF	Bioenergy	Offers an assessment of global energy supply and demand, addresses the chemistry of climate change, examines the response of plants and microbes to changes in the environment, and emphasizes the role of biology and photosynthesis in offering solutions to related energy and societal problems. Bioenergy is examined from the point-of-view of potential biofuels, including aspects of the biological generation of hydrogen, hydrocarbons, fatty acids, lipids, and bio-oils, polymers and related materials.
Plant Biology 122	Undergraduate	SF	Bioenergy	Offers an assessment of global energy supply and demand, addresses the chemistry of climate change, examines the response of plants and microbes to changes in the environment, and emphasizes the role of biology and photosynthesis in offering solutions to related energy and societal problems. Bioenergy is examined from the point-of-view of potential biofuels, including aspects of the biological generation of hydrogen, hydrocarbons, fatty acids, lipids, and bio-oils, polymers and related materials.
Plant & Microbial Biology 180	Undergraduate	SF	Environmental Plant Biology	An integrated and multidisciplinary approach to the study of interactions between plants and the environment. Introduces physical parameters in the global and micro-environment that affect plant function; and molecular, cellular, and developmental aspects of plant response to suboptimal/adverse conditions. Underlying biochemistry, physiology, and molecular biology of plant adaptation and acclimation mechanisms. Examines consequences of industrial activity on plant growth and productivity.
Plant Biology 180	Undergraduate	SF	Environmental Plant Biology	An integrated and multidisciplinary approach to the study of interactions between plants and the environment. Introduces physical parameters in the global and micro-environment that affect plant function; and molecular, cellular, and developmental aspects of plant response to suboptimal/adverse conditions. Underlying biochemistry, physiology, and molecular biology of plant adaptation and acclimation mechanisms. Examines consequences of industrial activity on plant growth and productivity.
Plant Biology C124	Undergraduate	SF	The Berkeley Lectures on Energy: Energy from Biomass	After an introduction to the different aspects of our global energy consumption, the course will focus on the role of biomass. The course will illustrate how the global scale of energy guides the biomass research. Emphasis will be placed on the integration of the biological aspects (crop selection, harvesting, storage and distribution, and chemical composition of biomass) with the chemical aspects to convert biomass to energy. The course aims to engage students in state-of-the-art research.
Plant & Microbial Biology C192	Undergraduate	SF	Molecular Approaches to Environmental Problem Solving	Seminar in which students consider how modern biotechnological approaches, including recombinant DNA methods, can be used to recognize and solve problems in the area of conservation, habitat and endangered species preservation, agriculture and environmental pollution. Students will also develop and present case studies of environmental problems solving using modern molecular methods.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Plant Biology C192	Undergraduate	SF	Molecular Approaches to Environmental Problem Solving	Seminar in which students consider how modern biotechnological approaches, including recombinant DNA methods, can be used to recognize and solve problems in the area of conservation, habitat and endangered species preservation, agriculture and environmental pollution. Students will also develop and present case studies of environmental problems solving using modern molecular methods.
Public Policy C184	Undergraduate	SF	Energy and Society	Energy sources, uses, and impacts: an introduction to the technology, politics, economics, and environmental effects of energy in contemporary society. Energy and well-being; energy in international perspective, origins, and character of energy crisis.
Public Policy C221	Graduate	SF	Climate, Energy and Development	Graduate seminar examining the role of energy science, technology, and policy in international development. The course will look at how changes in the theory and practice of energy systems and of international development have co-evolved over the past half-century, and what opportunities exist going forward. A focus will be on rural and decentralized energy use, and the issues of technology, culture, and politics that are raised by both current trajectories, and potential alternative energy choices. We will explore the frequently divergent ideas about energy and development that have emerged from civil society, academia, multinational development agencies, and the private and industrial sector.
Public Policy C284	Graduate	SF	Energy and Society	Energy sources, uses, and impacts; an introduction to the technology, politics, economics, and environmental effects of energy in contemporary society. Energy and well-being; energy international perspective, origins, and character of energy crisis.
Public Policy C285	Graduate	SF	Nuclear Security: The Nexus Between Policy and Technology	The course will review the origins and evolution of nuclear energy, how it has been applied for both peaceful and military purposes, and the current and prospective challenges it presents. The purpose of the course is to educate students on the policy roots and technological foundations of nuclear energy and nuclear weapons so they are positioned to make original contributions to the field in their scholarly and professional careers.
Sociology 137AC	Undergraduate	SF	Environmental Justice: Race, Class, Equity, and the Environment	Overview of the field of environmental justice, analyzing the implications of race, class, labor, and equity on environmental degradation and regulation. Environmental justice movements and struggles within poor and people of color communities in the U.S., including: African Americans, Latino Americans, and Native American Indians. Frameworks and methods for analyzing race, class, and labor. Cases of environmental injustice, community and government responses, and future strategies for achieving environmental and labor justice.
Sociology 139F	Undergraduate	SF	Selected Topics in Social Inequality: Social Problems of the Food Industry	This course will explore the social construction and material effects of social problems in the food industry. We will begin with an examination of the social constructionist approach to social phenomena and will specifically explore how sociologists study social problems. We will then apply sociological theories to the study of various aspects of the food industry by examining the treatment and pay of workers, the impacts on health, governmental policies, and environmental issues.

Environmental Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
UGIS-UG Interdisc Studies 167A	Undergraduate	SF	Environmental Politics & Policy	This course introduces students to the formation and implementation of environmental policy, with primary emphasis on the United States. It draws heavily from the discipline of political science in examining environmental politics and how this body of theory translates into public policy. Unlike many policy courses that focus exclusively on either national or international institutions, this course will concentrate on federal, state, and local governance and relations across these levels.
FPF-Earth & Planetary Sci 80	Undergraduate	SF	Environmental Earth Sciences	The course describes geologic processes active on and in the earth and man's interactions with them. Geologic aspects of use of the land and oceans based on an understanding of earth's environmental processes.
FPF-Env Sci, Pol, & Mgmt 50AC	Undergraduate	SF	Introduction to Culture and Natural Resource Management	An introduction to how culture affects the way we use and manage fire, wildland and urban forests, rangelands, parks and preserves, and croplands in America. The basic concepts and tools for evaluating the role of culture in resource use and management are introduced and used to examine the experience of American cultural groups in the development and management of western natural resources.

Courses that address social and economic sustainability issues (148 total). The courses are from the 2015-2016, 2016-2017 and 2017-2018 school years.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
African American Studies 112A	Undergraduate	SF	Political and Economic Development in the Third World	An examination of the structural and actual manifestations of Third World underdevelopment and the broad spectrum of theoretical positions put forward to explain it. Underdevelopment will be viewed from both the international and intranational perspective.
African American Studies 112B	Undergraduate	SF	Political and Economic Development in the Third World	A critical appraisal of the theoretically based policies employed by Third World nations in their attempts at transition to modernized developed socio-political and economic systems and an examination of the international and intranational impediments to Third World development. The focus will be on actual examples that represent the diversity of developing countries.
African American Studies 115	Undergraduate	SM	Language and Social Issues in Africa	This is an upper division course dealing with the relevance of language to social issues in African societies. It will focus on political developments in Africa and the use of language in fostering national identity; attaining cultural emancipation; and as a tool of oppression, of maintenance of social relations, and of addressing issues of education and childhood development, etc. The course will examine such issues as the roots of national language policies as influenced by Africa's reaction to colonialism; the role of western languages in African society and the attitudes towards African languages and cultures; the challenges of nation-building in modern African states; the use of African languages in government, education, and technology; the role of language in dealing with the HIV/AIDS pandemic, and other health issues; minority languages, endangered languages, and language preservation; cultural responses to migration and African diaspora: the use of African languages in the age of globalization and information technology.
African American Studies 116	Undergraduate	SM	Slavery and African American Life Before 1865	This course will examine the origins of the African slave trade, and explore political, economic, demographic and cultural factors shaping African American life and culture prior to 1865.
African American Studies 117	Undergraduate	SM	African Americans in the Industrial Age, 1865-1970	With emphasis given to the organization of labor after slavery, this course will explore the history of African American cultural, institutions and protest traditions from the Civil War to the Civil Rights Movement.
African American Studies 120	Undergraduate	SF	Africa From Revolution to Globalization	This course offers a panorama of the African historical experience from the political economic dynamics of Africa at the onset of European colonization in the late nineteenth century, through the colonial period, to our age of globalization. For better or for worse, African history and culture have shaped and have been shaped by European colonial rule and its aftermath, but we shall also give due attention to postcolonial-era structures and processes in the general context of Africans? attempts to remake their world. This course takes the thematic, rather regional, approach but will remain sensitive to interregional variations at every juncture.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
African American Studies 152F	Undergraduate	SM	Neo-Slave Narratives	This course explores African American fiction written during the 1970s and 1980s that attempt to re-present the ur-text of African American literature--and/or to represent for contemporary readers the lives of African slaves in the United States. In what ways do these authors imagine the experience and effects of slavery from their vantage point a century after emancipation, and with the Civil Rights and Black Power Movements shaping the context of their writing?
African American Studies 4B	Undergraduate	SF	Africa: History and Culture	Emphasis on social, political, and economic change in 20th century Africa; with further emphasis upon the roles of modernization, urbanization, and the emergence of contemporary African states.
African American Studies W111	Undergraduate	SF	Race, Class, and Gender	A focus on patterns of globalization, migration, and race/ethnic relations with regard to African Americans, Mexican Americans, and Asian Americans in the 1890s and 1990s. Key aspects like economics, politics, gender, and culture are examined. This course is web-based.
American Studies 139AC	Undergraduate	SF	Civil Rights and Social Movements in U.S. History	Beginning with the onset of World War II, America experienced not a singular, unitary Civil Rights Movement -- as is typically portrayed in standard textbook accounts and the collective memory -- but rather a variety of contemporaneous civil rights and their related social movements. This course explores the history, presenting a top-down (political and legal history), bottom-up (social and cultural history), and comparative (by race and ethnicity as well as region) view of America's struggles for racial equality from roughly World War II until the present.
American Studies C172	Undergraduate	SM	History of American Business	This course will examine selected aspects of the history of American business. Included will be discussions of the evolution of the large corporation, the development of modern managerial techniques, and the changing relationship of business, government, and labor.
Ag & Resource Econ & Pol C251	Graduate	SF	Microeconomics of Development	Theoretical and empirical analyses of poverty and inequality, household and community behavior, and contract and institutions in the context of developing countries.
Asian American Studies 121	Undergraduate	SM	Chinese American History	Chinese American history, 1848 to present. Topics include influence of traditional values, Eastern and Western; patterns of immigration and settlement; labor history; the influence of public policy, foreign and domestic, on the Chinese individual and community.
Asian American Studies 122	Undergraduate	SM	Japanese American History	This course will be presented as a proseminar with selected topics in order to give students an opportunity to participate in the dynamics of the study of Japanese American history. Topics include immigration, anti-Japanese racism, labor, concentration camps, agriculture, art and literature, and personality and culture.
