

Course Number	Course Title	Instructor	Course Description
African and American Studies			
AAAS 102-01 (Cross listed: LIT 102-01)	INTRO AFR/AFR-AMER ST (LEC) MASS INCARCERATION & BLACKNESS	Jasmine Nicole Cobb	A range of disciplinary perspectives on key topics in African American Studies: slavery and abolitionism, theories of race and racism, gender and race, the era of Jim Crow, cultural expressions, political and intellectual thought, African American freedom struggles from the seventeenth through the twentieth centuries, and race and public policy. Instructor: Staff
AAAS 103-01 (Cross listed: CULANTH 105-01, HISTORY 129-01, POLSCI 108-01, ICS 110-01)	INTRO TO AFRICAN STUDIES	Stephen William Smith	A range of disciplinary perspectives on key topics in contemporary African Studies: nationalism and pan-Africanism, imperialism and colonialism, genocide and famine, development and democratization, art and music, age and gender. Instructor: Staff
AAAS 104S-01 (Cross-listed : LSGS 101-01, AAAS 104S-01, ICS 106S-01, LIT 143S-01, SPANISH 160S-01)	INTRO TO LATINO/A STUDIES (SEM)	Antonio Viego	Intro to the interdisciplinary field of Latino/a Studies, and how it reconfigures the study of the United States and the Americas. Considers literature, history, sociology, economics, politics, culture and language in examining terms such as: Latino, latinidad, Global South, transnational, globalization, and multiculturalism. Exploration of alignments and divergences of Latino/a Studies with African and African American Studies, Latin American and Caribbean Studies, and Critical US Studies. Classroom learning will connect with the community outside of Duke. Required intro course for students in the Latino/a Studies in the Global South certificate program. Instructor: Viego

AAAS 134-01 (Cross-isted: HISTORY 105-01, MEDREN 105-10)	Old Worlds/New Histories, 500-1500 CE	Vasant Kaiwar	New approaches to history of the world from ca. 500 to 1500 CE. Examines the world before European hegemony. Topics may include nature of autonomous centers of production around the globe; characteristics of trade, empire, science, technology, and high culture across Asia, the Middle East, Africa and the Americas; diffusion of inventions, ideas, cultures and religions through travel, trade, state and empire building. Readings and films explore diverse cosmopolitan worlds before the coming of modernity.
AAAS 209-01 (Cross-listed: HISTORY 327-10, PORTUGUE 260-01)	AFRO-BRAZIL CULTURE/HST (LEC)	John D French	Slavery and the post-emancipation trajectory of Afro-Brazilians in a racist society that officially proclaims itself a "racial democracy." Comparisons drawn with the Afro-American experience elsewhere in Latin America and the United States.
AAAS 228S-01 (Cross-listed: LIT 382S-01, ENGLISH 379S-01)	FICTIONS THAT MARK THE MOMENT	Wahneema Lubiano	Course is an engagement with novels from spectacular moments of history, an imagination of the future, a response to narrative conventions of realism and thinking with and against the grain of social understandings. Look at examples of historical, speculative, postcolonial, experimental, science, magical realist fictions and theoretical work. Will consider the means by which narratives produce or rely on ethical beliefs and arguments within the specifics of their world-making as well as the ethical problems presented by relations of power within the particular histories of the texts' various moments.
AAAS 242S-05 (Cross-listed: WOMENST 364S-01, SXL 264S-01)	RACE, GENDER, AND SEXUALITY	Kimberly K Lamm	Gender's relationship to race and sexuality explored through a variety of issues, including health, intimacy, family, the state, economic practices, transnational communities and identities, and social movement.
AAAS 243-01 (Cross listed: HISTORY 348-01)	CIVIL RIGHTS MOVEMENT	Raymond Gavins	An interdisciplinary examination of the civil rights movement from World War II through the late 1960s. Instructor: Gavins or Lentz-Smith

AAAS 261-01 (Cross-listed: GENOME 258-01, ARTS&SCI 261-01, CULANTH 261-01, GLHLTH 258-01)	RACE, GENOMICS, AND SOCIETY (LEC	Charmaine D Royal	Integrated analysis of historical and contemporary aspects of 'race and genetics/genomics'. Focus on relevant applications in science, medicine, and society; develop skills required for scientific, sociopolitical, cultural, psychosocial, and ethical evaluation of issues. Topics include: introduction to population genetics/genetic variation; concepts and definitions of race; overview of bioethics; social and political history of race; genomics and health disparities; race, ancestry, and medical practice; genealogy, genetic ancestry, and identity; public perceptions of race and genetics/genomics. Instructor: Royal
AAAS 271-01 (Cross-listed: HISTORY 207-01)	HUMANITARIANISM IN AFRICA	Bruce S Hall	Focuses on the historical impact on Africa of international humanitarian movements. Includes anti-slavery movement, missionary Christianity, Congo Reform Association, environmentalism, development, disaster aid, fight against HIV/AIDS.
AAAS 290S-01 (Cross-listed: POLSCI 390S-2-01)	SPECIAL TOPCS (SEM) DEVELOPMENTAL STATE/ S. AFRICA	Ralph Bruce Lawrence- Kerry L Haynie	
AAAS 409S-01 (Cross-listed: HISTORY 481S-01)	CAP SEM: AGE OF JIM CROW (SEM)	Raymond Gavins	The emergence, nature, and consequences of racial segregation (also known as Jim Crow) in the South and nation; how Jim Crow compares to the system of apartheid in South Africa; perspectives on black life and race relations in southern communities; and major challenges to Jim Crow by African American religious, social, and civil rights organizations and their allies
AAAS 642S-01 (Cross-listed: ECON 541S-01, SOCIOL 642S-01, POLSCI 642S-01, PUBPOL 645S-01)	GLOBAL INEQUALITY RESEARCH (SEM) RACE, CLASS & PSYCHOLOGY	Nina Smith	Engagement of vertically integrated research teams in projects exploring racial and ethnic disparities exhibited and expressed in six arenas: employment, wealth, health, political participation, education, and arts and culture. Each team will produce a major paper that will qualify for submission to a refereed journal in the area relevant to the focus of the study. Instructor: Staff

AAAS 690-01 (Cross-listed: PUBPOL 590-01, SOCIO 690-01)	SPECIAL TOPICS (LEC) ECON OF POVERTY/INEQUALITY	John H Komlos	Topics vary from semester to semester. Instructor: Staff
Art History			
ARTHIST 231-01 (Cross-listed: ECON 344-01, VMS 242-01)	HISTORY OF ART MARKETS	Hans J Van Miegroet	Analytical survey of emergence of art markets, interactions between market behavior(s), visual/media culture(s). Addresses questions regarding the nature of art markets, the specificity of art markets and the application of economic and historical methodologies, how and where players in local markets throughout the world shape visual culture(s), effective causes for art consumption, taste, fashion throughout ages, and methodological implications of art market research at interface of Economics, Art History, Law and Visual Studies. I
Arts of the Moving Image			
AMI 214S-01 (Cross-listed: DOCST 350S-01, CULANTH 262S- 01, PUBPOL 387S- 01, ICS 368S-01, AAAS 225S-01)	DOCUMENTING BLACK EXPERIENCES	Timothy Buie Tyson	Interpretations of the black diaspora in documentary film from slavery to the present. Interdisciplinary study of black religions, cultures, histories, aesthetics, politics, and their representations, both globally and in the U.S. Students will view and study a variety of films and approaches to film and study film's evolution through numerous lenses from early ethnographic film to recent works by indigenous filmmakers, and understand the politics of representation, from D.W. Griffith to Spike Lee; read relevant works in the genres represented; and hear from guest critics, scholars of African and African American history and culture, and filmmakers. Instructor: James

<p>AMI 335S-01 (Cross-listed: DOCST 271S-01, PUBPOL 375S-01)</p>	<p>PUBLIC POLICY VIDEO</p>	<p>Bruce S Orenstein</p>	<p>Documentary film course focusing on the production of advocacy videos for social change. Covers methods and traditions of community organizing, introduces knowledge and skill sets needed to make effective videos for grassroots organizations, and explores how video is integrated into organizing strategies to achieve better results. Includes instructor-supervised fieldwork with community partner organization; student groups will research, write, direct, and produce a class video for a campaign to improve educational and economic opportunities in Durham's low-income communities. Instructor: Orenstein</p>
<p>AMI 336S-01 (Cross-listed: DOCST 272S-01, PUBPOL 228S-01)</p>	<p>DOCUMENTARY AND POLICY</p>	<p>Karen Price</p>	<p>Examines documentaries as catalysts for change in local, state, and federal laws and regulations, with special attention to relationships between film and organizations with political influence. Looks at how documentaries have altered public sentiment and political outcomes. Uses case studies of documentary films (essay-style, journalistic, information-driven films; narrative, story-driven films; propaganda; art films; and hybrids of all of the above). Explores the question of how a film achieves influence: for example, with a high-profile theatrical and/or television release, by utilization as an educational tool, or by 'going viral' to become part of a public conversation. Instructor: Price</p>
<p>Anesthesiol, Surg & Envntl Phys</p>	<p>Anesthesiology, Surgery & Environmental Physiology</p>		

			<p>Program Director: Richard Moon, M.D. The Anesthesiology, Surgery and Environmental Physiology study track provides opportunities for research in cardiovascular and respiratory physiology, molecular pharmacology, neurobiology, surgery, clinical investigation and environmental science. At the beginning of the year each student will define an area of independent study and a hypothesis. ASEP informal group meetings are held during hosted meals. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Departments of Anesthesiology, Surgery, Pediatrics and Medicine offer unique opportunities for students to present their projects in a formal setting moderated by an external reviewer of national stature. A course in Physiology and Medicine of Extreme Environments is also available.</p>
ASEP 301B-16	RESEARCH IN ASEP	Richard Moon	
Black Church Studies	Black Church Studies		
			<p>Religion is diffused throughout American life and culture; it is lived and practiced in complex and sometimes contradictory ways across the Nation's many miles and demographics. Race as a concept is a constantly shifting chimera which nevertheless bestows or denies historic, economic, and social benefits to those it defines. "Christianity, Race, and the American Nation" will explore the major themes of African American religious history as people of African descent battled slavery, survived Jim Crow segregation, pushed for equality in the Civil Rights Movement, and eventually came to see a man of African descent living in the White House.</p>
BCS 767-01	Christianity, Race, and the American Nation	Valerie C Cooper	
Bioethics and Science Policy			

