

Course Number	Course Title	Course Title	Instructor	Course Description
A	<b>African and American Studies</b>			
1	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
2	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
3	AAAS 133S Gateway Seminar	CIVIL RIGHTS AND ASIAN AMERICANS	Mazumdar	Study of crucial legal and political moments in the struggle for equal civil rights of minorities, beginning with the laws of Chinese Exclusion, the struggle to define who was "White," the Asian Immigration Exclusion Acts, the relationships of Asians and African Americans and the struggle for equal schooling in the American South, the Japanese Concentration camps, the Redress and Reparations Civil Rights struggle, and the involvement of Asians Americans in the African American-led Civil Rights Movement in the 1960s, including working with Martin Luther King and Malcolm X, and Asian Americans in the anti-sweatshop unionization movement
4	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.
5	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.
6	AAAS 243-01 (Cross listed: HISTORY 348-01)	CIVIL RIGHTS MOVEMENT	Adriane Lentz-Smith	An interdisciplinary examination of the civil rights movement from World War II through the late 1960s. Instructor: Gavins or Lentz-Smith
7	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
8	AAAS 290-07 LEC (9817)	SPECIAL TOPCS (LEC) RIGHTS AND ENVIRONMENT	Robin Kirk	
9	AAAS 642S-01 (Cross-listed: ECON 541S-01, SOCIOL 642S-01, POLSCI 642S-01, PUBPOL 645S-01)	GLOBAL INEQUALITY RESEARCH (SEM) RACE, CLASS & PSYCHOLOGY	Multiple	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
10	AAAS 740S-01 SEM (4417)	RACIAL/ETH MINORITIES AMER POL (SEM)	Ismail White	Graduate-level course on politics of the United States' four principal racial minority groups Blacks, Latinos, American Indians, and Asian Americans. Importance of race and ethnicity in American politics is also explored. Instructor: McClain

B	<b>Arts of the Moving Image</b>			
11	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
12	AMI 336S-01 (Cross-listed: DOCST 272S-01, PUBPOL 228S-01)	DOCUMENTARY AND POLICY	Karen Price	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
C	<b>Art History</b>			
13	ARTHIST 315-01	MAPPING HISTORY WITH GIS	Edward Triplett	This is a beginner/intermediate Geographic Information System (GIS) course designed to help students develop GIS skills. The class emphasizes perspectives, procedures and tools that are relevant to applications of GIS in Art History and Humanistic disciplines. This course is designed as a hybrid lecture/lab format in which direct instruction is supplemented by hands on learning labs using ArcGIS software and real-world spatial data. The main skills students will gain are: Integration of spatial and tabular data, Geoprocessing, Data visualization, Creating features, Editing Features, Vector and Raster Integration, Spatial Analysis, Georeferencing. Instructor: Staff
14	ARTHIST 231-01 (Cross-listed: ECON 344-01, VMS 242-01)	HISTORY OF ART MARKETS	Multiple	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
D	<b>Anesthesiol, Surg &amp; Env'tl Phys</b>	<b>Anesthesiology, Surgery &amp; Environmental Physiology</b>		
15	ASEP 301B-16	RESEARCH IN ASEP	Richard Moon	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.
E	<b>Black Church Studies</b>	<b>Black Church Studies</b>		

16	BCS 767-01	Christianity, Race, and the American Nation	Valerie C Cooper	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.
F	<b>Bioethics and Science Policy</b>			
17	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
18	BIOETHIC 704-01	SCIENCE LAW AND POLICY	Michael Waitzkin	What government policies support science? How is science regulated and controlled? How do the states, the federal government and international agencies interact to set science policy? How do disparate laws impact research and translation? Class is a mix of law, ethics and science students; learning to talk to one another in a common language is an important element of the course. Classes include analysis of cases studies. No prerequisites. No requirement for either graduate or upper-level undergraduate training in the sciences. Course evaluation based on class participation, student presentation, weekly discussion questions, a short paper, and a final exam. Instructor: Waitzkin
G	<b>Bioethics</b>			
19	BIOETHICS 591-01	TOPICS IN SCIENCE POLICY	Michael Waitzkin	During this independent research study, students will analyze science policy developments across government, including executive and agency actions, as well as proposed legislation and judicial decisions. Students will regularly produce policy brief summaries that overview the policy, explain the science at issue, present relevant background information, provide context concerning endorsements and opposition, and expound upon related legislation and governmental actions. Instructor consent required.
H	<b>Biology</b>			
20	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
21	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
22	BIOLOGY 205-01 (Cross-listed: ENVIRON 205-01)	MARINE MEGAFUNA (LEC)	Andre M Boustany	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