Asian American Studies 124	Undergraduate	SM	Filipino American History	Topics include consequences of the Spanish-American War on Filipino emigration; conditions in Hawaii and California and the need for Filipino labor; community development; changing relations between the U.S. and the Philippines; effects of the independence movement and World War II on Filipino Americans; and contemporary issues.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Asian American Studies 125	Undergraduate	SF	Contemporary Issues of Southeast Asian Refugees in the U.S	This course will introduce students to the sociocultural, economic, educational, and political issues facing Southeast Asian refugees in the U.S. While the course focus is on the Asian American experience, references will be made to the pre-migration experiences and histories of the Southeast Asian refugee groups. The processes and problems in the formulation of refugee programs and services in the U.S. also will be addressed in their implications for refugee resettlement and adaptation experience. Emphasis will be placed on comparative analyses of the Southeast Asian refugee communities.
Asian American Studies 143	Undergraduate	SM	Asian American Health	This course examines the state of Asian American health, the historical, structural, and cultural contexts of diverse Asian American communities, and the role of race, ethnicity, and socioeconomic status in the production of unequal outcomes between Asian Americans and other racial/ethnic groups as well as across different Asian American subgroups.
Chicano Studies 159	Undergraduate	SM	Mexican Immigration	This course provides an overview of Mexican immigration to the United States. The relationship between immigration and Chicano community formation will be examined. Issues addressed include settlement patterns, socialization, educational aspiration, identity transformation, and historical changes.
Chicano Studies 163	Undergraduate	SM	Caribbean Migration to Western Europe and the United States	The main goal of this course is to offer a broad and comprehensive understanding of the Caribbean migration experience to the United States. We will cover crucial issues such as the migration origins, modes of incorporation, racism, cultural/identity strategies, and the political-economic relationship between the country of origin and the metropolitan host society. To understand the specificity of Caribbean migrants to the USA, it is fundamental to understand the regional Caribbean migration circuits to Western Europe. Thus, the course will provide a comparative perspective with Caribbean migrations to Western Europe.
Chicano Studies 180	Undergraduate	SM	Topics in Chicano Studies	Topics in Latino/a-related art, history and contemporary issues, such as neighborhood development (e.g., Fruitvale neighborhood of Oakland, Mission district of San Francisco), mural arts movements, Spanish-language media, labor history, unionization efforts, immigration, demographic shifts, regional economic and/or social history, and transnational communities. Course topics will vary with the expertise of the particular instructor.
College Writing Programs 7D	Undergraduate	SM	English Language Studies: Food Culture in the U.S.	Many sociocultural and economic factors affect the ways individuals and groups manage food. The course focuses on current food movements and trends in the US--and the many ethical, cultural, and financial aspects that both underlie and result from them. Students will examine this topic through a wide variety of sources: readings, films, music, guest speakers, lectures, video clips, panel discussions, individual research, and personal experience.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
City & Regional Planning 113B	Undergraduate	SF	Community and Economic Development	Introduction to political, economic and social issues involved in theory and practice of community economic development. Focus on national economic and social policies, role of local community economic development corporations (CDCs), resolution of conflicts between private-sector profitability and public sector (community) accountability through critical use of the planning process.
City & Regional Planning 118AC	Undergraduate	SF	The Urban Community	This course looks at the idea and practice of community in cities and suburbs and at the dynamics of neighborhood and community formation. Topics include urban social geography, ethnicity, and identity, residential choice behavior, the political economy of neighborhoods, planning for neighborhoods and civic engagement. Instructors emphasize different topics. Class size limits depend on the instructor.
City & Regional Planning 120	Undergraduate	SM	Community Planning and Public Policy for Disability	This course reviews what society and local communities can do in terms of policies, programs, and local planning to address the needs of citizens with disabilities. Attention will be given to the economics of disability, to the politics of producing change, and to transportation, housing, public facilities, independent living, employment, and income policies. Options will be assessed from the varying perspectives of those with disabilities and the broader society.
City & Regional Planning 231	Graduate	SM	Housing in Developing Countries	This course covers issues of housing policy and housing form in the urbanizing developing world from a comparative and cross-cultural perspective. Using case studies from Latin America, Asia, and the Middle East, it highlights the role of physical planners as community activists involved in practices like squatter development slum upgrading, sites and services, and self-help.
City & Regional Planning 260	Graduate	SF	Theory, History, and Practice of Community Development	This course will explore the theory, history, methods, and practice of local community development. The course will begin by examining the historical roots of community involvement and action. It will present alternative explanations for different paths of neighborhood and community change.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Demography 88	Undergraduate	SM	Immigration: What do the data tell us?	<p>This course will cover the small but important part of the rich history human migration that deals with the population of the United States--focusing on the 20th and 21st Centuries. We will use the tools of DS8 to answer specific questions that relate to the themes of this course:</p> <p>(1) Why do people migrate?</p> <p>(2) Is immigration good or bad for receiving (and sending) countries?</p> <p>(3) How do immigrants adapt and how do societies change in response?</p> <p>In addition to scientific questions, this course will also address the demographic and political history of immigration in the US -- an understanding of which is crucial for understanding both the broad contours of US history and the particular situation in which we find ourselves today.</p>
East Asian Languages 112	Undergraduate	SM	The East Asian Sixties	The 1960s were a time of historical transformation and upheaval in East Asia. It saw the overthrow of political regimes, the consolidation of communism, unprecedented capitalist expansion, and the emergence of new technologies that affected aesthetic production and consumption. This course explores the multiple aspects of culture, aesthetics, and politics that defined this moment. It asks how and why we can define the 1960s as a period, while considering the significance of defining East Asia (a term which denotes an imagined space of relations) as a particular region at this time.
Economics 115	Undergraduate	SM	The World Economy in the Twentieth Century	Development of the world economic system with particular reference to worldwide trading relationships. This course is equivalent to History 160; students will not receive credit for both courses.
Economics 133	Undergraduate	SF	Global Inequality and Growth	This course provides an introduction to the analysis of economic inequalities and the interplay between inequality and economic growth. It focuses on three sets of core questions: 1) How does inequality evolve over the path of development? 2) What are the theories that can explain the degree of economic inequalities and its dynamic? 3) How do policies affect inequalities, and what types of policies can foster equitable growth? The course addresses these issues from a global and historical perspective: it comprehensively deals with the United States today, but also with inequality in China, India, Latin America, and Europe, as far back as 1700.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Economics 174	Undergraduate	SF	Global Poverty and Impact Evaluation	Rather than simply describing the causes and symptoms of global poverty, this course will explore the variety of tools available for rigorously measuring the impact of development programs. Through weekly case studies of field research, the course will cover impact evaluation theory and methods. The course will culminate with a final project in which each student will design an impact evaluation of a policy or intervention.
Economics 274	Graduate	SF	Global Poverty and Impact Evaluation	Rather than simply describing the causes and symptoms of global poverty, this course will explore the variety of tools available for rigorously measuring the impact of development programs. Through weekly case studies of field research, the course will cover impact evaluation theory and methods. The course will culminate with a final project in which each student will design an impact evaluation of a policy or intervention.
Education 188F	Undergraduate	SF	Language, Race, and Power in Education	This course is designed to critically examine the intersection of language, race, and power in education. Through dialogue, readings, research, and critical analysis the course aims to foster awareness of the ways in which seemingly neutral education processes are inherently embedded in power dynamics around language use. Participants will discuss the purposes of education, the ways schooling and education are related to other societal structures, and the potential of education to productively address inequalities, especially as they impact students of historically racialized group (e.g. Latino/a, African-American, Native American, and Asian).
Education 262H	Graduate	SM	Urban School Leadership and Management 2	The purpose of this course is to build on the essential ideas and values discussed in EDUC 262A: Urban School Leadership and Management I by focusing on effective teaching. This instructional vision guides the work of leaders in schools. It provides opportunities for future school leaders to deepen their notions of what socially just schools look like, and why; to analyze the challenges to creating socially just schools in urban centers; and to imagine the possible actions that leaders can take to promote such schools. The course will be framed by one major question. Goals have been listed under each question.
Education 269B	Graduate	SF	Citizenship, Democracy, and Education Research Group	Research group for graduate students whose work focuses on the role of schools in impeding or promoting social, economic, cultural, and political democracy. Provides extensive feedback on all phases of research and its application to the democratization of education. Topics range depend on students' interests and range from curriculum and pedagogy to the evolution of social movements for racial justice in education.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Education 283B	Graduate	SM	Historical Perspectives on American Education	Public schooling today reflects a long evolution, producing an institution that embodies social inequalities as well as democratic aspirations. Politicians, teachers, school reformers, and others interested in education invoke elements of this history to justify their efforts. This course examines the relationship of the changing goals, organization, and practices of American schools to broader social, economic, political, and intellectual developments.
Education C265C	Graduate	SM	Research Advances in Race, Diversity, and Educational Policy	This introductory graduate seminar will engage the research literature on race, diversity, and educational policy to provide a foundation for examining contemporary issues in American public schooling. We will examine research on race, culture, and learning alongside more policy driven research on school structures, governance, finance, politics, and policy. In doing so, we will blend micro level examinations of teaching and learning with macro level considerations of politics and policy.
Energy and Resources 273	Graduate	SM	Research Methods in Social Sciences	This course aims to introduce graduate students to the rich diversity of research methods that social scientists have developed for the empirical aspects of their work. Its primary goal is to encourage critical thinking about the research process: how we "know," how we match research methods to research questions, how we design and conduct our information/data collection, what we assume explicitly and implicitly, and the ethical dilemmas raised by fieldwork-oriented studies.
Ethnic Studies 103A	Undergraduate	SM	Proseminar: Issues in the Fields of Ethnic Studies: Racialization and Empire	Designed primarily to give majors in Asian American studies, Chicano studies, Latin American studies, ethnic studies, and Native American studies elementary training in theoretical approaches to the study of race and ethnicity. Emphasis will be placed on writing and discussion. For a precise schedule of offerings, see department catalog during pre-enrollment week each semester.
Ethnic Studies 135	Undergraduate	SM	Contemporary U.S. Immigration	The myth, reality and history of U.S. immigration. This course discusses issues raised by the recent immigration in a comparative, historical approach. An examination of theories, politics, and policy of U.S. immigration restriction.
Ethnic Studies 136	Undergraduate	SM	Immigrant Women	Examines patterns of women's immigration to the U.S. in specific socio-historical and cultural contexts. Special attention to race, ethnic, and identity issues from woman-centered analysis and methodology.
Ethnic Studies 173AC	Undergraduate	SM	Indigenous Peoples in Global Inequality	This course examines the history of indigenous, aboriginal, native, or "tribal" peoples over the last five centuries. Particular attention is paid to how these groups were brought into relations with an expanding Europe, capitalist development, and modern nation-states. How have these peoples survived, what are the contemporary challenges they face, and what resources and allies have they drawn on in the present?

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Ethnic Studies 41AC	Undergraduate	SF	A Comparative Survey of Protest Movements Since the 60's	An introductory, comparative, and interdisciplinary study of Native American, Mexican American, African American, and Asian American social and political struggles from 1960 to the present. The course traces the development of protest movements created by people of color in response to racial, class, gender, and political inequality in the context of U.S. politics and history. The course critically examines the internal and external factors contributing to the rise and fall of social and political movements and concludes with an analysis of the current conjuncture of race, ethnicity, culture, class, gender, and sexual preference in U.S. politics.