BIOETHIC 601S-01	FOUNDATIONS OF BIOETHICS	Jennifer Hawkins	An introduction to the philosophical foundations of bioethics and bioethical policy, including (1) major ethical theories [consequentialism, deontology], (2) important philosophical analyses of key ethical concepts, [e.g. well-being, autonomy, rights, respect for persons, consent, coercion, exploitation, fairness], and (3) the practices of rigorous argumentation. The aim is to give students a more sophisticated understanding of the values at play in major ethical disputes, while enabling students to engage productively with these debates by improving their ability to argue, and their ability to express themselves with clarity and precision. Consent of instructor required for undergraduates. Instructor: Hawkins
BIOETHIC 602S-01	Law, Research and Bioethics	Misha Angrist	An examination of the relationship between the law and bioethical issues, particularly in research and medical contexts. The course will explore the ways scientific advances affect law and other social institutions, and, conversely, how law affects the development and use of scientific knowledge. Topics include the history of human subject protections, current regulatory and statutory issues in research, and legal decisions governing informed consent, confidentiality, privacy, and other issues. Consent of instructor is required for undergraduates. Instructor: Dame
Biology			
BIOLOGY 157-01 (Cross-listed: EOS 102-01)	THE DYNAMIC OCEANS	Alexander Glass	The oceans and their impact on the Earth's surface, climate, and society. Topics include seafloor evolution, marine hazards, ocean currents and climate, waves and beach erosion, tides, hurricanes/cyclones, marine life and ecosystems, and marine resources. Emphasis on the historical, society and economic roots of oceanography, the formulation and testing of hypotheses, quantitative assessment of data, and technological developments that lead to understanding of current and future societal issues involving the oceans. Includes a field trip at the Duke University Marine Laboratory. Instructors: Glass

BIOLOGY 158-01 LEC (4197)	Plants and Human Use	Kathleen Pryer-Michael Windham	Historical and present interactions between humans and plants like coffee, tea, sugar, opium, pepper, potato and hemp, illustrating major changes in human civilization and cultures as a result. Social economic, trade, exploration, spiritual, medicinal, and plant structural and chemical reasons underlying the pivotal roles certain plant species have played in the development of human culture and technology. Case studies of different plant commodities (products) revealing these biological and historical interactions. For nonmajors. Instructor: Pryer
BIOLOGY 205-01 (Cross-listed: ENVIRON 205-01)	MARINE MEGAFUNA (LEC)	David W Johnston	Ecology, systematics, and behavior of large marine animals including giant squid, bony fishes, sharks, sea turtles, seabirds, and marine mammals. Relations between ocean dynamics, large marine animals, and their role in ocean food webs. Impact of human activities and technological advancement on populations. Economic, social, and policy considerations in the protection of threatened species. Prerequisite: AP Biology, Introductory Biology, or consent of the instructor. Instructor: Johnston
BIOLOGY 263-01	BIO RESPONSE TO CLIMATE CHANGE (LEC)	Kathleen Donohue	Lecture/discussion course on how organisms, populations, and biological communities are expected to respond to climate change. Topics include evidence for effects of climate change on organisms, how to experimentally test for potential effects of climate change, ecological and evolutionary mechanisms that organisms have—or do not have—that enable them to respond to climate change, community responses to climate change. Prerequisite: Biology 202L. Instructor: Donohue

<p>BIOLOGY 273LA-01 (Cross-listed: ENVIRON 273LA-01, EOS 374LA-01)</p>	<p>MARINE ECOLOGY</p>	<p>Brian Reed Silliman</p>	<p>Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, lab exercises and an independent project. Lecture topics include physical characteristics of marine systems, adaptation to environment, species interactions, biogeography, larval recruitment, and biodiversity and conservation of communities found in rocky shores, tidal flats, beaches, marshes, mangrove, coral reefs, and subtidal areas. Not open to students who have taken Bio 773LA. (Given at Beaufort fall, spring, summer. Spring enrollment requires travel to Caribbean). Prerequisite: AP biology, introductory biology or instructor consent. Instructor: Silliman</p>
<p>BIOLOGY 280A-01</p>	<p>FUNDAMENTALS TROP BIO (LEC)</p>	<p>Departmental Staff</p>	<p>Conceptual themes in ecology, emphasizing tropical organisms and ecosystems. Topics range from behavioral and physiological adaptation of individuals to processes and patterns in diverse assemblages, including: mutualism and parasitism in the tropics, competition and the structure of tropical guilds, pollination ecology, forest dynamics and gap-phase regeneration, island biogeography and the design of biological reserves, and evolutionary processes responsible for promoting high tropical biodiversity. (Taught in Costa Rica.) Instructor: Staff</p>
<p>BIOLOGY 283A-01</p>	<p>ENVIRONMENTAL AND HUMAN HEALTH (FLD)</p>	<p>Departmental Staff</p>	<p>The biology, ecology, and evolution of tropical diseases and how emerging diseases are expanding their range and virulence. Environmental changes in the tropics such as climate change and land conversion impacting ecosystem and human health including: diseases, cultural medicinal practices, and changes in ecosystem functions. Based at the three OTS biological field stations in Costa Rica and surrounding landscapes. Intact and altered ecosystems impacts on human health, including assessments of insect and water-borne disease vectors. Issues underlying current tropical medicine and public health policies in the context of responding to environmental changes. Instructor: Staff</p>

<p>BIOLOGY 284A-01 (Cross-listed: ENVIRON 284A-01)</p>	<p>S AFRICAN ECOSYSTEMS (LEC)</p>	<p>Departmental Staff</p>	<p>Conceptual themes in ecology emphasizing savannas; also consideration of fynbos, highveld, podocarp forests, coastal and intertidal zones. Topics include climate and geology of South Africa; roles of fire, drought, human presence, invasive species, and herbivores in shaping ecosystems; top-down and bottom-up control of mammalian herbivores; plant pollination and seed dispersal; role of rivers in defining savanna characteristics; origin and maintenance of biodiversity; vertebrate social systems; major research programs in Kruger National Park (taught in Kruger National Park, South Africa). Prerequisite: Biology 20 or introductory ecology. Instructor: McClearn</p>
<p>BIOLOGY 376A-01 (Cross-listed: ENVIRON 376A-01)</p>	<p>MARINE MAMMALS</p>	<p>Andrew J Read</p>	<p>The biology of cetaceans, pinnipeds, sirenians, and sea otters. Topics covered include the diversity, evolution, ecology, and behavior of marine mammals and their interactions with humans. Detailed consideration given to the adaptations that allow these mammals to live in the sea. Evaluation of the scientific, ethical, and aesthetic factors influencing societal attitudes toward these animals and of their conservation management in light of domestic legislation and international treaties. (Given at Beaufort.) Prerequisite: introductory biology. Instructor: Read</p>
<p>BIOLOGY 445A-01 (Cross-listed: ENVIRON 445A-01, PUBPOL 445A-01)</p>	<p>MARINE CLIMATE CHANGE</p>	<p>David W Johnston</p>	<p>Exploration of climate change science focusing on marine ecosystems and inhabitants - specifically ocean acidification, warming and sea level rise. Factors causing climate change, and how those vary spatially, focusing on sensitive polar ecosystems and marine mammal populations. Critical examination of climate change modeling using EdGCM (research-grade Global Climate Model), focusing on how scientists use models, observations/theory to predict climate, and assumptions/uncertainty implicit in modeling. Discussion of potential human impacts including consequences of sea level rise and potential increases in disease due to climate change. (Taught at Beaufort.) Instructor: Hunt</p>

BIOLOGY 570LA-1-01	Experimental Tropical Marine Ecology	Humberto J Diaz	Distribution and density of marine and semi-terrestrial tropical invertebrate populations; behavioral and mechanical adaptations to physical stress, competition, and predation using rapid empirical approaches and hypothesis testing. Offered only at Beaufort, with preparation for fieldwork before and analysis and presentation of projects after required one week intensive field experience on the coast of Panama. Consent of instructor required. Instructor: Diaz
BIOLOGY 704LA-001	BIOLOGICAL OCEANOGRAPHY	Zackary I Johnson	Discusses patterns of abundance, diversity and activity of organisms in major ocean ecosystems. Identifies major physical, chemical and ecological processes that affect these patterns, and analyzes impact of biology on ecosystems. Uses a 'flipped' classroom for enhanced development of quantitative skills to measure these patterns, emphasizing hands-on data collection and analyses, multiple field trips aboard DUMML research vessels, and participatory activities to demonstrate core concepts in biological oceanography. (Given at Beaufort.) Prerequisite: AP biology, introductory biology, or permission of instructor. Graduate section will include experimental design component. Instructor: Johnson
BIOLOGY 711S-01 (Cross-listed: EVANTH 743-01, UPE 703S-01)	ECOLOGY SEMINAR	Christine Drea	Discussion of current research and literature. Instructor: Staff

BIOLOGY 773LA-01 (Cross-listed: ENVIRON 773LA-01)	MARINE ECOLOGY	Joseph P Morton	<p>Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, lab exercises and an independent project. Lecture topics include physical characteristics of marine systems, adaptation to environment, species interactions, biogeography, larval recruitment, and biodiversity and conservation of communities found in rocky shores, tidal flats, beaches, marshes, mangrove, coral reefs, and subtidal areas. Not open to students who have taken Bio 273LA. (Given at Beaufort fall, spring, summer. Spring enrollment requires travel to Caribbean.) Grad students submit literature review. Prerequisite: Introductory Biology. Instructor: Silliman</p>
Biomedical Engineering			
BME 195FS-01	MED INST DEVELOP WORLD (LEC)	Robert A Malkin	<p>Medical devices have revolutionized healthcare in the developed world. Yet, this technology revolution has failed to reach the developing world. Compared to the estimated 1.5 million medical devices introduced in the developed world in the last 50 years, only a few dozen pieces of medical equipment have been specifically designed to be appropriate and affordable for resource poor settings. We will examine and discuss the factors that make the research, design & development, introduction & marketing, maintenance and use of medical devices in resource poor settings uniquely challenging conditions. Focus students only. Instructor: Malkin</p>

BME 462L - 001	DESIGN DEVELOPING WORLD (LEC)	Robert A Malkin	Design of custom devices to help the specific and unique needs of developing world hospitals. Formal engineering design principles will be emphasized; overview of developing world conditions, patent issues, engineering ethics. Oral and written reports will be required. Students may elect to personally deliver their projects to a developing world hospital, if selected, in the summer following the course. Prerequisite: BME 354L; senior standing. Instructor: Malkin
Civil and Environmental Egr			
CEE 160L-001	INTRO TO ENVIRON EGR AND SCI (LEC)	Claudia Gunsch	Examination of engineering and the societal context of anthropogenic contributions and impacts to the built environment. Focus on the human necessities of air, water, land, and energy and the technological interplays of environmental engineering in sustainably meeting human needs. Materials and energy balances applied to environmental engineering problems. Water pollution control, applied ecology, air quality management, solid and hazardous waste control, and environmental ethics. Instructor: Plata or Schaad
CEE 463L - 001	Water Resources Engineering	Marco Marani	Descriptive and quantitative hydrology, hydraulics of pressure conduits and measurement of flow, compound pipe systems, analysis of flow in pressure distribution systems, open channel flow, reservoirs and distribution system storage. Groundwater hydrology and well-hydraulics. Probability and statistics in water resources. Selected laboratory and field exercises, computer applications. Prerequisite: Civil and Environmental Engineering 301L. Instructor: Albertson, Kabala

CEE 560 - 01	Environmental Transport Phenomena	Mark R Wiesner	Conservation principles in the atmosphere and bodies of water, fundamental equations for transport in the atmosphere and bodies of water, scaling principles, simplification, turbulence, turbulent transport, Lagrangian transport, applications to transport of particles from volcanoes and stacks, case studies: volcanic eruption, Chernobyl accident, forest fires and Toms River power plant emission. Instructor: Wiesner
CEE 561L-001 (Cross-listed: ENVIRON 542L-001)	ENVIRONMENTAL AQUATIC CHEM	P. Lee Ferguson	Principles of chemical equilibria and kinetics applied to quantitative chemical description of natural and engineered aquatic systems. Topics include acid/base equilibrium, the carbonate system, metal complexation, oxidation/reduction reactions, precipitation/dissolution of minerals, and surface absorption. Instructor: Hsu-Kim
CEE 665-01 (Cross-listed: ENVIRON 739-01, ENVIRON 239-01, ENERGY 239-01)	Our Changing Atmosphere: From Air Pollution to Climate Change	Prasad S Kasibhatla	A broad overview of the science of oxidant chemistry in the atmosphere. Basic physical and chemical concepts relevant to the understanding of atmospheric chemistry; several contemporary topics discussed from a process-level perspective. Topics include atmospheric structure and chemical composition; atomic structure and chemical bonds; chemical thermodynamics and kinetics; atmospheric radiation and photochemistry, tropospheric and stratospheric ozone chemistry; aqueous-phase atmospheric chemistry; atmospheric aerosols; and air quality modeling. Prerequisites: one college-level course each in chemistry and calculus. Instructor: Kasibhatla
CEE 566-01	ENVIRONMENTAL MICROBIOLOGY (LEC)	Claudia Gunsch	Fundamentals of microbiology and biochemistry as they apply to environmental engineering. General topics include cell chemistry, microbial metabolism, bioenergetics, microbial ecology and pollutant biodegradation. Prerequisites: Civil and Environmental Engineering 462L or graduate standing or consent of the instructor. Instructor: Gunsch

CEE 643-01	ENVIRON/EGR GEOPHYSICS (LEC)	Fred K Boadu	Use of geophysical methods for solving engineering and environmental problems. Theoretical frameworks, techniques, and relevant case histories as applied to engineering and environmental problems (including groundwater evaluation and protection, siting of landfills, chemical waste disposals, roads assessments, foundations investigations for structures, liquefaction and earthquake risk assessment). Introduction to theory of elasticity and wave propagation in elastic and poroelastic media, electrical and electromagnetic methods, and ground penetrating radar technology. Prerequisite: Mathematics 353 or Physics 152L, or consent of instructor. Instructor: Boadu
CEE 683-01	GROUNDWATER HYDROLOGY	Zbigniew J Kabala	Review of surface hydrology and its interaction with groundwater. The nature of porous media, hydraulic conductivity, and permeability. General hydrodynamic equations of flow in isotropic and anisotropic media. Water quality standards and contaminant transport processes: advective-dispersive equation for solute transport in saturated porous media. Analytical and numerical methods, selected computer applications. Deterministic versus stochastic models. Applications: leachate from sanitary landfills, industrial lagoons and ponds, subsurface wastewater injection, monitoring of groundwater contamination. Conjunctive surface-subsurface models. Prerequisite: Civil and Environmental Engineering 301L, or consent of instructor. Instructor: Staff
Chemistry			

CHEM 91-01	CHEM/TECHNOL/SOCIETY (LEC)	Dewey G McCafferty	Science, the scientific method, and background topics from chemistry, biochemistry, and environmental chemistry that enable citizens to utilize the inductive-deductive methodology of science to better evaluate the potential benefits and risks associated with selected existing and proposed technologies. Intended primarily for non-science majors. Normally not open to students who have credit for, or are enrolled in, Chemistry 20, 21, or 101DL. Instructor: Staff
CHEM 99D-01	INTRODUCTION TO CHEMISTRY (LEC)	Dorian A Canelas	Introductory course for students with limited background in chemistry emphasizing chemical problem solving. Topics include atoms, molecules, ions, compounds, and the periodic table, stoichiometry and chemical reactions, reactions in solution, and an introduction to chemical bonding, thermochemistry, and gas laws. To be followed by Chemistry 101DL. Not open to students who have credit for Chemistry 20, 21 or 101DL. Instructor: Staff
CHEM 101DL - 001	Core Concepts in Chemistry	Christopher Roy	Emphasizes core concepts required for organic chemistry, including atomic and molecular structure, chemical equilibrium with applications to acids and bases, thermodynamics, chemical kinetics, and reaction mechanisms. Relevance and integrated nature of these concepts illustrated through applications to a modern theme in chemistry, e.g. in biological, materials, or environmental chemistry. Laboratory illustrates experimental applications of these core concepts. Instructor: Staff

CHEM 210DL - 001	Modern Applications of Chemical Principles	Warren S Warren	Modern applications of chemistry in context of larger scientific theme, e.g. in biology, materials science, or environmental chemistry. Revisits core concepts from Chemistry 101DL or 110DL, incorporating additional topics including intermolecular interactions, phases of matter, solutions, quantitative treatment of aqueous equilibria, electron transfer reactions, and inorganic and coordination chemistry. Laboratory illustrates experimental approaches to modern problems in biological, materials, and environmental chemistry, as well as analytical and synthetic techniques. Prerequisite: Chemistry 101DL or 110DL. Instructor: Staff
Community and Family Medicine			
COMMFAM 435C - 41	HEALTH PROMOTION AND DISEASE PREVENTION	Joyce A Copeland	This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center, Duke Affiliated Programs, and Duke Community Health Programs. They will participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include risk assessment, counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Students will be introduced to the practical implementation of preventative care in the clinical and community setting.
Computer Science			

COMPSCI 110 - 02	Information, Society & Culture: Bass Connections Gateway	Departmental Staff	Information, Society, and Culture across disciplines. How all aspects of information theory and practice, including computational and mathematical and those from social sciences and the humanities are transforming research, reframing intellectual questions in research and its application, and having an impact on interactions within societies, cultures, ideologies, economics, politics. Modules presented by faculty from all areas and schools, contrasting and comparative perspectives in research-driven modules focused on interdisciplinary project questions and ideas. Lecture/section activities. Course Gateway for the Bass Connections theme in Information, Society and Culture. Instructor: Staff
Cultural Anthropology			
CULANTH 190FS-02	SPECIAL TOPICS IN FOCUS (SEM) TECHNOLOGY AND SOCIAL CHANGE	Richard Lamarr Collier	Selected topics vary each semester. Open only to students in the Focus Program. Instructor consent required. Instructor: Staff
CULANTH 195-01 (Cross-listed: ICS 195-01, HISTORY 103-01, POLSCI 110-01, SOCIOL 195-01, WOMENST 195-01)	COMP APPR GLOBAL ISSUES (LEC)	Catherine Mathers	Introduction to critical transnational studies through several disciplinary approaches. Examines capitalism and neo-liberal globalization and their relationships to culture, politics, economics, and other social forms and outcomes; considers transnationalism "from below"; addresses linear and Western-centric thinking about progress and modernity; focuses a historical lens on political discourses, institutions, and projects to understand them contextually; demonstrates how cultures and identities are dynamically constituted in interaction with historical, material, political, and situational factors; considers how different inequalities and contestations inflect most social formations. Instructor: Campoamor or Namakkal

<p>CULANTH 238S-01 (Cross-listed: DOCST 341S-01, PUBPOL 380S-01, ICS 342S-01)</p>	<p>POLITICS OF FOOD</p>	<p>Charles D Thompson</p>	<p>Explores the food system through fieldwork, study, and guest lectures that include farmers, nutritionists, sustainable agriculture advocates, rural organizers, and farmworker activists. Examines how food is produced, seeks to identify and understand its workers and working conditions in fields and factories, and, using documentary research conducted in the field and other means, unpacks the major current issues in the food justice arena globally and locally. Fieldwork required, but no advanced technological experience necessary. At least one group field trip, perhaps to a local farm or farmers market, required. Instructor: Thompson</p>
<p>CULANTH 278 - 01 (Cross-listed: WOMENST 278-01, NEUROSCI 278-01, PSY 226-01, SXL 278-01)</p>	<p>SEX/GENDER - NATURE/NURTURE</p>	<p>Ara A Wilson</p>	<p>Debates about sexuality, sex, and gender hinge on radically different ideas about relative effects of biological forces vs. social forces, or nature vs. nurture. Course changes terms of arguments about sexuality and gender and nature/nurture. Explores how nature/nurture emerged as scientific and popular debate. Evaluates new developments in science and cultural fields that are now reconsidering how biology and environments interact. Showcases debates about how sex and sexuality are formed through interplay of genetic information, hormones, material bodies, and social environments. Instructor: Wilson, Williams</p>
<p>CULANTH 747S</p>	<p>THEORIZING ENVIRONMENT</p>	<p>Christine Folch</p>	<p>Readings in environment, political ecology, and the socio-cultural/political economic construction of space. Rather than the neutral backdrop to human life, space, place, and environment are crucial components to our material and symbolic worlds. This course overviews geographical thought and theory and then explores its use in anthropology and other social scientific disciplines. Authors include: Lefebvre, Harvey, Massey, etc. Instructor: Folch</p>
<p>Dance</p>			