Geography 100	Undergraduate	SM	Field Study of Cuba: Landscapes of Power, Production, Promise	Field course in the cultural geography. Using the landscape as our reference, we will explore the historical transformation of Cuban cities, town, and countryside from colonial times up to the present. Focus our exploration through two particular perspectives: attention to production in key sectors of the Cuban economy at different historical moments, and the ways their attendant forms of labor, ownership, technology, and trade shape the cultural landscape. The other major point of reference for this course is representations of Cuba as a place: what has Cuba stood for over time, to Cubans and to outsiders, and how have these stories played out in the forms and functions of the Cuban land
Geography 110	Undergraduate	SF	Economic Geography of the Industrial World	Industrialization, urbanization, and economic growth in the global North. Locational patterns in manufacturing, retailing, trade, and finance. Geographic dynamics of technical change, employment, business organization, resource use, and divisions of labor. Property, labor, and social conflict as geographic forces. Local, national, and continental rivalries in a global economy, and challenges to U.S. dominance.
Geography 123	Undergraduate	SF	Postcolonial Geographies	Postcolonial studies focus on how processes of colonialism/imperialism continue even after the formal dissolution of empire. A central argument of this course is that critical human geography can make important contributions to understanding the interconnections between forces at play in different parts of the world. Drawing on concepts of space, place, culture, power, and difference, its purpose is to provide a set of tools for grappling with the conditions in which we find ourselves, and for thinking about the possibilities for social change.
Geography 181	Undergraduate	SM	Urban Field Study	Introduction to the metropolitan Bay Area: its history, economy, social makeup. Evolution of urban landscapes and spatial patterns. Social justice and conflict in the city. Business and industry location, real estate and housing, producing and consuming in the city. Regional characteristics of class, race, gender and politics.
Geography 20	Undergraduate	SM	Globalization	How and why are geographical patterns of employment, production, and consumption unstable in the contemporary world? What are the consequences of NAFTA, an expanded European Community, and post-colonial migration flows? How is global restructuring culturally reworked locally and nationally?

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Geography C112	Undergraduate	SF	History of Development and Underdevelopment	Historical review of the development of world economic systems and the impact of these developments on less advanced countries. Course objective is to provide a background against which to understand and assess theoretical interpretations of development and underdevelopment.
Geography C155	Undergraduate	SF	Race, Space, and Inequality	This course examines the the spatial configurations of inequality and poverty and their relationship to race through an analysis of the historical, theoretical and ethnographic conceptualizations, practices, and lived experiences of that relationship. The course will cover the topics of race, space, and inequality through four interwoven thematic lenses of formation, implementation, normalization, and resistances.
Geography C32	Undergraduate	SF	Introduction to Development	This course is designed as an introduction to comparative development. The course will be a general service course, as well as a prerequisite for the upper division 100 series. It is assumed that students enrolled in 10 know little about life in the Third World countries and are unfamiliar with the relevant theory in political economy of development and underdevelopment. The course will be structured around three critical concepts: land, labor, and work.
Geography C55	Undergraduate	SM	Introduction to Central Asia	This course will introduce the student not only to ancient and modern Central Asia, but also to the role played by the region in the shaping of the history of neighboring regions and regimes. The course will outline the history, languages, ethnicities, religions, and archaeology of the region and will acquaint the student with the historical foundations of some of the political, social and economic challenges for contemporary post-Soviet Central Asian republics.
Global Studies 110M	Undergraduate	SM	Middle East In Global Context	This course provides Global Studies majors with an introduction to the Middle East region, broadly defined. It takes an interdisciplinary approach, joining the fields of history, political science, anthropology, religious studies, economics, and Middle Eastern studies. Students will be introduced to major historical themes in the study of Middle Eastern societies that are relevant in understanding contemporary intellectual debates and the origins, nature, and trajectory of war and peace in the region. Focusing on the 20th century, the course explores how the modern Middle East evolved politically, socially, and economically into a region burdened by webs of power and influence.
Global Studies 110Q	Undergraduate	SM	Asia In Global Context	This course provides students with an introduction to Asia in global context. The course employs a Global History approach, which emphasizes national histories as a part of a series of global processes. It explores how countries in Asia, regardless of their diverse cultures, have been drawn into the development of global capitalism. This course addresses all of the Global Studies major's concentrations, i.e. Societies and Cultures, Development, Peace and Conflict.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Global Studies 173	Undergraduate	SM	International Human Rights	This course will explore the philosophical evolution of human rights principles in the realm of political theory and the influence of such principles as they have transformed into a coherent body of law. We will focus specifically on issues in international human rights law; the approach will be both thematic and comparative. Topics will include but are not limited to: human rights diplomacy; the influence of human rights in international legal practice; cultural and minority rights; genocide and the world community; cultural relativism and national sovereignty; international law and international relations; individual and collective rights; migration, labor, and globalization; and national, international, and nongovernmental organizations.
Global Poverty & Practice 115	Undergraduate	SF	Global Poverty: Challenges and Hopes in the New Millennium	This class seeks to provide a rigorous understanding of 20th century development and thus 21st century poverty alleviation. Students will take a look at popular ideas of poverty alleviation, the institutional framework of poverty ideas and practices, and the social and political mobilizations that seek to transform the structures of poverty.
Global Poverty & Practice 196	Undergraduate	SF	Global Poverty and Practice Capstone Course	This course is intended to provide students with a forum for reflection on the Practice Experience component of the Global Poverty and Practice minor. Lessons learned in the minor will be applied to the realm of public discourse through various forms of public scholarship. Issues of power and privilege, civic engagement, and tensions between tourism vs. travel and community service vs. engagement will be addressed. Students will also explore academic and professional post-graduation options.
Gender & Womens Studies 139	Undergraduate	SM	Women, Gender, and Work	This course uses gender as a lens to examine the nature, meaning, and organization of work. Students learn varied conceptual approaches with which to probe such issues as gender and race divisions of labor, the economic significance of caring and other forms of unpaid labor, earnings disparities between men and women, race and class differences in women's work, transnational labor immigration, and worker resistance and organizing.
Gender & Womens Studies 236	Graduate	SM	Diaspora, Border, and Transnational Identities	This course will study debates around the notions of home, location, migrancy, mobility, and dislocation by focusing on issues of gender and sexuality. We will examine the ways in which various cultural flows have fundamentally challenged and changed the nature of global economy by expanding mobility of capital, labor, and systems of representations in a transnational context. We will also look at the impact of new technologies in production, distribution, communication, and circulation of cultural meanings and social identities by linking nationalism, immigration, diaspora, and globalization to the process of subject formation in a postcolonial context.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Gender & Womens Studies C138	Undergraduate	SM	Gender and Capitalism	The 21st century has seen powerful critiques of both growing economic inequality and the troubling persistence of domination based on gender, race and other categorical differences. Gender has a distinctive role here for many reasons: the centrality of gender to social reproduction; the historical coproduction of male domination and capitalism; and the way gender operates in the constitution of selves. Insofar as capitalism is organized and distributes power and profits through gendered structures, and gendered meanings and identities are shaped by their emergence within capitalist logics, it behooves us to think gender and capitalism in tandem. Figuring out how to do that, and sorting out the consequences, is our project in this class.
History 124A	Undergraduate	SM	The Recent United States: The United States from the Late 19th Century to the Eve of World War II	During the first half-century before World War II, the United States became an industrialized, urban society with national markets and communication media. This class will explore in depth some of the most important changes and how they were connected. We will also examine what did not change, and how state and local priorities persisted in many arenas. Among the topics addressed: population movements and efforts to control immigration; the growth of corporations and trade unions; the campaign for women's suffrage; Prohibition; an end to child labor; the institution of the Jim Crow system; and the reshaping of higher education.
History 124B	Undergraduate	SM	The Recent United States: The United States from World War II to the Vietnam Era	Immediately prior to World War II, the US military ranked 17th in the world, most African-Americans lived in the rural south and were barred from voting, culture and basic science in the United States enjoyed no world-wide recognition, most married women did not work for wages, and the census did not classify most Americans as middle-class or higher. By 1973, all this had changed. This course will explore these and other transformations, all part of the making of modern America. We will take care to analyze the events, significance and cost of US ascendancy to world power in an international and domestic context.
History 125A	Undergraduate	SF	History of African-Americans and Race Relations in the United States: The History of Black People an	The course will survey African American history from the African background to the outbreak of the Civil War. The origins and development of Afro-American society, culture and politics will be explored from the perspective of African-Americans themselves: slave and free, North and South. Throughout, the enduring dilemma of race relations functions as a central theme.
History 125B	Undergraduate	SF	History of African-Americans and Race Relations in the United States: Soul Power: African American H	This course will examine the history of African Americans and ethno-racial relations from the Civil War and Emancipation (1861-1865) to the modern African American Freedom Struggle (1954-1972). Social, cultural, economic, and political developments will be emphasized. Topics to be covered include: Black Reconstruction; black life and labor in the New South; leadership; class; gender; Jim Crow; migration; urbanization; war and social change; the Harlem Renaissance; civil rights; and Black Power.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
History 127AC	Undergraduate	SM	California	The history of California from pre-European contact to the present, with emphasis on the diversity of cultures and the interplay of social, economic, and political developments.
History 131B	Undergraduate	SF	Social History of the United States: Creating Modern American Society: From the End of the Civil War	This course examines the transformation of American society since the Civil War. The lectures and readings give special attention to the emergence of city culture and its possibilities for a pluralistic society; the experience and effect of immigration in the nineteenth and twentieth centuries; the revolution in communications and industry; changes in family dynamics, the emergence of modern childhood, schooling, and youth culture; changes in gender relations and sexuality; the problematics of race and the changing nature of class relationships in a consumer society; the triumph of psychological and therapeutic concepts of the self.
History 159B	Undergraduate	SM	European Economic History	The Industrial Revolution and the rise of the European economy to world dominance in the 19th century, emphasizing the diffusion of the industrial system and its consequences, the world trading system, and the rise of modern imperialism.
History 160	Undergraduate	SM	The International Economy of the 20th Century	Development and crises of the advanced economies, with particular emphasis on trade relations with third world countries. Economic impact of war, business cycles, and social movements. This course is equivalent to Economics 115; students will not receive credit for both courses.
History 190	Undergraduate	SM	Society and the Sexes in Europe and the U.S., 1750 to the Present	Sex roles, sexuality and gender systems in social, political, economic and cultural life. This is a comparative course: specific societies (at least two) and periods to be covered will vary by semester. It will focus on specific historical events, issues, and periods in which gender was an especially significant factor.
History N124A	Undergraduate	SM	The United States from the Late 19th Century to the Eve of the World War II	During the first half-century before World War II, the United States became an industrialized, urban society with national markets and communication media. This class will explore in depth some of the most important changes and how they were connected. We will also examine what did not change, and how state and local priorities persisted in many arenas. Among the topics addressed: population movements and efforts to control immigration; the growth of corporations and trade unions; the campaign for women's suffrage; Prohibition; an end to child labor; the institution of the Jim Crow system; and the reshaping of higher education.