DANCE 290-01 (Cross-listed: THEATRST 290-4- 01, LIT 290-01, PUBPOL 290-01, WOMENST 290- 02)	SPECIAL TOPICS LECTURE (LEC) STORIES FOR SOCIAL CHANGE	Lynden Cooper Harris, Madeleine Lambert	Content to be determined each semester. Instructor: Staff
Economics			
ECON 112FS-01 (Cross-listed: HISTORY 127FS- 01, PUBPOL 187FS-01, ETHICS 160FS-0)	GLOBALIZATION/CORP CITIZENSHIP	Dirk Philipsen	Are corporations citizens? And if so who defines their rights and responsibilities? To whom are they obligated? This course will critically examine the origins and diffusion of increasingly prevalent notions of corporate citizenship and corporate social responsibility from an anthropological perspective. Particular emphasis will be upon corporate environmental and conservation policies in East Africa and the United States. Open only to students in the Focus Program. Director of undergraduate studies consent required. Instructor: Philipsen
ECON 334 - 01 (Cross-listed: PUBPOL 331-01)	HEALTH ECONOMICS	Tracy A Falba	Economic aspects of the production, distribution, and organization of health care services, such as measuring output, structure of markets, demand for services, pricing of services, cost of care, financing, mechanisms, and their impact on the relevant markets. Prerequisite: Economics 205D or Public Policy Studies 303D. Instructor: Falba, Sloan or staff
ECON 345 - 01	URBAN ECONOMICS (LEC)	Charles M Becker	Introduction to urban and spatial economics. Neoclassical monocentric city spatial model, patterns of land values, property prices, residential density and impact of distressed communities on broader development. Systems of cities and regional growth, role of cities in economic development. United States urban features: ethical and socio-economic effects of housing segregation and implications for discrimination. Tradeoffs between efficiency and fairness in housing resource allocation. Business location theory, impact of innovations in transportation, and technology's effect on work patterns. Prerequisite: Economics 201D. Instructor: Becker

ECON 348 - 01 (Cross-listed: WOMENST 230-01, ICS 348-01)	WOMEN IN THE ECONOMY	Genna R Miller	Economics of gender including the status of women in the labor market; feminist economic theories; ethical considerations of gender-based inequalities; gendered division of labor within the family and between the household and labor market. Situation of women in developing countries undergoing transition to market economies; gender-related measurements and indicators; explanations and remedies for female/male occupational segregation and wage differentials. Prerequisite: Economics 201D. Instructor: McElroy or staff
ECON 753-01 (Cross-listed: ENVIRON 829-01)	NATURAL RESOURCE ECONOMICS (LEC)	Martin D Smith	Addresses questions about natural resource scarcity using modern capital theory and optimal control theory to derive core results. Two objectives: provide students with a solid foundation in theory of natural resource economics, emphasizing tools and theoretical breadth to enhance research and teaching. Second objective to highlight contemporary themes in theoretical and empirical resource economics. Designed for PhD students in economics, finance, agriculture and resource economics, or public policy (with economics concentration). Prerequisites: one year PhD-level microeconomic theory and econometrics; review of differential equations recommended. Consent of instructor required. Instructor: Smith
ECON 881-04	TOPICS IN APPLIED MICROECON (LEC) DEVELOPMENT ECONOMICS I	Erica Field	Topics vary from semester to semester. Instructor: Staff
Energy			

ENERGY 310 - 01	Introduction to Energy Generation, Delivery, Conversion and Efficiency	Franklin H Cocks	<p>An overall introduction to energy issues as they related to generation, delivery, conversion and efficiency. Topics include efficiencies of both new and established energy generation and conversion methods, electricity generation by fossil fuels, nuclear, solar, wind and hydropower and alternative energy technologies. Other topics include space heating and cooling by traditional methods and by solar, transportation energy in automobiles, mass transit and freight. Topics are evaluated quantitatively by modeling and using principles of fluid mechanics, thermodynamics and heat transfer. The environmental consequences of energy choices on local, national and global scales, including toxic emissions, greenhouse gases and resource depletion are also discussed in integrated throughout the course. Prerequisite: Mechanical Engineering 331L, or Mechanical Engineering 512, or Physics 311, or similar thermodynamics, or consent of instructor. One course. C-L: Energy 310. Course is not open to students who have taken Mechanical Engineering 461. Instructors: Cocks and Knight</p>
ENERGY 231-01 (Cross-listed: ENVIRON 231-01, EOS 231-01)	ENERGY AND ENVIRONMENT (LEC)	Lincoln F Pratson	<p>Overview of the challenges confronting humanity as a consequence of our reliance on energy. Challenges include dwindling supplies, rising demand and environmental degradation. Realistic responses require an understanding of the complexity of the energy system, including energy resources, uses, and impacts, in the context of social, political and economic imperatives. Lectures will be augmented by presentations from guest speakers from industry, government and non-profit organizations. Instructor: Pratson</p>

ENERGY 395-02	CONNECTIONS IN ENERGY: PROJECT (IND)	Michelle Nowlin	<p>Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project.</p> <p>Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff</p>
ENERGY 395-06 IND (8447)	CONNECTIONS IN ENERGY: PROJECT (IND)	Timothy H Profeta- William A Pizer	<p>Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project.</p> <p>Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff</p>
ENERGY 395-05	CONNECTIONS IN ENERGY: PROJECT (IND) ENERGY DATA ANALYTICS LAB	Multiple	<p>Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project.</p> <p>Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff</p>

ENERGY 395-04 IND (8447)	CONNECTIONS IN ENERGY: PROJECT (IND) ENERGY EFFICIENCY IN INDUSTRY	Gale Allen Boyd	Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff
ENERGY 395-03 IND (8447)	CONNECTIONS IN ENERGY: PROJECT (IND) HISTORY & FUTURE OCEAN ENERGY	Douglas P Nowacek	Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff
ENERGY 395-07 IND (8447)	CONNECTIONS IN ENERGY: PROJECT (IND) MODELING TOOLS ENERGY SYSTEMS	Dalia Patino Echeverri	Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff

ENERGY 395-1-01	CONNECTIONS IN ENERGY: PROJECT (IND) ENE&ENV DESIGN AND INNOVATION	Emily M Klein-Josiah Knight	<p>Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff</p>
ENERGY 395-1-08	CONNECTIONS IN ENERGY: PROJECT (IND) ENE&ENV DESIGN AND INNOVATION	Emily M Klein-Josiah Knight	<p>Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing energy issues. Teams may also include postdoctoral fellows, visiting energy fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff</p>

ENERGY 620 - 01	Energy Finance	Emma B Rasiel, Jennifer Francis, John M Buley	Exploration of energy financing and investment decisions as they relate to energy companies and energy-related projects. Key topics include discount rates, discounted cash flows, valuation approaches, option pricing, real options, energy derivatives, project finance, energy specific taxation, and risk management. Prerequisites: College-level calculus, Introductory Micro/Macroeconomics (Economics 101 Economic Principles or equivalent), and either Economics 572, Environment 782, or Engineering Management 530
ENERGY 630-01 LEC (7174)	TRANSPORTATION AND ENERGY (LEC)	Timothy L Johnson	Examination of transportation-related energy use and its impact on the environment. Learn how technology, infrastructure, and policy, as well as personal and cultural preferences, interact to meet demands for personal mobility and freight movement. Cutting across these themes will be consideration of strategies to reduce transportation energy use and its environmental impacts, with an introduction to information resources and tools for evaluating both. Provides opportunities to hone problem solving and analytical skills, and challenges students to think critically and creatively about the trade-offs among complex transportation options. Instructor: Johnson
ENERGY 635-01 LEC	ENERGY ECONOMICS AND POLICY	Richard G Newell	Economics of markets and policies for various energy supply sources, energy demand and efficiency, their interactions with each other, and with the economy and environment. Will explore rationales for why markets for energy and related technologies have been subject to extensive government intervention. Course will analyze effects of policy responses, including energy price regulation, the interface of energy, environmental, and technology policy, and policy motivated by energy security concerns. Prerequisites: Introductory Microeconomics (Economics 101 or equivalent) and college calculus. Instructor: Newell

ENERGY 711-01 LEC (7176)	ENERGY & ENVIRONMENT (LEC)	Lincoln F Pratson	Overview of the challenges confronting humanity as a consequence of our reliance on energy. Challenges include dwindling supplies, rising demand and environmental degradation. Realistic responses require an understanding of the complexity of the energy system, including energy resources, uses, and impacts, in the context of social, political and economic imperatives. Lectures will be augmented by presentations from guest speakers from industry, government and non-profit organizations. Instructor: Pratson
ENERGY 716L-001	MODELING FOR ENERGY SYSTEMS	Dalia Patino Echeverri	Introduction to computer programming and operations research in energy systems analysis with emphasis on formulation of optimization problems and simulation models. Applications and case studies dealing with energy systems problems, their externalities, and government policies that affect them. Data analysis, spreadsheet modeling, VBA programming in Excel; linear programming (lp), post-optimality and sensitivity analysis, multi-period lp, stochastic lp, network models for minimum path, maximum flow and optimal planning problems; probabilistic analysis Monte Carlo simulation, including generation of independent and correlated random variables, and goodness of fit tests. Instructor: Patino-Echeverri
ENERGY 811-01 (Cross-listed: ENVIRON 811-01)	SUSTAINABLE SYST THEOR & DRIVR	Jay Golden	Theoretical grounding on Sustainable Systems (SS) thinking and overview of national and international frameworks that have led to development and use of sustainable systems modeling, life cycle analysis and policy decision models. Topics include socio-metabolic consumption, sustainability as a field of inquiry, systems thinking, industrial ecology, earth systems engineering, complexity and resiliency. Explore current drivers and implications of sustainable systems with specific focus on nexus of industry and environmental systems including examining cumulative impacts and benefits resulting from shifting supply chains, green engineering, technological designs and consumer behavior.