History N124B	Undergraduate	SM	The United States from World War II to the Vietnam Era	Immediately prior to World War II, the U.S. military ranked 17th in the world, most African-Americans lived in the rural south and were barred from voting, culture and basic science in the United States enjoyed no world-wide recognition, most married women did not work for wages, and the census did not classify most Americans as middle-class or higher. By 1973, all this had changed. This course will explore these and other transformations, all part of the making of modern America. We will take care to analyze the events, significance and cost of U.S. ascendancy to world power in an international and domestic context.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
History N160	Undergraduate	SM	The International Economy of the 20th Century	Development and crises of the advanced economies, with particular emphasis on trade relations with third world countries. Economic impact of war, business cycles, and social movements. This course is equivalent to Economics 115; students will not receive credit for both courses.
Interdisciplinary Studies 100F	Undergraduate	SF	Theorizing Modern Capitalism: Controversies and Interpretations	The focus of this course will be on the various ways the nature and trajectory of modern capitalism has been interpreted. Our stress will be on post-Marxist works of analysis. The initial focal point will be on the work of Max Weber and Joseph Schumpeter, as well as important current debates in economic history and social theory generated by their work. Both Weber and Schumpeter display a strong fascination and elaboration with the work of Marx. The way they analyze Marx is very revealing about the way contemporary analysts seek to understand the capitalist system. We will also consider a number of current efforts that look at the systemic nature of capitalism. In particular, we are interested in how economic historians now see the development of capitalism. We also want to examine the Weberian tradition in terms of the role of culture in shaping economic behavior. Debates about the nature of globalization will also be considered as well as analysis of the changing nature of work.
Interdisciplinary Studies 100G	Undergraduate	SM	Introduction to Science, Society, and Ethics	This interdisciplinary course will explore whether it has proven possible and desirable to understand society through value-free and positivistic scientific methods as predominantly developed in the transatlantic worlds of the 19th centuries. We shall explore questions that may be applied to the realms of public health and human biology, or to the social sciences generally, including anthropology, sociology, economics, and political science.
Interdisciplinary Studies 100K	Undergraduate	SF	HEALTH AND DEVELOPMENT	Development is often defined as a process of economic growth. Only recently there has been a growing disagreement about this definition and scholars argue that development should be understood as a process of improving human conditions. Health is an important indicator of human development. It is still not conclusive whether economic growth automatically translates into better population health and whether healthy population is a precondition of economic growth because there are other factors that affect both health and development. This course will focus on this debate and examine social, political, demographic and epidemiologic determinants of health in relation to levels of economic development.
Law 212.5	Graduate	SF	Critical Race Theory of Black Lives Matter	0
Law 224.3	Graduate	SF	Social Justice Issues in Entertainment and Media Law	0
Law 224.4	Graduate	SM	Immigration Law Through Film	NONE

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Law 231.8	Graduate	SF	Restorative Justice	NONE
Law 234.1	Graduate	SF	The School-to-Prison Pipeline	0
Law 262.6	Graduate	SM	UN Human Rights Practice Course	0
Law 263.2	Graduate	SF	Business, Social Responsibility and Human Rights	0
Law 264.6	Graduate	SF	Health and Human Rights	0
Law 278.6	Graduate	SF	Intellectual Property and Social Justice	0
Law 284.4	Graduate	SF	Welfare, Social Security & the Law	0
Law 284.6	Graduate	SF	Sexual and Gender Harassment Law	NONE
Law 284.7	Graduate	SF	Wealth Inequality and the Law	0
Law 285.2D	Graduate	SM	Death Penalty Clinic Seminar I	0
Law 285.31	Graduate	SF	Groups, Diversity, and Law	0
Law 286.2	Graduate	SF	Race, Policing, and Data Science	0
Law 286.4	Graduate	SM	Asian Americans and the Law	NONE
Law 286.5	Graduate	SM	Federal Indian Law	NONE
Law 286.6	Graduate	SF	Race, Sexuality and the Law	0
Law 286.7	Graduate	SF	Sexuality, Gender & the Law	NONE
Law 287.7	Graduate	SF	Contemporary Civil Rights Law and Policy	NONE
Law 288.1	Graduate	SM	Immigration Law	0
Law 288.4	Graduate	SM	Refugee Law and Processes	NONE
Law 295.1A	Graduate	SF	Berkeley Journal of Gender, Law and Justice	NONE
Law 295.1B	Graduate	SM	Asian American Law Journal	0
Law 295.1D	Graduate	SM	Berkeley Journal of African American Law & Policy	NONE
Law 295.1M	Graduate	SM	Berkeley Technology Law Journal	NONE
Law 295.1V	Graduate	SM	La Raza Law Journal	NONE
Law 295.4D	Graduate	SM	African American Law & Policy Report	0
Law 295.5D	Graduate	SM	Death Penalty Clinic	0
Law 295.5H	Graduate	SM	International Human Rights Law Clinic	0

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Law 295.5I	Graduate	SM	Advanced International Human Rights Clinic	NONE
Legal Studies 102	Undergraduate	SM	Policing and Society	This course examines the American social institution of policing with particular emphasis on urban law enforcement. It explores the social, economic, and cultural forces that pull policing in the direction of state legal authority and power as well as those that are a counter-weight to the concentration of policing powers in the state. Special attention is given to how policing shapes and is shaped by the urban landscape, legal to cultural.
Legal Studies 103	Undergraduate	SM	Theories of Law and Society	An historical examination of major interpretations of law, morals and social development, with special emphasis on the social thought of the 18th and 19th centuries and including the writings of Marx, Maine, Durkheim, Weber and other contemporary figures.
Legal Studies 176	Undergraduate	SM	Twentieth-Century American Legal and Constitutional History	Development of American law and the constitutional system in the 20th century. Topics include Progressive Era Regulatory policy, criminal justice and relations, freedom of speech and press, New Deal legal innovations, modern tort liability, environmental regulation, judicial reform, and federalism.
Letters & Science 126	Undergraduate	SM	Toward an Anthropology of Biology: Genomics and Citizenship	0
Business Admin-MBA 292A	Graduate	SM	Strategy and Leadership for Social Impact	This course prepares students conceptually and practically to create, lead, and manage nonprofit organizations. Focuses on the centrality of the mission, governing board leadership, application of strategy and strategic planning, and strategic management of issues unique to or characteristic of the sector: performance measurement, program development, financial management, resource development, community relations and marketing, human resource management, advocacy, and management.
Business Admin-MBA 292T	Graduate	SF	Topics in Socially Responsible Business	Advanced study in the field of Socially Responsible Business. Topics will vary from year to year and will be announced at the beginning of each semester.
Native American Studies 72	Undergraduate	SM	Native Americans in North America 1900-Present	A survey and analysis of issues affecting Native Americans in the 20th and 21st centuries. Course will explore political, economic, and social/cultural developments as they shape federal-Indian relations and tribal sovereignty.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Peace & Conflict Studies 126	Undergraduate	SF	International Human Rights	This course provides an overview to the historical, theoretical, political, and legal underpinnings that have shaped and continue to shape the development of human rights. Students are introduced to substantive topics within human rights and provided an opportunity to develop critical thinking, oral presentation, and writing skills. We discuss where the concept of human rights originates, how these ideas have been memorialized in international declarations and treaties, how they develop over time, and how they are enforced and monitored. We examine a variety of issues and encourage students to think differently--to analyze world and community events through a human rights framework utilizing some of the necessary tools to investigate, research, and think critically about human rights and the roles that we may assume within this arena. The course requires two six-page papers, participation in a team debate, and an independent reading assignment.
Peace & Conflict Studies 127	Undergraduate	SF	Human Rights and Global Politics	After World War II, we witnessed a "revolution" in human rights theory, practice, and institution building. The implications of viewing individuals as equal and endowed with certain rights is potentially far reaching as in the declaration that individuals hold many of those rights irrespective of the views of their government. Yet, we also live in a world of sovereign states with sovereign state's rights. We see everyday a clash between the rights of the individual and lack of duty to fulfill those rights when an individual's home state is unwilling or unable to do so. After introducing the idea of human rights, its historic development and various international human rights mechanisms, this course will ask what post-World War II conceptions of human rights mean for a number of specific issues including humanitarian intervention, international criminal justice, U.S. foreign policy, immigration, and economic rights. Looking in-depth at these five areas, we will ask how ideas about human rights, laws about human rights, and institutions to protect human rights have on how states and other global actors act, and how individuals have fared.
Peace & Conflict Studies 148AC	Undergraduate	SF	Social Movements, Urban Histories, and the Politics of Memory	Course examines the history of progressive social movements in the San Francisco Bay Area. Combining history, sociology, urban geography, and ethnic studies, we ask: why and how these movements emerged? What cultural, racial, ethnic and political identities were drawn from, reconfigured, and created within these movements? What kinds of knowledge and institutions were created by these movements, and how have these legacies shaped (and been shaped by) the geography, culture, and politics of the area. As part of the ACES program, this course also engages students in creating social movement documentation through collaborations with community partners. Small student groups, supervised by an ACES Fellow, will carry out documentation projects.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Peace & Conflict Studies 149	Undergraduate	SF	Global Change and World Order	This course will analyze emerging trends, patterns, and problems associated with the phenomenon of globalization. Particular attention will be given to world economic and social integration, ethno-religious nationalism and identity politics, domestic politics, and foreign policy. Special emphasis is placed on the prospects of peace and world order in the post-cold war era.
Peace & Conflict Studies 150	Undergraduate	SM	Conflict Resolution: Theory and Practice	This course will investigate theories of individual and group conflict as a conceptual framework for practical application. Students will engage in practice as parties to conflicts and as third-party intervenors. The course will look at the sources of conflict, including multicultural aspects, and will emphasize the opportunities for growth and development in conflictive incidents.
Peace & Conflict Studies 151	Undergraduate	SM	International Conflict: Analysis and Resolution	Inspired by the changed meaning of international conflict and the expanding mission of conflict resolution in the post-cold war era, this course will study the contemporary context and issues of conflict by examining the evolution in thinking about conflict, the resolution, and their application in practice.
Peace & Conflict Studies 159	Undergraduate	SM	Conflict Resolution Intensive Training	This course provides intensive experiential training in conflict resolution and mediation techniques. Participants are provided with the opportunity to apply, analyze, and evaluate in a supervised setting the results of applying conflict resolution mediation theory and models presented in other conflict resolution course work. Participants will develop and refine mediation techniques and skills through participation and observation of exercises and case studies specifically designed to focus on types and structures of interventions, roles and relationships, negotiation, and cultural diversity.
Peace & Conflict Studies 164A	Undergraduate	SM	Introduction to Nonviolence	An introduction to the science of nonviolence, mainly as seen through the life and work of Mahatma Gandhi. Historical overview of nonviolence East and the West up to the American Civil Rights movement and Martin Luther King, Jr., with emphasis on the ideal of principled nonviolence and the reality of mixed or strategic nonviolence in practice, especially as applied to problems of social justice and defense.