ENERGY 835-01	ENVIRONMENTAL LAW (LEC)	Jonathan B Wiene	Examination of rapidly growing body of law concerned with interrelationships between human activities and the larger environment. Focus on rationales for environmental protection; risk assessment and priorities. Instructor: Salzman
English			
ENGLISH 590S-4-01	SP TOP CRITICISM/THEORY/METH (SEM) RACE, GENDER AND GENRES	Tsitsi Jaji	Seminar Version of 288. Satisfies the Criticism, Theory, or Methodology (CTM) for English majors. Instructor: Staff
ENGLISH 990S-03	SPECIAL TOPICS SEMINAR (SEM) THEORIES OF NATURE/HUMAN	Priscilla Wald	
Environment			
ENVIRON 89S-01	FIRST-YEAR SEMINAR (TOP) (SEM) CLIMATE CHANGE	Prasad S Kasibhatla	Topics vary each semester offered. Instructor: Staff
ENVIRON 102 - 01	Introduction to Environmental Sciences and Policy	Rebecca L Vidra	An introduction to the study of environmental sciences and policy through exploration of basic environmental principles in the life, physical, and social sciences. Emphasis on understanding how the atmosphere, hydrosphere, lithosphere, cryosphere, and biosphere function, and how these spheres interact with human consumption, production, and technological patterns and processes. Field trips to a local site as well as the Duke University Marine Laboratory. Instructors: Meyer or Vidra

ENVIRON 210D - 01	Conserving the Variety of Life on Earth	Stuart L Pimm	An overview of biological diversity, its patterns, and the current extinction crisis. Historical and theoretical foundations of conservation, from human values and law to criteria and frameworks for setting conservation priorities; island biogeography theory, landscape ecology, and socioeconomic considerations in reserve design; management of endangered species in the wild and in captivity; managing protected areas for long term viability of populations; the role of the landscape matrix around protected areas; and techniques for conserving biological diversity in semi-wild productive ecosystems such as forests. Instructor: Pimm
ENVIRON 226S-01 (Cross-listed: EOS 226S-01)	FIELD METH EARTH/ENV SCI	Gary Stephen Dwyer	Introduction to basic field methods used in the earth and environmental sciences. Field investigations focus on topics such as groundwater and surface water movements, soil chemistry and identification, topographic and geologic mapping, the atmosphere/soil interface, and plant identification and distributions. Design of a field investigation, collection of data to address a specific goal, and interpretation and reporting of the results. Emphasis on learning to report field results in the format of scientific publications. Visits to five local field sites. Open only to juniors and seniors. Instructor: Klein or Dwyer
ENVIRON 245 - 01	The Theory and Practice of Sustainability	Charlotte Clark, Tavey Capps	Theories and practices of sustainability explored with application to the campus environment, including economic, social and environmental factors, and a local to global reach. The Duke campus is used as a case study to illustrate institutional practices including building design and operations, utility supply and consumption, carbon offsets design and calculation, transportation, water, sustainability education and communication, behavior change, waste production and recycling, and procurement. In a service-learning project, students might perform sustainability inventories and cost/benefit analyses, or gather behavior change data. Instructor: Clark

ENVIRON 286A-01 (Cross-listed: PUBPOL 281A-01)	MARINE POLICY (LEC)	Luke Warren Fairbanks-Heather Leigh Heenehan	Policy and policy-making concerning the coastal marine environment. History of marine-related organizations, legislation, and issues and their effects on local, regional, national, and international arenas. Use of theoretical and methodological perspectives, including political science, sociology, and economics. (Given at Beaufort). Instructor: Staff
ENVIRON 332S-01 (Cross-listed: ECON 432A-01)	ENVIRONMENTAL JUSTICE	Christopher D Timmins	Minorities, people of color, and low-income households bear a disproportionate burden from environmental pollution. Since the Clinton Administration, addressing environmental injustice has been among the policy objectives of the Environmental Protection Agency. Course examines how environmental injustices may arise out of discriminatory behavior and/or market forces founded on individual, firm, and government incentives. We begin with the theoretical framework used to document and explain disproportionate exposures, then review existing empirical evidence through case studies and evaluate competing explanations for injustice using an economics framework. Prerequisites: Econ 201D, 205D, 208D. Instructor: Timmins
ENVIRON 362S-01 (Cross-listed: 64S-01)	CHANGING OCEANS (SEM)	Nicolas M. Cassar	Our oceans are under severe stress. This seminar will explore human disturbances of marine environments, including ocean warming, sea level rise, melting of ice caps and sea ice, ocean acidification, coastal eutrophication, changes in primary production and food web dynamics, invasive species, overfishing, increased subsurface hypoxia, changes in circulation, stratification, and physical, chemical (e.g. oil spills) and noise pollution. Instructor: Cassar
ENVIRON 390-01	SP TOP ENVIRON SCI/POL (LEC) FOOD-WATER-ENERGY NEXUS	Jessica Elizabeth Brandt	Content to be determined each semester. Instructor: Staff

ENVIRON 501 - 01	ENVIRONMENTAL TOXICOLOGY (LEC)	Joel N Meyer, Richard T Di Giuli	An introduction to the field of environmental toxicology. Study of environmental contaminants from a broad perspective encompassing biochemical, ecological, and toxicological principles and methodologies. Discussion of sources, environmental transport and transformation phenomena, accumulation in biota and ecosystems. Impacts at various levels of organization, particularly biochemical and physiological effects. Prerequisites: organic chemistry and an upper-level biology course, or consent of instructor. Instructor: Di Giulio/Meyer
ENVIRON 505-01	FUNCTIONAL ECOLOGY OF TREES	Jean- Christophe Domec- Sari Palmroth	Designed primarily for graduate students and advanced undergraduates in areas of ecology, forestry or related disciplines who desire basic understanding of how plants (special focus on woody plants) function at various scales from molecules to canopies. Course will facilitate application of plant physiological principles in the students' specific areas of interest. Focus is on responses of water loss and carbon gain of plants to variation in their environment. Background in biology preferred. Instructor: Palmroth
ENVIRON 520-01	RESOURCE & ENVIRON ECON I (LEC)	Richard G Newell	Part 1 of a survey course in environmental and natural resource economics. Part 1 focuses on basic theory and methods of economic analysis of environmental problems including benefit-cost analysis, non-market valuation, and instrument choice. Prerequisite: Introductory course in microeconomics and one semester of calculus. Instructor: Bennear or Smith
ENVIRON 521-01 (Cross-listed: ECON 531-01, PUBPOL 584-01)	RESOURCE & ENVIRON ECON II (LEC)	Jeffrey R Vincent	Part 2 of a survey course in environmental and natural resource economics. Part 2 focuses on basic theory and methods of economic analysis of natural resource problems including extraction of non-renewable resources over time, fisheries economics and forest economics. Prerequisite: ENVIRON 520. Instructor: Bennear, Smith, or Vincent

<p>ENVIRON 538-01 (cross-listed: GLHLTH 538-01, PUBPOL 582-01)</p>	<p>ENVIRON HEALTH: ECON AND POLIC (LEC)</p>	<p>Subhrendu Pattanayak</p>	<p>Social science perspective on global environmental health. Students will learn to identify primary environmental causes of high burden diseases such as malaria, diarrhea, and respiratory infections; describe how to measure socio-economic impacts of global environmental health diseases; discuss key policies to control global environmental health problems based on private prevention and therapeutic behaviors; and propose frameworks to empirically monitor and evaluate global environmental health policies. A sub-module will focus on climate change and water-borne diseases. Prerequisites: Introductory course in statistics. Instructor: Pattanayak</p>
<p>ENVIRON 552 - 01</p>	<p>Climate and Society</p>	<p>Drew Shindell</p>	<p>Advanced, interdisciplinary course on causes, consequences, and future trajectory of climate change. Course will cover physical observations of past climate change, role of human activities in driving climate change to date, and impacts of climate change on human and natural systems. Course will analyze how socioeconomic choices affects future climate as well as factors influencing those choices, including risk analyses, geoengineering proposals, intergenerational equity, climate metrics and the media. Instructor: Shindell</p>
<p>ENVIRON 559 - 001</p>	<p>Fundamentals of Geographic Information Systems and Geospatial Analysis</p>	<p>Patrick N Halpin, Peter A Harrell</p>	<p>Fundamental aspects of geographic information systems and satellite remote sensing for environmental applications. Covers concepts of geographic data development, cartography, image processing, and spatial analysis. Gateway into more advanced training in geospatial analysis curriculum. Consent of instructor required. Instructor: Halpin/ Harrell</p>

ENVIRON 579S - 01	Collective Action, Environment, and Development	Alexander Pfaff Talikoff	Examines the conditions under which collective or participatory decisions may raise welfare in defined ways. Presents the growing empirical evidence for an environment and development setting including common property issues (tragedy of the commons and competing models). Identifies what evidence exists for sharing norms on a background of self-interested strategies. Definitions of and reactions to equity and/or its absence are a focus. Providing scientific information for policy is another. Experimental and behavioral economics are frequently applied. Instructor: Pfaff
ENVIRON 590-37 LEC (6758)	SPECIAL TOPICS (LEC)	Anthony M Sease	Content to be determined each semester. May be repeated. Instructor: Staff
ENVIRON 590-38 LEC (6759)	SPECIAL TOPICS (LEC)	Mary Lou Addor	Content to be determined each semester. May be repeated. Instructor: Staff
ENVIRON 621 - 01	Water Resources, Finance and Planning	Martin W Doyle	Introductory course to water in the built environment, with basic treatment of hydrology, treatment, regulation, and planning of water resources. Course will serve as a survey course for non-water specialists, and a bridge course from hydrology to policy, management, planning, and finance, or vice versa for policy students interested in bridging to hydrology. Emphasis will be on applications of basic techniques common in management contexts. Instructor: Doyle
ENVIRON 665-01 LEC (4736) (Cross-listed: BIOLOGY 665-01)	BAYESIAN INFERENCE ENV MODELS (LEC)	James S Clark	Formulation of environmental models and applications to data using R. Distribution theory, algorithms, and implementation. Topics include physiology, population growth, species interactions, disturbance, and ecosystem dynamics. Discussions focus on classical and current primary literature. Instructor: J. Clark

ENVIRON 680-01 LEC (6902)	ECONOMICS OF FOREST RESOURCES (LEC)	Jeffrey R Vincent	Core economic theory of forest management and application of theory to selected forestry policy issues. Course focuses on management of forests for timber production as well as for non-timber values. Concepts explored include policy challenges such as biodiversity conservation, deforestation, community forest management, and payments for ecosystem services. Two groups of economic tools will be used: non-market valuation methods and program evaluation techniques. Prerequisites: college-level calculus, microeconomics and statistics, as well as Excel proficiency. Instructor: Vincent
ENVIRON 701 - 01	Forest Measurements	Nicolette L Cagle	Course is designed to provide field and analytical measurement skills expected of professionals working in forest ecosystem management. Additional emphasis on habitat assessment and forest vegetation and wildlife identification. Extensive field work required. Instructor: Richter
ENVIRON 703 - 001	Conservation Biology: Theory and Practice	Stuart L Pimm	An overview of biological diversity, its patterns, and the current extinction crisis. Historical and theoretical foundations of conservation, from human values and law to criteria and frameworks for setting conservation priorities; island biogeography theory, landscape ecology, and socioeconomic considerations in reserve design; management of endangered species in the wild and in captivity; managing protected areas for long term viability of populations; the role of the landscape matrix around protected areas; and techniques for conserving biological diversity in semiwild productive ecosystems like forests. Three field trips. Prerequisite: one ecology course or consent of instructor. Instructor: Pimm

ENVIRON 710 - 001	Applied Data Analysis for Environmental Science	John Randolph Poulsen	Graphical and exploratory data analysis; modeling, estimation, and hypothesis testing; analysis of variance; random effect models; regression and scatterplot smoothing; generalized linear models; resampling and randomization methods. Concepts and tools involved in data analysis. Special emphasis on examples drawn from the social and environmental sciences. Students to be involved in applied work through statistical computing using software, STATA or R. Instructor: Albright or Poulsen
ENVIRON 714 - 01	Landscape Ecology	Dean L Urban	Landscape ecology embraces spatial heterogeneity in ecosystems: how spatial pattern arises, how it changes through time, and its implications for populations, communities, and ecosystem processes. Course adopts task-oriented perspective, emphasizing concepts and tools for habitat classification, inventory and monitoring, modeling and interpreting landscape change, and site prioritization for conservation or restoration. Prerequisites: an intermediate course in ecology; introductory statistics helpful but not required. Instructor: Urban
ENVIRON 727-01	FORESTS IN THE PUBLIC INTEREST (SEM)	Jeffrey R Vincent	Discussion and analysis of current forestry issues of concern to the public, both in U.S. and abroad. Students propose discussion topics by identifying forest-related news stories reported in leading print or online sources during the current calendar year. The topics are discussed in two parts. First, students review the information reported in the news stories and generate a series of questions for additional analysis. Each student then investigates one of the questions before the next class meeting and reports his or her findings to the group. Particular themes (e.g., forest health, wildlife) might be highlighted in particular years. May be taken up to three times for credit. Instructor: Vincent or Richter

ENVIRON 734L - 001	Watershed Hydrology	Gabriel Katul	Introduction to the hydrologic cycle with emphasis on the influence of land use, vegetation, soil types, climate, and land forms on water quantity and quality and methods for control. Development of water balance models. Analysis of precipitation patterns, rainfall and runoff, and nonpoint source impacts. Statistical handling and preparation of hydrologic data, simulation and prediction models, introduction to groundwater flow, laboratory and field sampling methods. Instructor: Katu
ENVIRON 737 - 01	ENVL EDUCAT & INTERPRETATN	Nicolette L Cagle	Course will provide students with foundational knowledge and practical communication skills drawn from five schools of environmental education (EE): natural resource interpretation, science education, European approaches to EE, placed-based learning, and nature connectedness. Through readings, program observations, practicums, and instructor- and peer-based evaluations, students learn to evaluate their audience, develop measurable goals for communication, and refine their presentation skills. Students will also be able to adapt presentations and programs based on the five school of EE addressed in class. Students successfully completing course will become NAI Certified Interpretive Guides. Instructor: Cagle
ENVIRON 753LA - 01	Sensory Physiology and Behavior of Marine Animals	Daniel Rittschof	Sensory physiological principles with emphasis on visual and chemical cues. Laboratories will use behavior to measure physiological processes. Only open to undergraduates under Biology 373LA. (Given at Beaufort.) Prerequisites: introductory biology and chemistry. Instructor: Rittschof

ENVIRON 755-01	COMMUNITY-BASED ENV MGMT (LEC)	Elizabeth N Shapiro	Goal of the course is to provide students with fundamental theory and methods that will allow them to identify some of the potential problems and pitfalls associated with community-based environmental management (CBEM) initiatives, both domestically and internationally, along with tools necessary to create and manage their own projects. To accomplish this, course will combine readings and discussion of academic literature with presentations of specific CBEM case studies, guest speakers, and interactions with local CBEM projects. Instructor: Shapiro
ENVIRON 762-01	ENVIRONMENTAL MEGA- TRENDS (LEC)	Jesko Von Windheim	Course investigates major, over-arching trends in environmental science, policy, thought, and practice and likely trajectories for the coming 25 years. Goal is to understand these trends and assess how changes in the environment might impact - and be impacted by - society, from the scale of individual decisions to global economies. Individual topics driven by emerging issues that are of most pressing interest but also that may not have immediately obvious connections to contemporary environmental discussions. Instructor: Doyle
ENVIRON 764 - 01	APPL DIFF EQUA ENV SCI (LEC)	Gabriel Katul	General calculus and analytic geometry review; numerical differentiation and integration; analytic and exact methods for first and second order ordinary differential equations (ODE); introduction to higher order linear ODE, numerical integration of ODEs and systems of ODEs; extension of Euler's method to partial differential equations (PDE) with special emphasis on parabolic PDE. Example applications include population forecasting, soil-plant-atmosphere water flow models, ground water and heat flow in soils, and diffusion of gases from leaves into the atmosphere. Prerequisite: Mathematics 21 or equivalent or consent of instructor. Instructor: Katul

ENVIRON 775 - 01	Ocean and Coastal Law and Policy	Stephen E Roady	Explores law, policies and attitudes that affect US ocean and coastal resources. Using case studies and other materials, examines use, management and protection of coasts and oceans. Government and private sector approaches to ocean and coastal resources such as, wetlands, estuaries, beaches, reefs, fisheries, endangered species and special areas. Instructor: Roady
ENVIRON 812 - 01	Wetlands Ecology and Management	Curtis J Richardson	The study of bogs, fens, marshes, and swamps. Emphasis on processes within the ecosystem: biogeochemical cycling, decomposition, hydrology, and primary productivity. Ecosystem structure, the response of these systems to perturbations, and management strategies are discussed. A research project is required. Prerequisites: one course in ecology and chemistry. Instructor: Richardson
ENVIRON 823-01	ECOL RESILIENCE & ECOSYS MGT (LEC)	James B Heffernan	Course provides an introduction to concepts of ecological resilience and its application to the management of ecological systems, and is intended for both PhD and MEM students. The course does not require formal mathematical training, but students are expected to engage the models used in this field. Course consists of lectures, discussion, and a group research project. Lectures will address fundamental theory, case studies, and empirical approaches used to understand the resilience of basic ideas, observations, and approaches to understanding the ecology of flowing water systems. Instructor: Heffernan
ENVIRON 847S - 01 (Cross-listed: PHARM 847S-01)	SEMINAR IN TOXICOLOGY	Edward D Levin	A weekly research seminar throughout the year is required of participants in the Toxicology Program. Students, faculty, and invited speakers present their findings. Instructor: Levin

ENVIRON 857L - 001	Satellite Remote Sensing for Environmental Analysis	Jennifer J Swenson	Environmental analysis using satellite remote sensing. Theoretical and technical underpinnings of remote sensing (corrections/pre-processing, image enhancement, analysis) with practical applications (land cover mapping, change detection e.g. deforestation mapping, forest health monitoring). Strong emphasis on hands-on processing and analysis. Will include variety of image types: multi-spectral, hyper-spectral, radar and others. Prerequisite: familiarity with GIS. Instructor: Swenson
ENVIRON 859-01	ADV GEOSPATIAL ANALYSIS (LEC)	John P Fay	Provide training in more advanced skills such as: GIS database programming, modeling applications, spatial decision support systems and Internet map server technologies. The course requires a fundamental knowledge of geospatial analysis theory, analysis tools, and applications. Consent of instructor required. Prerequisites: Environment 559 and Environment 564. Instructor: Halpin
ENVIRON 860SA - 01	Political Ecology	Lisa M Campbell	Seminar to examine concept of political ecology as means of conceptualizing conservation and development conflicts and solutions. Intended to engage students with political ecology to strengthen usefulness, enrich possibilities, and improve participants ongoing research, collaborations and critical inquiries. Enrollment limited to graduate students. (Given at Beaufort). Instructor: Campbell

ENVIRON 869-01	ENVIRONMENTAL LAW CLINIC (LEC)	James P Longest-Michelle Nowlin	Under supervision of Law clinical faculty, students work on current case and policy advocacy priorities as determined by Clinic's Intake Board. Cases and issues undertaken by the Clinic will vary by semester. Skills training emphasizes skills needed to counsel clients, examine witnesses and to advocate effectively in rulemaking and litigation settings. One semester enrollment; 2 semesters with instructor consent. Minimum 100 hours of clinic work per semester plus weekly group training meetings. Must be in second or third semester in Nicholas School to enroll. Suggested for students to also enroll in Environment 835, Environmental Law. Instructor: Longest and Nowlin
ENVIRON 876A - 01	Data and Time Series Analysis in Marine Sciences	James L Hench	Analysis of environmental time-series and other data sets. Topics include discrete sampling issues, data rejection and interpolation, coordinate rotations and principal axes, curve fits, regression, error and propagation of uncertainty, bootstrapping, filtering, spectral analysis, harmonic analysis, EOFs, wavelets. Lectures, workshops and homework assignments will apply these methods to environmental data sets. Each student will complete a final project, applying methods covered in class to data sets they choose, as part of or related to their research. Consent of instructor required. Instructor: Hench
ENVIRON 887A - 001	POLICY ANALYSIS OF THE COMMONS (LEC)	Xavier Basurto Guillermo	Survey course of main theories and methods used by scholars to understand how collective action problems and different institutional arrangements affect how common-pool resources and public goods are governed. Students are asked to design a project that incorporates some of the concepts and methodological approaches learned in class. Offered at Beaufort. Instructor: Basurto
ENVIRON 898-02	PROGRAM AREA SEMINAR (LEC) COASTAL ENVIRONMENTAL MGT	Patrick N Halpin-Andrew J Read	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff

ENVIRON 898-03	PROGRAM AREA SEMINAR (LEC) ECOSYSTEM SCIENCE & CONSERVATN	Dean L Urban	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-07	PROGRAM AREA SEMINAR (LEC) ECOTOXICOLOGY & ENVL HEALTH	Heather M Stapleton	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-09	PROGRAM AREA SEMINAR (LEC) ENERGY AND ENVIRONMENT	Timothy L Johnson	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-05	PROGRAM AREA SEMINAR (LEC) ENVIRONMENTAL ECON & POLICY	Martin D Smith-Megan Mullin	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-01	PROGRAM AREA SEMINAR (LEC) FOREST RESOURCE MANAGEMENT	Ram Oren	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-08	PROGRAM AREA SEMINAR (LEC) GLOBAL ENVIRONMENTAL CHANGE	Allen B Murray	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-10	PROGRAM AREA SEMINAR (LEC) GROUP MPS	Charlotte Clark	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 898-04	PROGRAM AREA SEMINAR (LEC) WATER RESOURCES MANAGMT	Mukesh Kumar	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
ENVIRON 960 - 01	Duke Environmental Leadership: Orientation Course: Making a Difference in the World	Deborah Rigling Gallagher	One-week course to introduce the curriculum of the Duke Environmental Leadership (DEL) program. Provides framework for program studies. Focus on real-world environmental challenges and timely case studies. Field studies in Durham and at Duke University Marine Lab, Beaufort, NC. Open to Duke Environmental Leadership Master of Environmental Management students only. Department consent required for all other students. Instructor: Gallagher