Peace & Conflict Studies 170	Undergraduate	SF	Conflict Resolution, Social Change, and the Cultures of Peace	A comprehensive exploration of the concepts and processes of conflict resolution, using this term in the broadest sense. In particular, the course elaborates upon the relationships among conflict resolution, social change, and cultures of peace with examples drawn from the domestic and global levels.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 107	Undergraduate	SF	Violence, Social Justice, and Public Health	This course addresses violence as a public health issue, using an interdisciplinary public health approach to enable undergraduate students to explore and analyze violence from personal, social, community, and political perspectives. Beginning with individual experiences of violence and its impact, the course will go on to focus on gender- and race-based violence, firearms, poverty, youth, and collective violence; students will learn to apply public health strategies to identify causes of violence and develop practical community-based plans to prevent violence and promote safety.
Public Health 15	Undergraduate	SF	Introduction to Global Health Equity	This seminar provides an overview of the intersection between global health and social justice, with a specific focus on the ways in which inequity, specifically the conditions that lead to poverty, disproportionately affect health outcomes. Students will learn about the historical and theoretical underpinnings of global health, how social determinants affect medical outcomes and health policy, the principles of international law and health economics, and the structure of health delivery models. In the process, students will engage in topics related to social factors that impact health, including class, race, gender, and poverty. Class discussions will address contemporary global health priorities through the lens of human rights activism.
Public Health 181	Undergraduate	SF	Poverty and Population	Globally one million more births than deaths occur every 112 hours, 90% in the poorest countries. Between 1960 and 1980, considerable attention was focused on rapid population growth. Afterwards, the attention has faded and investment in family planning evaporated. Family size among some of the poorest women is increasing. This course seeks to provide an understanding of the relationships between population growth, poverty, women's autonomy, and health. It explores the political "fashions" underlying changing paradigms among demographers, and economists, and development specialists.
Public Health 202B	Graduate	SF	Ethnic and Cultural Diversity in Health Status	Focus on ethnic and cultural diversity in health behavior as a basis for public health programs. Consideration of U.S. ethnic minority groups and cultural groups in non-Western societies. Health status and behavior examined in context of relevant social and anthropological theory (social class, acculturation, political economy). Influence of socio-cultural background on concepts of health, illness, and health-seeking behavior. Implications for planning public health programs and policies.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 204F	Graduate	SF	Culture, Public Health Practice, and Eliminating Health Disparities: From Ideas to Action in the 21s	Public health literature and practice make frequent reference to the terms culture, cultural competence, race, racism, ethnicity, and health disparities. Understanding these terms, their complex meanings and current application in public health practice is the subject matter of this course. By the end of the course students will be able to describe the concepts of culture, race, racism, ethnicity, cultural competence, cultural humility, health disparities and their use in public health theory and practice; identify and describe the application of these concepts in local public health practice; and demonstrate an understanding of these concepts and their application in public health practice through the completion of a group project.
Public Health 204G	Graduate	SF	Research Advances in Health Disparities: Multidisciplinary Perspectives	Understanding and addressing persistent racial inequities in health status is a core public health problem. Ethnic minorities are much more likely to experience much higher rates of poor birth outcomes, infant mortality, infectious and chronic diseases, hospitalization rates, and early death rates from all causes. This course examines racial and ethnic health inequities as a function of social inequality. Topics are drawn from a social determinants of health framework emphasizing the importance of the economic, social, and political features that adversely affect the health status of many underrepresented racial and ethnic minorities in the U.S. from a multidisciplinary approach: Public Health, sociology, anthropology, and social welfare
Public Health 211	Graduate	SF	Health and Human Rights	The course examines the origins of health and human rights concerns and outlines a conceptual basis for human rights among health professionals. It provides an overview of the epidemiology of human rights violations worldwide and an analysis of the psychology of abuse. The course considers the role of health professionals in (1) documenting the health and social consequences of human rights violations and war; (2) treating survivors of abuse; (3) addressing specific human rights concerns of women and children; (4) identifying the impact of health policy on human rights; and (5) participating in human rights education and advocacy. The course will also examine issues of universality of human rights and cultural relativism and the role of accountability for the past abuses in prevention.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 220E	Graduate	SM	Global Health Policy	This course will provide an intensive introduction to current topics in international health policy. Students in the course will become familiar with the major actors, institutions, and regimes that shape international health policy. The course will also introduce students to theories of governance as they apply to international settings and evaluate the relative roles of state actors, NGOs, and international regimes in producing key health policy outcomes. The course will cover several current issues in international health and will require students to critically assess the state of policy with respect to these issues. Using Bardach's method for policy analysis, students will analyze current policies and propose policy alternatives with an assessment of the tradeoffs implied in choosing a given policy option over its competitors.
Public Health 226C	Graduate	SF	Economics of Population Health	An introduction to the literature that suggests that the performance of a regional economy affects the health of the population it supports. Controversies in the theoretical and empirical literature are discussed. The implications of the work for public health practice are discussed.
Public Health 271D	Graduate	SM	Global Burden of Disease and Comparative Risk Assessment	The Global Burden of Disease (GBD) database utilized by <who> provides estimates of illness, injury, and death by disease type, age, sex, and world region in a consistent and coherent manner. The course will explore the ways such a detailed database makes possible a wide range of new types of analysis of health priorities and the relationship of database will also be introduced. This seminar will also provide an opportunity for reading and discussion of the basic assumptions, data limitations, critiques, and methodological difficulties of the GBD. It is intended to be a true seminar relying heavy on class participation. The homework assignments will be greatly facilitated by use of computer spreadsheets.
Public Health C233	Graduate	SF	Healthy Cities	Exploration of common origins of urban planning and public health, from why and how the fields separated and strategies to reconnect them, to addressing urban health inequities in the 21st century. Inquiry to influences of urban population health, analysis of determinants, and roles that city planning and public health agencies - at local and international level - have in research, and action aimed at improving urban health. Measures, analysis, and design of policy strategies are explored.
Public Health C253	Graduate	SF	Foundations of Public Health	The seminar will introduce core disciplines and concepts in public health, using a case-based, integrated approach. Examples of cases discussed include: respiratory disease and air pollution; tobacco control and prevention of smoking-related conditions; disease elimination or eradication via childhood immunization; environmental control and prevention of schistosomiasis; behavior change and prevention of HIV/AIDS; and novel economic approaches to improving healthcare delivery to impoverished groups.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health W202	Graduate	SF	Ethnic and Cultural Diversity in Health Status	This course will examine ethnic and cultural differences in health status and behavior among historically marginalized communities in the United States, including African-Americans, Latinos, Asian-Americans, Native Americans, as well as sexual minorities and groups from non-Western societies.
Public Health W212	Graduate	SF	Foundations of Global Health	This course introduces students to the basic principles of global public health that are used to improve population health at all levels. The course will start with an introduction to essential concepts from public health disciplines that are the foundations of global health practice. Students will then apply these concepts to current global health challenges through course activities, assignments, and readings that will provide a real world context. Global health experts will share their experiences and lessons learned from implementing global health research and programs. Throughout the course, students will gain critical and creative-thinking experience in applying tools and frameworks towards addressing diverse global health needs.
Public Health W258	Graduate	SM	Global Health Disaster Preparedness and Response	This course is designed to serve the emerging field of global disaster management. Topics include the analysis of past mega-disasters; global disaster trends; hazard identification, profiling, and analysis; concepts of risk and vulnerability and risk evaluation; structural and non-structural mitigation; multi-level disaster preparedness; pre-, peri-, and post-disaster response, including the provision of water, food, and shelter, and the management of volunteers; components of recovery, disaster effects on communities and societies; participation of governmental, non-governmental, and multilateral agencies and organizations in planning and response; role of the media, including social media.
Political Science 111AC	Undergraduate	SF	The Politics of Displacement	Antebellum American political history generally follows a routine script in which the purpose of the Revolution was to liberate Americans for self-government and economic and social development. Slavery is viewed as an anomaly still needing explanation, and Native American relocation as the consequence of natural forces of immigration and pre-modern social values. In this class, the revolution against traditional political authority embodied in Jefferson's and Thomas Paine's attack on the British crown, the rise of slavery, and the conflict with Native America are seen as coherent parts of a cultural and social development that emerges in the 18th- and 19th-century America. Using both original antebellum materials, including biographies, history, and literature, and contemporary images from American popular culture such as film, news and magazine articles, and music, we will compare and contrast the experiences of antebellum Native Americans, European immigrants, and African slaves as a connection between the past and the present emerges.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Political Science 124C	Undergraduate	SF	Ethics and Justice in International Affairs	Should nations intervene in other countries to prevent human rights abuses or famine? On what principles should immigration be based? Should wealthy states aid poorer states, and if so, how much? Who should pay for global environmental damage? Answers to these moral questions depend to a great degree on who we believe we have an obligation to: Ourselves? Nationals of our country? Residents of our country? Everyone in the world equally? We will examine different traditions of moral thought including skeptics, communitarians, cosmopolitans, and use these traditions as tools to make reasoned judgments about difficult moral problems in world politics.
Political Science 248A	Graduate	SM	Latin American Politics	Explores different analytical approaches to Latin American politics, focusing both on major concepts (clientelism, corporatism, the state, legitimacy, nationalism) and different explanatory approaches (focusing on factors such as dependency and imperialism, internal social order and economic change, political structure and institutions and political culture).
Public Policy 117AC	Undergraduate	SF	Race, Ethnicity, and Public Policy	The objective of this course is to use the tools and insights of public policy analysis as a means of understanding the ways in which policies are shaped by and respond to issues of race, ethnicity, and cultural difference. The course is organized around a series of discrete policy problems involving issues of race and ethnicity. It is designed to allow for comparative analysis within and across cases to explore the variety of ways in which policy intersects with different racial and ethnic groups.
Rhetoric 115	Undergraduate	SM	Technology and Culture	This course will examine the place and meaning of technology in culture, emphasizing the ways in which technologies shape and inflect social and political interactions. The primary focus will be on the wider reception and perception of technological and cultural shifts as represented in imaginative scientific and cultural works, endeavors and ambitions. This course will then question the conditions for the production and sustainability of these technologies and technological dreams.
Sociology 148	Undergraduate	SF	Social Policy	In this course, we will examine American policy responses to poverty and inequality and evaluate various theories. We will pay particular attention to the role of public opinion, interest groups, race and class relations, social movements, and the state in explaining the American social welfare provision.
Sociology 180I	Undergraduate	SF	Comparative Perspectives on U.S. and European Societies: Inequality	This survey course explores differences between modern societies through systematic comparisons of inequality in the U.S. and European countries. It analyzes central social changes, social problems and institutions in the societies, addressing gender inequality, immigration, and rising inequality.

Social and Economic Sustainability; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Sociology 180P	Undergraduate	SM	Comparative Perspectives on U.S. and European Societies: Political Economy	This course introduces comparative political economy with focus on the US, European countries, and the international economic arena. We will compare and contrast different theories of comparative political economy. Then we will focus on the varied economic, political, and social impacts of the EU in comparison to the NAFTA. Lastly, we will focus on challenges of and possible solutions to economic developments.
Sociology 182	Undergraduate	SF	Elementary Forms of Racial Domination: International Perspectives	A broad survey of race and ethnic relations in a wide variety of nations and periods, with special attention to comparisons with the present and past patterns in the United States. Emphasis on: social, economic, political, institutional, social psychological, and demographic processes.