ENVIRON 961-01	DEL: ECOSYSTEM SCI & MGMT (LEC)	Rebecca L Vidra	<p>Principles of environmental management in the context of arbitrary temporal and spatial boundaries, complexity, dynamic processes, uncertainty, and varied and changing human values. Topics to include adaptive management, decision making in the context of uncertainty, conflict resolution, strategic planning, evaluation, and accountability. Case studies will cover terrestrial aquatic and marine ecosystems and an array of social and institutional settings. Open to Duke Environmental Leadership Master of Environmental Management students only. Department consent required for all other students. Online course. Instructor: Vidra</p> <p>Textbook/Other Materials</p>
ENVIRON 962-01	DEL: ECONOMICS OF ENVRMNTL MGT (LEC)	Thomas Paul Holmes	<p>An economic perspective on the management of env. resources. Conceptual topics emphasized include env. externalities, market failure, public goods, sustainability, and benefit-cost analysis. Applications illustrate the role of price signals in energy choices, managing renewable resource use over time, use of marketable pollution permits to encourage voluntary reductions in air and water pollution, and the political economy of env. policy formulation. Case studies examine carbon trading and taxes to address climate change, and economic incentives and values for biodiversity conservation. Open to Duke Environmental Leadership Master of Environmental Management students only. Department consent required for all other students. Online course. Instructor: Murray</p>

ENVIRON 972-01	DEL: MAKING ENV DECISIONS (LEC)	Elizabeth A Albright	In environmental management, things don't always turn out as expected. You must address multiple goals, even when those goals themselves conflict. You must respond to diverse stakeholders, with varying worldviews. The tools of decision analysis help you to - going beyond unaided intuition - organize and analyze difficult environmental management decisions. This course covers quantitative methods for analyzing environmental problems involving uncertainty and multiple, conflicting objectives. Topics include subjective probability, utility, value of information, and multiattribute methods. Students will apply these tools to an environmental policy decision in a group or individual project. Open to Duke Environmental Leadership Master of Environmental Management students only. Online course. Instructor: Maguire
Earth and Ocean Sciences			
EOS 101-01	THE DYNAMIC EARTH (LEC)	Emily M Klein	Introduction to the dynamic processes that shape the Earth and the environment and their impact upon society. Volcanoes, earthquakes, seafloor spreading, floods, landslides, groundwater, seashores and geohazards. Emphasis on examining the lines of inductive and deductive reasoning, quantitative methods, modes of inquiry, and technological developments that lead to understanding the Earth's dynamic systems. Instructors: Klein or Glass
EOS 201L - 001	The Solid Earth: Minerals, Rocks, and Structural Geology	Alan E Boudreau	Description and interpretation of minerals, rocks and geologic structures. Lectures on theoretical aspects, lab on practical applications and use of petrographic microscope. Prerequisite: Earth and Ocean Sciences 101. Instructor: Boudreau
EOS 202 - 01	Atmosphere and Ocean Dynamics	M Susan Lozier	Introduction to the dynamics of ocean and atmospheric circulations, with particular emphasis on the global climate cycle. Prerequisites: Mathematics 21 and 122, Physics 141L or consent of instructor. Instructor: Lozier

EOS 315 - 01	WAVES, BEACHES, COASTLINE DYNA (LEC)	Allen B Murray	Oceanographic and geologic processes responsible for the evolution of nearshore features; fluid motions of many time scales in the nearshore environment, including waves and currents. Conceptual basis for models of how fluid motions interact with the shape of the beach and bed in the surf zone, giving rise to features such as beach cusps, bars, channels, and barrier islands. Various attempted engineering and coastal management solutions to the global retreat of shorelines. Instructor: Murray
EOS 527-01	INTERNATIONAL WATER RESOURCES (LEC)	Avner Vengosh	Overview of the hydrology, hydrogeology, water quality, and management of major international water resources. Focus on cross-boundary international rivers and aquifers, up-stream versus down-stream water users, the politics of water sharing and disputes, the role of science in water management, and prospects and implications for future utilization of contaminated rivers and stressed aquifers. Examples from international rivers such as the Tigris, Euphrates, Nile, Jordan, Colorado, Indus, Ganges, and Mekong and international aquifer systems such as the Mountain aquifer, Gaza Strip, Disi, and Nubian basins in northern Africa. Instructor: Vengosh
EOS 715-01	INTRO COASTAL ENVIRON CHANGE	Allen B Murray	Nearshore physical processes responsible for the evolution of beaches and barrier islands. Various problems and possible solutions arising from human development of retreating shorelines. Involves a field trip and research paper. Instructor: Murray
Focus			
FOCUS 195FS-11	SPECIAL TOPICS IN FOCUS (LEC) GLOBAL HEALTH	Sherryl A Broverman	Forum for discussing and bridging the varied interdisciplinary issues that arise within the individual Focus Program seminars. May include group discussion, readings, guest lectures, film viewings, and other educational activities. Open only to participants in the Focus Program. Satisfactory/Unsatisfactory grading only. Staff: Instructor

FOCUS 195FS-23	SPECIAL TOPICS IN FOCUS (LEC) HUMANITARIAN CHALLENGES	Ingrid Byerly	Forum for discussing and bridging the varied interdisciplinary issues that arise within the individual Focus Program seminars. May include group discussion, readings, guest lectures, film viewings, and other educational activities. Open only to participants in the Focus Program. Satisfactory/Unsatisfactory grading only. Staff: Instructor
RESEARCH IN EPI & PUBLIC HEALT			
EPH 301B - 16	RESEARCH IN EPI & PUBLIC HEALTH	David Edelman	It combines formal course work in epidemiology and population health, allowing students an opportunity to participate in the research design and/or analysis of a research study. Participants will practice skills related to research design, statistical analyses, assessment, health policy, and comparative effectiveness so that they can be effective contributors to improve the system of health care. The focus may be on improved health of the patient or a discrete population but should be transferable to local, state, national and/or global health issues. Each student selects a Duke Faculty mentor in consultation with the study track director.
Ethics			
ETHICS 129FS-01 (Cross-listed: POLSCI 176FS-01, ICS 128FS-01)	Human Rights and World Politics	Suzanne Katzenstein	Examines the role of human rights and global justice in world politics. We will consider questions such as whether human rights are universal, what role human rights and global justice should be play in U.S. foreign policy, which strategies are most effective in promoting human rights and global justice, and which risk inciting backlash. The course will cover topics including civil and political rights; economic, social and cultural rights; genocide, torture, humanitarian intervention, and the international criminal court. Instructor: Katzenstein

ETHICS 171FS - 01	THE ETHICS OF DEMOCRACY	Departmental Staff	Exploration of the ways in which, in an American context, social, political, or historical issues can become focused in moments of individual ethical decision, or indecision. In-depth probing of the ways in which novels and films approach characteristically American tensions surrounding issues of race, sex, inequality, religion, education, and patriotism. Open only to students in the Focus Program. Director of Undergraduate Studies permission required. Instructor: Harpham
ETHICS 285 - 01	Denial, Faith, Reason: Sustainability and Survival		Provides historical overview and working understanding of concept of sustainability. Explores how sustainability relates to most aspects of our lives. Examines core ethical concepts, developing models to get on path of sustainable living. Instructor: Philipsen
Genome Sciences and Policy			
GENOME 369-01	PUBLIC HEALTH IN AMERICA	Margaret Humphreys	he role of epidemic diseases such as smallpox, cholera, yellow fever, tuberculosis, and polio in shaping public health policy in the United States from the colonial era to World War II. Instructor: Humphreys
Global Health			
GLHLTH 101D - 001	Fundamentals of Global Health	David L Boyd	Introduction to global health issues and challenges. Develop an understanding of key concepts, tools, and frameworks essential for continued study in global health. Focus on global disease burden, health determinants and disparities, health policy and actors, and challenges of global health interventions. Explore the importance of understanding and addressing global health through multidisciplinary frameworks of the natural sciences, social-behavioral sciences, humanities, and policy. Consists of lecture and learning labs, intensive small group discussion, and global health case analyses. Intended for undergraduates. Instructor: Boyd

GLHLTH 189FS - 01	GLOBAL HEALTH AND PROGRESS (SEM) GLOBAL HEALTH AND PROGRESS	Amy L Hall	<p>Course examines assumptions and language of “Global Health” in the U.S and ethical challenges of cross-cultural engagement. Title comes from Roddenberry's Star Trek (1966); course uses the series to think about technology, exploration, and encounter. We will use texts that examine how culture and power in the U.S. have framed interactions with and control of people inside the U.S. and in other countries, from people carrying contagious disease to women whose bodies represent a threat to a proposed social order. Students will analyze historical documents and images from popular culture and write close analyses identifying the underlying ethical and cultural frameworks in these documents.</p> <p>Instructor: Hall</p>
GLHLTH 210-01	GLOBAL HEALTH ETHICS	Kathryn Whetten	<p>Ethical issues of conducting research on or working with marginalized/stigmatized populations, using theoretical frameworks and case studies. Investigations of ethical choices made by multinational, national and local policymakers, clinicians and researchers, and their impact on individuals, families and communities. Emphasis on working with community partners to develop needs assessment programs. Topics include: differential standards of care; protection of human subjects; access to essential medicines; genetic information and confidentiality; pharmaceutical development; health information technology; placebo controlled trials; best outcomes vs distributive justice. Requires a background in Global Health. Instructor: Whetten</p>