Science & Tech Studies C100	Undergraduate	SM	Introduction to Science, Technology, and Society	This course provides an overview of the field of Science and Technology Studies (STS) as a way to study how our knowledge and technology shape and are shaped by social, political, historical, economic, and other factors. We will learn key concepts of the field (e.g., how technologies are understood and used differently in different communities) and apply them to a wide range of topics, including geography, history, environmental and information science, and others. Questions this course will address include: how are scientific facts constructed? How are values embedded in technical systems?
FPF-Ethnic Studies 21AC	Undergraduate	SF	A Comparative Survey of Racial and Ethnic Groups in the U.S	This survey course will examine the historical experiences of European immigrants, African Americans, and Latinos, emphasizing the themes of migration and economic change since the late 19th century. Though the class will focus on the three groups, the course will also address salient features of the experiences of Asian Americans, Native Americans, and recently arrived immigrants in light of the themes of the course. Intragroup differences such as class and gender will be discussed.

Courses that address all three types of sustainability themes - social, economic and environmental. (78 total)				
Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
African American Studies 131	Undergraduate	SM	Caribbean Societies and Cultures	Comparative study of Spanish, Dutch, English, and French-speaking Caribbean societies. Analysis of Caribbean social structure including the development of the plantation system, urban dynamics, ethnic politics, family structures, and ecology of African Caribbean religions.
American Studies C112B	Undergraduate	SM	American Cultural Landscapes, 1900 to Present	Introduces ways of seeing and interpreting American histories and cultures, as revealed in everyday built surroundings--homes, highways, farms, factories, stores, recreation areas, small towns, city districts, and regions. Encourages students to read landscapes as records of past and present social relations, and to speculate for themselves about cultural meaning.
American Studies C171	Undergraduate	SM	The American Designed Landscape Since 1850	This course surveys the history of American landscape architecture since 1850 in four realms: 1) urban open spaces--that is squares, plazas, parks, and recreation systems; 2) urban and suburban design; 3) regional and environmental planning; 4) gardens. The course will review the cultural and social contexts which have shaped and informed landscape architecture in the United States since the advent of the public parks movement, as well as, the aesthetic precepts, environmental concerns, horticultural practices, and technological innovations of American landscapes. Students will complete a midterm, final, and a research assignment.
Anthropology 174AC	Undergraduate	SM		Combining historical archaeology, ethnohistory, and ethnography, this course will take account of ethnic groups and their interaction in early colonial California; Native Americans; mission, presidio, pueblo, and rancho communities of Spanish/Mexican California; Russian frontier society at Fort Ross; and American expansion into California, especially the Gold Rush. The course will also examine how the colonial past affects ethnic relations and cultural identity among contemporary California Indians.
Architecture 100A	Undergraduate	SM	Fundamentals of Architectural Design	Introductory courses in the design of buildings. Problems emphasize conceptual strategies of form and space, site relationships and social, technological and environmental determinants. 100A focuses on the conceptual design process.
Architecture 100B	Undergraduate	SM	Fundamentals of Architectural Design	Introductory courses in the design of buildings. Problems emphasize conceptual strategies of form and space, site relationships and social, technological and environmental determinants. 100B stresses tectonics, materials, and energy considerations. Studio work is supplemented by lectures, discussions, readings and field trips.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Architecture 110AC	Undergraduate	SF	The Social and Cultural Processes in Architecture & Urban Design	Architecture 110AC focuses on the significance of the physical environment in human life as citizens and as future design professionals. This course is an introduction to the field of human-environment studies. Its objectives include: 1. Working knowledge of the concepts in person-environment relations, 2. Understanding how these concepts vary by subculture, primarily Anglo-, Hispanic-, and Chinese-American,* 3. Learning to use the methodological skills needed to conduct architectural programming and evaluation research, 4. Thinking critically about the values embedded in design and the consequences for people, their behavior, and feelings.
Architecture 130	Undergraduate	SM	Introduction to Architectural Design Theory and Criticism	This class introduces students to the history and practice of design theory from the late 19th century to the present, with emphasis on developments of the last four decades. Readings and lectures explore specific constellations of theory and practice in relation to changing social and historical conditions. The course follows the rise of modernist design thinking, with particular emphasis on the growing influence of technical rationality across multiple fields in the post World War II period. Systematic approaches based in cybernetics and operations research (amongst others) are examined in the context of wider attempts to develop a science of design. Challenges to modernist design thinking, through advocacy planning and community-based design, the influence of social movements and countercultures, and parallel developments in postmodernism within and beyond architecture, provide the critical background for consideration of recent approaches to design theory, including those informed by developments in digital media and technology, environmental and ecological concerns, questions surrounding the globalization of architectural production, and the development of new materials.
Ag & Resource Econ & Pol 201	Graduate	SM	Production, Industrial Organization, and Regulation in Agriculture	Basic concepts of micro and welfare economics: partial and general equilibrium. Industrial organization: monopolistic competition, vertical integration, price discrimination, and economics of information with applications to food retailing, cooperatives, fishing, and energy.
Ag & Resource Econ & Pol 239	Graduate	SM	Markets and Trade Workshop	Presentation and criticism of ongoing research by faculty, staff, and students. Not necessarily offered every semester.
Ag & Resource Econ & Pol 259	Graduate	SF	Rural Economic Development Workshop	Presentation and criticism of ongoing research by faculty, staff and students. Not necessarily offered every semester.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Ag & Resource Econ & Pol C253	Graduate	SF	International Economic Development Policy	This course emphasizes the development and application of policy solutions to developing-world problems related to poverty, macroeconomic policy, and environmental sustainability. Methods of statistical, economic, and policy analysis are applied to a series of case studies. The course is designed to develop practical professional skills for application in the international arena.
Civil & Environmental Eng 88	Undergraduate	SM	Data Science for Smart Cities	Cities become more dependent on the data flows that connect infrastructures between themselves, and users to infrastructures. Design and operation of smart, efficient, and resilient cities nowadays require data science skills. This course provides an introduction to working with data generated within transportation systems, power grids, communication networks, as well as collected via crowd-sensing and remote sensing technologies, to build demand- and supply-side urban services based on data analytics.
Civil & Environmental Eng C250N	Graduate	SM	Transportation Policy and Planning	Policy issues in urban transportation planning; measuring the performance of transportation systems; the transportation policy formulation process; transportation finance, pricing, and subsidy issues; energy and air quality in transportation; specialized transportation for elderly and disabled people; innovations in transportation policy.
City & Regional Planning 101	Undergraduate	SM	Introduction to Urban Data Analytics	This course (1) provides a basic intro to census and economic data collection, processing, and analysis; (2) surveys forecasting and modeling techniques in planning; (3) demonstrates the uses of real-time urban data and analytics; and (4) provides a socio-economic-political context for the smart cities movement, focusing on data ethics and governance.
City & Regional Planning 110	Undergraduate	SM	Introduction to City Planning	Survey of city planning as it has evolved in the United States since 1800 in response to physical, social, and economic problems; major concepts and procedures used by city planners and local governments to improve the urban environment.
City & Regional Planning 216	Graduate	SM	Active Transportation	Covers pedestrian and bicycle transportation planning including benefits of active transportation, importance of urban design and network connectivity, and facility design. Examines policies and programs to support active transportation and the processes to create, implement, and evaluate bicycle and pedestrian plans.
City & Regional Planning 219	Graduate	SM	Comparative International Topics in Transportation	Covers comparative planning and policy topics in urban, regional, and rural transportation that are transnational in nature. Builds policy lessons on planning for mobility, accessibility, and sustainability in different political and contextual settings. Case studies are drawn from both developed and developing countries.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
City & Regional Planning 220	Graduate	SM	The Urban and Regional Economy	Analysis of the urban, metropolitan, and regional economy for planning. Economic base and other macro models; impact analysis and projection of changing labor force and industrial structure; economic-demographic interaction; issues in growth, income distribution, planning controls; interregional growth and population distribution issues.
City & Regional Planning 248	Graduate	SM	Advanced Studio: Urban Design/Environmental Planning	Advanced problems in urban design and land use, and in environmental planning. Occasional Friday meetings are required.
City & Regional Planning C139	Undergraduate	SF	Urban and Sub-national Politics in Developing Countries	Over half of the world's population is now urban. As urban populations swell, metropolitan areas in both the developed and the developing world struggle to provide basic services and address the negative externalities associated with rapid growth. Sanitation, transportation, pollution, energy services, and public safety typically fall to sub-national governments. Yet local sub-national institutions face difficulties as they tackle these challenges because development tends to spill over political boundaries and resources are limited. Such difficulties are particularly acute in the developing world due to tighter resource constraints, weak institutions, and the comparative severity of the underlying problems. Moreover, democratization and decentralization suggest that urban governance and service delivery may have become more democratic, but present challenges with respect to priority setting, coordination, and corruption.
City & Regional Planning C217	Graduate	SF	Transportation Policy and Planning	Policy issues in urban transportation planning; measuring the performance of transportation systems; the transportation policy formulation process; transportation finance, pricing, and subsidy issues; energy and air quality in transportation; specialized transportation for elderly and disabled people; innovations in transportation policy.
City & Regional Planning C256	Graduate	SF	Healthy Cities	Exploration of common origins of urban planning and public health, from why and how the fields separated and strategies to reconnect them, to addressing urban health inequities in the 21st century. Inquiry to influences of urban population health, analysis of determinants, and roles that city planning and public health agencies - at local and international level - have in research, and action aimed at improving urban health. Measures, analysis, and design of policy strategies are explored.
Demography 200	Graduate	SF	Fundamentals of Population Thought	This course offers an intensive introduction to the history of population thought in Europe and the United States through the close reading and contextualization of selected classic texts, including Graunt, Malthus, and Quetelet. Required of graduate students in the M.A. or Ph.D. program in Demography.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Demography 220	Graduate	SF	Human Fertility	This course offers a critical, graduate-level introduction to the social science of reproduction, drawing especially on models and theories from demography, sociology, and anthropology. Among the topics are parity specific control and the calculus of conscious choice, below-replacement fertility, and the political economy of stratified reproduction.
Demography C126	Undergraduate	SF	Sex, Death, and Data	Introduction to population issues and the field of demography, with emphasis on historical patterns of population growth and change during the industrial era. Topics covered include the demographic transition, resource issues, economic development, the environment, population control, family planning, birth control, family and gender, aging, intergenerational transfers, and international migration.
Demography C175	Undergraduate	SF	Economic Demography	A general introduction to economic demography, addressing the following kinds of questions: What are the economic consequences of immigration to the U.S.? Will industrial nations be able to afford the health and pension costs of the aging populations? How has the size of the baby boom affected its economic well being? Why has fertility been high in Third World countries? In industrial countries, why is marriage postponed, divorce high, fertility so low, and extramarital fertility rising? What are the economic and environmental consequences of rapid population growth?
Development Practice 233	Graduate	SM	Law, Politics, and Policymaking	Law, Politics, and Policymaking will introduce students to principles of law, the mechanisms of politics, political economy, and policymaking delving into fundamentals of business, as well as environmental, international, and human rights law in the context of development. This course will provide students with insights into real-world contexts in which sustainable development practice takes place. It will consist of case studies of political economic and legal analysis.
Development Practice 295	Graduate	SM	Implementation and Assessment of Internationally- Funded Development Projects	This course will bridge the gap between development theory and its application by sharing the challenges that arise from: i) the implementation of projects and programs supported by international financing institutions like IFAD; and ii) the assessment of their impact. Since the mandate of IFAD is to focus on fighting rural poverty, the seminar will cover a range of topics regarding: i) sectoral/sub-sectoral domains such as rural development, natural resource management, and micro-finance; ii) vulnerable social groups such as indigenous people, marginal farmers, women and youth; and iii) key development processes such as targeting, empowerment, participatory planning, and monitoring and evaluation.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Development Practice 296	Graduate	SF	Innovative Finance for Development	This course will focus on the means and methods of finance applied to social, economic, and environmental challenges facing developing economies. It will survey the application of innovative financing emerging through new products and services, new processes and operations and organizational forms in addressing problems as diverse as entrepreneurial finance, renewable energy, environmental finance, global health, accelerating medical solutions, regional development, affordable housing, urban revitalization and infrastructure.
Development Practice C232	Graduate	SM	Foundations of Public Health	The seminar will introduce core disciplines and concepts in public health, using a case-based, integrated approach. Examples of cases discussed include: respiratory disease and air pollution; tobacco control and prevention of smoking-related conditions; disease elimination or eradication via childhood immunization; environmental control and prevention of schistosomiasis; behavior change and prevention of HIV/AIDS; and novel economic approaches to improving healthcare delivery to impoverished groups.
East Asian Languages 111	Undergraduate	SM	Reading Global Politics in Contemporary East Asian Literature	This class examines the global dynamics and local distinction of literary writings from contemporary East Asia. Beginning with the colonial connections among Tokyo, Shanghai and Seoul during the 1920s-1940s, and moving on to texts composed since 2000 in Manila, Hong Kong, India and elsewhere, the course considers how literary writers have grappled with an increasingly integrated global marketplace in which culture, ideas and people circulate alongside (and as) capital. Discussions will reflect on the confluence of culture and politics in literary writings that treat race tension, ecological crisis, capitalist catastrophe and other themes. Primary readings will be supplemented by iconic essays of cultural criticism and recent films.
Economics 131	Undergraduate	SM	Public Economics	This course focuses on the role of the government in the economy from a theoretical and empirical perspective. The aim of the course is to provide an understanding of the reasons for government intervention in the economy, analyzing the merits of possible government policies, and the response of economic agents to the government's actions. The course covers the analysis of tax policy, social insurance programs, public goods, environmental protection, and the interaction between different levels of government. Special emphasis is set on current government policy issues such as social security reform, income tax reform, and budget deficits.
Economics 155A	Undergraduate	SM	Cities and Public Policy	This is an advanced course considering the economic forces governing cities and a host of attendant public policy issues. Topics covered will include theory and evidence on sources of agglomeration economies and urban growth, housing markets, segregation, neighborhood effects, and place-based policies.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Economics C175	Undergraduate	SM	Economic Demography	A general introduction to economic demography, addressing the following kinds of questions: What are the economic consequences of immigration to the U.S.? Will industrial nations be able to afford the health and pension costs of the aging populations? How has the size of the baby boom affected its economic well being? Why has fertility been high in Third World countries? In industrial countries, why is marriage postponed, divorce high, fertility so low, and extramarital fertility rising? What are the economic and environmental consequences of rapid population growth?
Engineering 296MA	Graduate	SF	Master of Engineering Capstone Project	This course is the first of a sequence of two capstone project courses for candidates of the Masters of Engineering degree. Students engage in professionally oriented independent or group research or study under the supervision of a research advisor. The research and study synthesizes the technical, environmental, economic, and social issues involved in the design and operation of complex engineering devices, systems, and organization.
Environmental Design 4A	Undergraduate	SM	Design and Activism	This course explores the relationships between design and activism, raising critical questions about what design is, and how designers serve as guardians of culture and as agents of change. Students will participate in "spontaneous acts of design activism" that address contemporary issues through the making of forms and space to reinvent relationships between people and their environments.
Environmental Design 4B	Undergraduate	SM	Global Cities	This study of cities is more important than ever; for the first time in history more people live in urban than rural areas, and cities will account for all of the world's population growth for at least the next half-century. We will explore the challenges facing global cities in the 21st Century and expose students to some of the key texts, theories, and methods of inquiry that shape the built environment, from the human scale of home and community to the regional scale of the megacity.
Env Sci, Policy, & Mgmt 155	Undergraduate	SF	Sociology and Political Ecology of Agro-Food Systems	Sociology and political ecology of agro-food systems; explores the nex
Env Sci, Policy, & Mgmt 155AC	Undergraduate	SF	Sociology and Political Ecology of Agro-Food Systems	Sociology and political ecology of agro-food systems; explores the nexus of agriculture, society, the environment; analysis of agro-food systems and social and environmental movements; examination of alternative agricultural initiatives--(i.e. fair trade, food justice/food sovereignty, organic farming, urban agriculture).
Env Sci, Policy, & Mgmt 165	Undergraduate	SF	International Rural Development Policy	Comparative analysis of policy systems governing natural resource development in the rural Third World. Emphasis on organization and function of agricultural and mineral development, with particular consideration of rural hunger, resource availability, technology, and patterns of international aid.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 168	Undergraduate	SF	Political Ecology	Analysis of environmental problems in an international context with a focus on political and economic processes, resource access, and representations of nature. Discussion of the ways in which film, literature, and the news media reflect and influence environmental politics. Approaches to policy analysis arising from recent social theory.
Env Sci, Policy, & Mgmt 169	Undergraduate	SF	International Environmental Politics	The dynamics of international politics are examined over the last 25 years. Attention is paid to different perspectives in global environmental politics, the actors involved, how well international agreements address the problems they are supposed to solve, and the main debates in the field, including trade-environmental conflicts, security, and environmental justice issues. Issues covered vary, but may include climate change, biodiversity, population, and toxics.
Env Sci, Policy, & Mgmt 230	Graduate	SF	Sociology of Agriculture	This graduate seminar explores the sociology of agriculture and food systems, addressing key theories and topics in the field. We begin with the antecedents of the sociology of agriculture, including foundation classical agrarian theories and an overview of the field, followed by topics ranging from pesticide drift to agricultural labor injustice to food sovereignty movements and more. This course is most appropriate for students with some background in agri-food and social systems.
Env Sci, Policy, & Mgmt 253	Graduate	SF	Advanced Readings in Political Ecology	Critique and comparison of literature in political ecology--an approach to sociological analysis of environmental change focusing on environmental conflict. Initial sessions address the definition of political ecology, its origins, and the politics and discourses of natural resource management. Literature includes domestic and international research involving the combination of social and environmental history, local perspectives, and political economy to discuss accounts of social and environmental change.
Env Sci, Policy, & Mgmt 258	Graduate	SF	Race, Science, and Resource Policy	This course addresses explanation and strategy in natural resource policy with an emphasis on whether, why, and how (a) 'race' distributes access to and control of environmental resources, (b) 'science' creates and arrays perceptions, organization and control of these resources, and (c) public policy shapes racial disparities in natural resource opportunities. Topics are drawn primarily from issues in metropolitan, agricultural, and public resource systems.
Env Sci, Policy, & Mgmt 260	Graduate	SF	Governance of Global Production	This course explores critical policy and theoretical questions in the governance of global production. Current trends in the restructuring of industrial production; distributions of environmental, labor, and social impacts from this production; and new strategies for democratic governance are analyzed, including corporate self-regulation, monitoring, certification and labeling, fair trade programs, legal strategies, and international accords and agreements.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Env Sci, Policy, & Mgmt 262	Graduate	SF	Race, Identity, and the Environment	Advanced readings on environment and race. Shifting meanings of "race" and its application and usefulness in theorizing human-environment relationships. Foundations of environmental ideas and attitudes towards the natural environment and their connections to contemporary environmental practices. Construction of environmental narratives and images in defining ideas of racial and place identity. How representations of the natural environment are structurally and culturally racialized within environmental institutions and the media. Post-race possibilities.
Evening & Weekend MBA 292I	Graduate	SF	Social Investing--Recent Findings in Management and Finance	This course introduces the field of social investment. The use of ESG (environmental, social, and governance) criteria is becoming increasingly prevalent among both high net worth individuals and institutions. Many ethical and religious traditions advocate altruism and community-mindedness in all dealings, while some economic and financial theorists argue for a narrow focus on risk and reward, with little regard for the impact of decisions on stakeholder groups or the environment.
Evening & Weekend MBA 292J	Graduate	SF	Haas Socially Responsible Investment Fund	In this course, students manage a real investment fund (\$1.7 million +) focused on both social and financial returns. Through the Fund students have the opportunity to test the investment and corporate responsibility principles they have learned in the classroom, and to experience the complexities, challenges, and rewards of the investing world. Students have full responsibility for investment decisions, including conducting their own research on companies' environmental, social and governance (ESG) performance. Students receive guidance from both a faculty advisor and an advisory board. The faculty advisor provides regular input on portfolio management, understanding portfolio performance and ESG investing.
Geography 10	Undergraduate	SM	World Regions, Peoples, and States	This course will provide a framework for recognizing and analyzing the major distinctive regions of the world in comparative context. The most important interrelations between environment, economy, ethnicity, and the national identity and viability of states will be explored.
Geography 164	Undergraduate	SM	The Geography of Economic Development in China	This course focuses on four issues in contemporary China: (1) the transformation of the socialist state, (2) the environmental politics, (3) the interplay of gender and class in the transitional society, (4) urban expansion and the changing rural-urban dynamics, and (5) global China. Each of these issues will be examined with reference to critical theories of development and histories of China's modernization. This is a lecture course designed mainly for upper level undergraduate students with preliminary background in East Asian-Chinese studies or development studies.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Geography 31	Undergraduate	SF	Justice, Nature, and the Geographies of Identity	The intersection of nature, identity, and politics pepper the pages of newspapers almost every day from stories of toxic waste sites, crime, genetic engineering to indigenous struggles, and terrorist tendencies. In all these and many other cases, ideas of race, class, and gender intersect with ideas of nature and geography in often tenacious and troubling ways. Our approach will be to understand these traditional ideas of environmental justice as well as to examine less traditional sites of environmental justice such as the laboratory, the war zone, the urban mall, and the courtroom.
German 160C	Undergraduate	SM	Politics and Culture in 20th-Century Germany: A Divided Nation. Politics and Culture 1945-1990	This course offers an introduction to the history and culture of divided Germany in the era of the Cold War. It will look at the different ways the two states dealt with the country's pre-1945 history, the relations to the Allied Powers, and the major cultural shifts which eventually created a watershed in the history of German mentalities. We will look at various kinds of sources, including literature and film. Major national debates will be touched upon, such as breaks and continuities within the national elites, re-armament and pacifism, the student movement, opposition and conformity under Socialism, and the rise of environmentalism. We will also discuss the problems and opportunities of re-unification.