GLHLTH 303 - 01	Global Health Systems and Policy	David C Toole	<p>Introduces global health systems and policy in four modules: 1.Globalization; 2. Health; 3. Systems; 4. Policy. Draws on faculty from a range of disciplines, including anthropology, biology, economics, history, medicine, political science, and sociology, to situate the concept and practice of "global health" within these four broad themes. Provides an understanding of variations in health systems around the world and of current issues in global health policy, including the political economies of health care, decision-making processes, governance structures, and the resource-constrained realities of global health policy-making. Instructor: Toole</p>
GLHLTH 326 - 02	HEALTH, CULTURE, LATINO COMMUNITY	Departmental Staff	<p>Exploration of health issues in the Spanish-speaking world shaped by social, cultural, political, ethnic, and economic determinants. Topics: cultural competency, community beliefs, medical practices and policies, preventive medicine, mental health. Projects include presentations, writing, research, and conversations with local and global contacts. Evaluation on knowledge of content, oral and written proficiency in Spanish. One 300-level Spanish course recommended prior to enrolling. Prerequisite: Spanish 204 or equivalent. Instructor: Staff</p>
GLHLTH 340 - 10 (Cross-listed: SOCIOL 361-01)	Social Determinants of U.S. Health Disparities	Jenifer Leigh Hamil-Luker	<p>Introduction to how social factors influence health and well-being, with a particular focus on contemporary U.S. society. Topics include obesity, aging, socioeconomic disadvantage, access to health insurance, public health systems, the role of the media, and racial/ethnic and gender inequalities. The course will provide descriptive assessments of health inequalities and analytic examinations of the mechanisms through which social factors affect health. Instructor: Read or staff</p>

GLHLTH 341 - 01	Ethics of Global Infectious Disease Control	Kearsley Stewart	Examination of the role of ethical decision-making when controlling infectious disease epidemics. Applies classic public health ethics of balancing individual liberty vs. public good to the new global health context of emerging infectious diseases such as HIV/AIDS, Ebola, and SARS, plus re-emerging infectious diseases such as multidrug-resistant TB, polio, and cholera. Explores questions of resource allocation, mandatory or voluntary prevention measures, and ethical obligations of health care workers vs. responsibilities of individuals in the context of new global public health. Prior global health coursework recommended. Instructor: Stewart
GLHLTH 395 - 01	Connections in Global Health: Interdisciplinary Team Projects	Subhashini Chandrasekharan	Teams of undergraduate and graduate students work with faculty supervisors to identify, refine, explore and develop solutions to pressing global health issues. Teams may also include postdoctoral fellows, visiting global health fellows, and other experts from business, government, and the non-profit sector. A team's work may run in parallel with or contribute to an on-going research project. Teams will participate in seminars, lectures, field work and other learning experiences relevant to the project. Requires substantive paper or product containing significant analysis and interpretation. Instructor consent required. Instructor: Staff
Mechanical Engr/Materials Sci			

ME 461-01	Energy Engineering and the Environment	Franklin H Cocks, Josiah Knight	Efficiencies of both new and established energy sources and conversion methods. Evaluation of alternative energy technologies by statistical information and by modeling using principals of fluid mechanics, thermodynamics and heat transfer. Electricity generation by fossil fuels, nuclear, solar, wind and hydro. Space heating and cooling by traditional methods and by solar. Transportation energy in automobiles, mass transit and freight. Environmental consequences of energy choices on local, national and global scales, including toxic emissions, greenhouse gases and resource depletion. Prerequisite: Mechanical Engineering 331L Thermodynamics. Instructors: Cocks and Knight
Pharmacology			
PHARM 554 - 01	Mammalian Toxicology	Mohamed B Abou Donia	Principles of toxicology as related to humans. Emphasis on the molecular basis for toxicity of chemical and physical agents. Subjects include metabolism and toxicokinetics, toxicologic evaluation, toxic agents, target organs, toxic effects, environmental toxicity, management of poisoning, epidemiology, risk assessment, and regulatory toxicology, Prerequisite: introductory biology, and Chemistry 201DL, or consent of instructor. Instructor: Abou-Donia and staff
Philosophy			
PHIL 345 - 01	PHILOSOPHY/METHOD OF ECONOMICS (LEC)	Alexander Rosenberg	Introduction to conceptual and methodological issues raised in modern economics. Topics may include choice, rationality and irrationality, realism, models, the relationship between microeconomics and macroeconomics, prediction and explanation, value judgments and policymaking, and causality. Case studies of applications to economic problems. Prerequisites: One course in economics or consent of instructor. Instructor: Hoover or Rosenberg
Physical Education			

PHYSEDU 180 - 01	Outdoor Recreation	Nathan McKinnis	Provides an introduction to basic skills and concepts in a variety of outdoor adventure pursuits. Covers trip planning, menu preparation, cooking, orienteering, navigation, first aid and safety, with emphasis on 'learning by doing'. Focus is on the fundamentals of backcountry camping, with an introduction to climbing, mountain biking, and kayaking. Includes a 1-2 night trip. Instructor: McKinnis
PHYSEDU 203 - 01	Diet and Nutrition	Franca B Alphin	How diet affects well-being and reduces risk of certain diseases. Basic nutrition principles, sports performance enhancement, supplements, disordered eating, vegetarianism, herbs, diet and disease, and current trends in nutrition. Instructor: Alphin
Political Science			
POLSCI 172FS - 01	US RACIAL ATTITUDES & POLITICS	Ashley Jardina	Course considers the different conceptions and definitions of racial attitudes and racial prejudice in the United States. Compares across the disciplines of social psychology, sociology, and political science, acknowledging debates about both the sources and consequences of these attitudes. Focuses on how in the present day, different theories lead to different understanding of racial conflict and its political consequences. Discusses how racial attitudes, prejudice, and conflict may be mitigated in political world. Open only to students in the Focus Program. Instructor consent required. Instructor: Jardina
Public Policy			
PUBPOL 290S-01	SELECTED TOPICS (SEM) COMPARATIVE ECONOMIES	Emiliano Corral	Seminar version of Public Policy Studies 290. Instructor: Staff

PUBPOL 598 - 01	Economic Growth and Development Policy	Fernando R Fernholz	<p>Basic principles and policy issues in the study of economic growth and development. The roles of physical, natural and human capital, technological innovation, productivity improvements, history and institutions in explaining patterns and causes of variations in growth and developmental performance of countries. Effects on growth, development, wellbeing and poverty levels of many current policy issues including HIV/AIDS, financial crises, macro-stability, foreign aid and investment, debt burdens and forgiveness, governance and corruption. Instructor: Fernholz</p>
PUBPOL 723 - 01	Poverty Reduction and the International Financial Institutions	Phyllis R Pomerantz	<p>Over the last 50 years, development and poverty reduction have been the twin concerns of the International Financial Institutions (the World Bank, the International Monetary Fund (IMF) and the regional development banks). The course will trace the evolution of international poverty reduction theory, policy and implementation from the emphasis on capital accumulation and large infrastructure projects in the 1960s to the integrated rural development programs and basic needs approaches of the 1970s, through structural adjustment and sectoral programs in the 1980s and 1990s, to today's emphasis on debt relief and Poverty Reduction Strategies. As these changes were happening, related changes also were taking place in the structures, policies, and practices of the IFIs. The course will, look at the rationale, basic features, and effectiveness of each poverty reduction approach, as well as the accompanying changes in the two principal IFIs, the World Bank and the IMF. The course will use general studies and reviews, as well as actual project and program examples. The course is primarily a group discussion, with occasional mini-lectures and student presentations. Written requirements include a mid-term assignment and final paper. Instructor consent required. Instructor: Phyllis Pomerantz</p>

PUBPOL 761 - 01	Human Rights and Conflict	Catherine Admay	<p>One story of the relationship between human rights and conflict is told in the Preamble to the UN Charter: the human rights framework of our age came about because of the 20th century's two world wars. But for the "untold sorrow" brought about by these conflicts, so the story goes, there would have been no effective demand for and no construction of a set of legal, political and ethical norms intended to help "save succeeding generations from the scourge of war". In this course we will examine the link between human rights and conflict in an interdisciplinary fashion. What are the multiple ways in which the law and political advocacy of human rights relate to conflict? Do demands for human rights precipitate or fuel as much as prevent-conflicts, whether as war or in other forms of large scale suffering? Are human rights essential for what the field of conflict resolution has termed "positive peace"? Should policymakers involved in multiple stages of conflict, both inter-and intrastate, be more cautious about viewing rights as a remedy for conflicts? What are relevant ethical considerations? With the benefit of greater analytical and contextual understanding of competing priorities and tradeoffs, what positive role might be cast for human rights in the conflicts of the 21st century? To consider these and other questions, we will draw substantially on historical and policy analyses, learning the legal/political history of the contemporary framework for human rights and connecting it to real world efforts underway by lawyers and other practitioners to reframe and transform conflict and build peace. Consent required by instructor. Instructor: Catherine Admay</p>
Sociology			
SOCIOLOGY 218-01	SEX, GENDER, AND SOCIETY (LEC)	Mary G Hovsepian	Nature and acquisition of sex roles. Cross-cultural variations. Developing nature of sex roles in American society. Instructor: Hovsepian or Smith-Lovin

SOCIOL 690-03	SPECIAL TOPICS IN SOCIOLOGY (LEC) ECON OF POVERTY/INEQUALITY	John H Komlos	Substantive, theoretical, or methodological topics vary by semester. Instructor: Staff
SOCIOL 690S-02	SEMINAR SELECTED TOPICS (SEM) RACE, GENDER, CLASS AND HEALTH	Tyson Haywood Brown	Substantive, theoretical, or methodological topics. Instructor: Staff
Women's Studies			
WOMENST 366-01	NATURE, CULTURE, AND GENDER (LEC)	Mary K Rudy	Understanding human identity through a consideration of the human animal boundary, feminist primatology, animal welfare, the great ape project. Do women view nature differently than men? Ethics of primate research, primate gender roles, human justice and non-human animals, subjectivity and emotional lives of nonhuman animals, the relationship between gender, nature, and animals, new formulations of "nature/culture," women and animals. Instructor: Rudy
Writing			
WRITING 101-05, 06, 07	ACADEMIC WRITING (LEC) CONTROLLING NATURE	Departmental Staff	Instruction in the complexities of producing sophisticated academic argument, with attention to critical analysis and rhetorical practices. Topics vary by section. Instructor: Staff
WRITING 101-24, 25, 26	ACADEMIC WRITING (LEC) Debt, Race, and Power	Departmental Staff	Instruction in the complexities of producing sophisticated academic argument, with attention to critical analysis and rhetorical practices. Topics vary by section. Instructor: Staff
WRITING 101-13, 14	ACADEMIC WRITING (LEC) NATURE: UTOPIA & APOCALYPSE	Departmental Staff	Instruction in the complexities of producing sophisticated academic argument, with attention to critical analysis and rhetorical practices. Topics vary by section. Instructor: Staff
WRITING 101-32, 33	ACADEMIC WRITING (LEC) THE SCI BEHIND HEALTH EQUITY	Departmental Staff	Instruction in the complexities of producing sophisticated academic argument, with attention to critical analysis and rhetorical practices. Topics vary by section. Instructor: Staff