Global Studies 123L	Undergraduate	SF	Perspectives For Sustainable Rural Development	This course analyzes the ecological, socio-economic and policy challenges and opportunities facing the rural population of Latin America in today's globalized economy. After a critique of the impacts of conventional, agro-export development models of agricultural development (green revolution, non-traditional export crops, biotechnology, biofuels, etc.) the elements of a sustainable agroecological development path are discussed, a path that emphasizes: farmers empowerment, local production for food sovereignty, poverty reduction, cultural identity and natural resource and biodiversity conservation. Technical, institutional, policy and market requirements for sustainable agriculture are also analyzed in detail.
History 143	Undergraduate	SM	Brazil	From 16th Century conquest and settlement to the emergence of an industrial economy during the post-1964 period of military rule. Emphasis on dependence of colony on empire, on plantation agriculture, slavery, export economy, and the transition from agrarian to industrial society.
History 186	Undergraduate	SF	International and Global History since 1945	This course explores great and complex global historical changes that have taken place since the end of the second World War. By situating the major postwar upheavals - from decolonization to the Cold War; from population growth to environmental degradation; from globalization to the endurance of economic inequalities - in comparative and international contexts, this course encourages students to see the origins of our own times and dilemmas in their proper historical context and provides an introduction to recent international and global history.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
History C182C	Undergraduate	SM	Introduction to Science, Technology, and Society	This course provides an overview of the field of Science and Technology Studies (STS) as a way to study how our knowledge and technology shape and are shaped by social, political, historical, economic, and other factors. We will learn key concepts of the field (e.g., how technologies are understood and used differently in different communities) and apply them to a wide range of topics, including geography, history, environmental and information science, and others. Questions this course will address include: how are scientific facts constructed? How are values embedded in technical systems?
International & Area Stds 157AC	Undergraduate	SF	Engineering, The Environment, and Society	This course engages students at the intersection of environmental justice, social justice, and engineering to explore how problems that are commonly defined in technical terms are at their roots deeply socially embedded. Through partnerships with community-based organizations, students are trained to recognize the socio-political nature of technical problems so that they may approach solutions in ways that prioritize social justice. Topics covered include environmental engineering as it relates to air, water, and soil contamination; race, class, and privilege; expertise; ethics; and engaged citizenship. This course cannot be used to complete any engineering technical or unit requirements.
International & Area Stds C118	Undergraduate	SF	Introductory Applied Econometrics	Formulation of a research hypothesis and definition of an empirical strategy. Regression analysis with cross-sectional and time-series data; econometric methods for the analysis of qualitative information; hypothesis testing. The techniques of statistical and econometric analysis are developed through applications to a set of case studies and real data in the fields of environmental, resource, and international development economics. Students learn the use of a statistical software for economic data analysis.
Interdisciplinary Studies 100I	Undergraduate	SF	Consumer Society and Culture	In many ways, consumption defines our lives - our identities as consumers are even more important, some would argue, our identities as workers or producers. But what are the implications of a society in which "you are what you consume?" In this class, we will address questions such as: Under what conditions does a "consumer society" develop? What does global commodity chain tell us about colonialization, global inequality, and environmental injustice? How can we shape the life cycle of basic commodities from raw materials to iPhones--in a socially sustainable way? This course will be interdisciplinary in its attempt to understand consumer society and culture in terms of political economy, geography, history, anthropology and sociology.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Interdisciplinary Studies 60	Undergraduate	SM	Technology and Values in the Global Arena	In recent years, the pace of international transfers of technology, funds, resources, information, and even populations has increased dramatically. This cross-cultural diffusion has raised complex and interesting moral issues, issues which this course seeks to explore. We will examine some of the emergent ethical issues in international affairs, with particular attention to those involving technological development. Such issues include the effect of mass media and the Internet on cultural integrity, the politics of environmental regulation, ethical implications of genetic engineering, and others. In each case, the student will explore the relevant historical and empirical background as well as the salient moral and political debates. We will draw on classical, academic, and popular sources, including contemporary films, to explore the ramifications of such issues in modern culture. The goal of the course is to provide the student with an interdisciplinary introduction to key areas of conflict in the next century.
Interdisciplinary Studies C100G	Undergraduate	SM	Introduction to Science, Technology, and Society	This course provides an overview of the field of Science and Technology Studies (STS) as a way to study how our knowledge and technology shape and are shaped by social, political, historical, economic, and other factors. We will learn key concepts of the field (e.g., how technologies are understood and used differently in different communities) and apply them to a wide range of topics, including geography, history, environmental and information science, and others. Questions this course will address include: how are scientific facts constructed? How are values embedded in technical systems?
Law 257.4	Graduate	SF	An Interdisciplinary Approach Land Development and Investment	NONE
Landscape Arch & Env Plan C250	Graduate	SM	Theories of Urban Form and Design	Theories and patterns of urban form throughout history are studied with emphasis on the role of planning and design in shaping cities and the relationship between urban form and social, economic, and geographic factors. Using a case study approach, cities are evaluated in terms of various theories and performance dimensions.
Business Admin-MBA 292I	Graduate	SF	Social Investing--Recent Findings in Management and Finance	This course introduces the field of social investment. The use of ESG (environmental, social, and governance) criteria is becoming increasingly prevalent among both high net worth individuals and institutions. Many ethical and religious traditions advocate altruism and community-mindedness in all dealings, while some economic and financial theorists argue for a narrow focus on risk and reward, with little regard for the impact of decisions on stakeholder groups or the environment.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Business Admin-MBA 292J	Graduate	SF	Haas Socially Responsible Investment Fund	In this course, students manage a real investment fund (\$1.7 million +) focused on both social and financial returns. Through the Fund students have the opportunity to test the investment and corporate responsibility principles they have learned in the classroom, and to experience the complexities, challenges, and rewards of the investing world. Students have full responsibility for investment decisions, including conducting their own research on companies' environmental, social and governance (ESG) performance. Students receive guidance from both a faculty advisor and an advisory board. The faculty advisor provides regular input on portfolio management, understanding portfolio performance and ESG investing.
Peace & Conflict Studies 10	Undergraduate	SM	Introduction to Peace and Conflict Studies	This course introduces students to a broad range of issues, concepts, and approaches integral to the study of peace and conflict. Subject areas include the war system and war prevention, conflict resolution and nonviolence, human rights and social justice, development and environmental sustainability. Required of all Peace and Conflict Studies majors.
Public Health 116	Undergraduate	SM	Seminar on Social, Political, and Ethical Issues in Health and Medicine	This course offers an introduction to issues and perspectives related to health and medicine. Guest lecturers speak about the week's topic, which can include a variety of topics such as public health, violence, chronic illnesses, environmental health, and health care economics. Speakers share their first-hand experiences in their fields, discuss current issues, debate ethical dilemmas, and pose and answer questions. During the weekly discussion sections, students delve deeper into the issues, not only exploring and perhaps questioning their own thoughts and beliefs, but also learning from the experiences and perspectives of their fellow students.
Public Health 206D	Graduate	SM	Food and Nutrition Programs and Policies in Developing Countries	This course will use a case-based approach to examine the ways in which governments in developing countries design and implement policies and programs that affect food production and access to safe, affordable, and nutritionally adequate diets. In the course we will analyze, assess and evaluate ways to take action to ameliorate the major nutritional problems facing vulnerable populations in developing countries.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Public Health 207A	Graduate	SM	Public Health Aspects of Maternal and Child Nutrition	Nutrition plays a vital role in human reproduction and child growth and development. This course provides an overview of the major nutritional issues faced by women of childbearing age, infants, children, and adolescents in the United States and around the world, with selected topics explored in greater depth. Nutritional problems are multi-factorial and occur at multiple levels and we will study them from a variety of viewpoints (biological, psychological, socio-cultural, economic, political, and behavioral) as well as from individual and population perspectives. Participants in the course will become acquainted with nutritional research, policies, and interventions designed to enhance reproduction, growth, and development. This course will also explore health disparities in maternal and child nutrition in both a domestic and international context.
Public Health 213A	Graduate	SF	Family Planning, Population Change, and Health	Course examines the determinants of family size and the role played by contraception, voluntary sterilization, and induced abortion in the transition to small families. It looks at the factors controlling access to fertility regulation in developed and developing countries and discusses the factors that have made for successful family programs as well as those that have generated controversy. The course looks at the relationship between family planning and the health of women and children and at the role of family size in economic development and environmental problems. It looks at advances in family planning, organization, and promotion of services and discusses ethical issues facing providers.
Public Health C256	Graduate	SF	Human Genome, Environment and Public Health	This introductory course will cover basic principles of human/population genetics and molecular biology relevant to molecular and genetic epidemiology. The latest methods for genome-wide association studies and other approaches to identify genetic variants and environmental risk factors important to disease and health will be presented. The application of biomarkers to define exposures and outcomes will be explored. Recent developments in genomics, epigenomics and other 'omics' will be included. Computer and wet laboratory work will provide hands-on experience.
Political Science 139B	Undergraduate	SM	Development Politics	Politics of economic development in developing countries. Comparative analysis of the theories and practice of development in the light of contemporary experience. Political strategies of agrarian, industrial, educational, and regional development and their impact on autonomy, welfare, justice, and human development.

Social, Economic & Environmental; Course Number	Graduate or Undergraduate	Sustainability-Focused (SF) or Course With Sustainability Material (SM)	Full Course Title	Catalog Description
Political Science 139D	Undergraduate	SF	Urban and Sub-national Politics in Developing Countries	Over half of the world's population is now urban. As urban populations swell, metropolitan areas in both the developed and the developing world struggle to provide basic services and address the negative externalities associated with rapid growth. Sanitation, transportation, pollution, energy services, and public safety typically fall to sub-national governments. Yet local sub-national institutions face difficulties as they tackle these challenges because development tends to spill over political boundaries and resources are limited. Such difficulties are particularly acute in the developing world due to tighter resource constraints, weak institutions, and the comparative severity of the underlying problems. Moreover, democratization and decentralization suggest that urban governance and service delivery may have become more democratic, but present challenges with respect to priority setting, coordination, and corruption.
Political Science C139	Undergraduate	SF	Urban and Sub-national Politics in Developing Countries	Over half of the world's population is now urban. As urban populations swell, metropolitan areas in both the developed and the developing world struggle to provide basic services and address the negative externalities associated with rapid growth. Sanitation, transportation, pollution, energy services, and public safety typically fall to sub-national governments. Yet local sub-national institutions face difficulties as they tackle these challenges because development tends to spill over political boundaries and resources are limited. Such difficulties are particularly acute in the developing world due to tighter resource constraints, weak institutions, and the comparative severity of the underlying problems. Moreover, democratization and decentralization suggest that urban governance and service delivery may have become more democratic, but present challenges with respect to priority setting, coordination, and corruption.
Public Policy C253	Graduate	SF	International Economic Development Policy	This course emphasizes the development and application of policy solutions to developing-world problems related to poverty, macroeconomic policy, and environmental sustainability. Methods of statistical, economic, and policy analysis are applied to a series of case studies. The course is designed to develop practical professional skills for application in the international arena.
Public Policy C271	Graduate	SF	Energy and Development	This advanced graduate seminar will examine the theoretical frames and models used to examine the linkages between energy and development, and the impacts of one on the other.