23	BIOLOGY 209-1	THE ECOLOGY OF HUMAN HEALTH	Julie A Reynolds-William F Morris	
24	BIOLOGY 228S	HOW PLANS FEED/FUEL THE WORLD	Chantal Reid	Covers primary physiological processes from subcellular to whole plant that affect plant growth in a changing environment. Processes include photosynthesis, respiration, water relations, nutrient and carbohydrate allocation, signaling, and stress responses to various biotic and abiotic factors for a range of plant species adapted to different environments. Applications include plant improvement for food and biofuel production, management of plant growth in response to global change. Offered through the Dukelmerse program. Will include travel to farms in NC locally, to the mountains, and to the coast. Prerequisite: Biology 201L or 202L. Instructor consent required.
25	BIOLOGY 261D	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
26	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
27	BIOLOGY 262-01	PEOPLE, PLANTS, AND POLLUTION	William Wilson	Cities turn natural lands into impervious surfaces, like roofs and parking lots, while trees, forests, and grass decrease. Course covers urban environmental issues, including energy and carbon, air, heat, and water pollution, the health and welfare of people, and changes in other species and regional/global climatic patterns. Examines costs/benefits of urban nature on solving urban environmental problems, including enhancing the social welfare of people's lives.
28	BIOLOGY 273LA-01 (Cross-listed: ENVIRON 273LA-01, EOS 374LA-01)	MARINE ECOLOGY	Joseph P Morton, Yin San Zhang	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
29	BIOLOGY 344S	PLANT DIVERSITY IN THE FIELD	Jonathan Shaw	Field-based study of plant diversity. Collection, identification, and ecology of plant species in a specific forested location. Biodiversity informatics, plant evolution, and ecology.
30	BIOLOGY 361LS	FIELD ECOLOGY	Emily Bernhardt	Explore the natural systems of North Carolina through hands-on experimentation. Through student-guided inquiry and field experimentation students will gain experience in formulating hypotheses, designing field observations and experiments, analyzing field data and interpreting results from the fields of ecosystem, community, population, and physiological ecology. In addition to weekly field labs, the course will include a weekend field trip. Prerequisites: Biology 20 or one course in ecology or consent of instructor; Mathematics 111L.

31	BIOLOGY 376A-01 (Cross-listed: ENVIRON 376A-01)	MARINE MAMMALS	Andrew J Read, Joseph Emerson Fader	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
32	BIOLOGY 445A-01 (Cross-listed: ENVIRON 445A-01, PUBPOL 445A-01)	MARINE CLIMATE CHANGE	David W Johnston, Chen-Yi Wu	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
33	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
34	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 DUML 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
35	BIOLOGY 711S-01 (Cross-listed: EVANTH 743-01, UPE 703S-01)	ECOLOGY SEMINAR	Christine Drea, James S Clark	Discussion of current research and literature. Instructor: Staff
36	BIOLOGY 773LA-01 (Cross-listed: ENVIRON 773LA-01)	MARINE ECOLOGY	Joseph P Morton	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
I	<b>Biomedical Engineering</b>			
37	BME 195FS-01	MED INST DEVELOP WORLD (LEC)	Robert A Malkin	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

38	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
J	<b>Civil and Environmental Egr</b>			
39	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
40	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
41	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
42	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
43	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
44	CEE 690-02	ADVANCED TOPICS IN AIR POLLUTION ENGINEERING	Michael Howard Bergin	A course on an advanced topic within the civil and environmental engineering department
45	CEE 690-04	ENVIRONMENTAL CHEMINFORMATICS	P. Lee Ferguson	
45	CEE 690-03	MODEL ENV CHEM BIO ENERGY PROC	Marc Dehusses	
K	<b>Civic Engagement/Social Change</b>			
46	CESC 201S	Engaged Citizens/Social Change	Eric J. Mlyn	Introduction to key concepts, theories, and critiques of civic engagement and social change, with a focus on competing notions of democratic citizenship. Examination of voluntarism, philanthropy, community service, political participation, social activism and other forms of community engagement. Critical reflection on ethical issues related to community engagement and social change, including critiques of progressivism and service. Students will also be asked to apply these various approaches to pressing social issues of our time, such as income inequality, environmental justice, education reform and gender and race equality.
L	<b>Chemistry</b>			

47	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
48	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
49	CHEM 101DL - 001	Core Concepts in Chemistry	Christopher Roy, Richard A. MacPhail	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
50	CHEM 210DL - 001	Modern Applications of Chemical Principles	Dorian A Canela, Katherine J Franz, Christopher P Roy	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
M	<b>Chinese</b>			
51	CHINESE 407S	ISSUES IN CHINESE LANG/SOC I	Yujia Ye	Materials from public media used to analyze diverse social phenomena and cultural issues in contemporary China. Major focus on developing literary reading and writing skills along with learning methods of writing academic Chinese essays on a wide range of complex topics. Topics include popular culture, food, marriage outlooks, Cultural Revolution, Confucianism, and social issues after the economic reform in China. Analysis of cultural and literary texts from variety of media and genres providing a basis for practice in discussion and writing
N	<b>Classical Studies</b>			
51	CLST 170FD	Liberty and Equality	Jed W Atkins	Examines the democratic values of liberty and equality in Greek, Roman, and American political thought. Are democracy and liberty allies or foes? What is the relationship between liberty and equality? Is freedom possible under non-democratic regimes? Is individual liberty protected by equal and inalienable human rights? What is the relationship between individual liberties and aspirations for a good and just society? Why have some democratic societies embraced imperialism or slavery?
52	CLST364-01	Ancient Science and Technology	Departmental Staff	Development of scientific thought and technological innovation in the ancient Near East, Greece, and Rome. Topics might include the rise of scientific thought, as against myth; impact of scientific and technological developments on Greek and Roman society and culture; history of medicine; history of mathematics; military technology.
O	<b>Community and Family Medicine</b>			

53	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.
P	<b>Computer Science</b>			
53	COMPSCI 110 - 02	Information, Society & Culture: Bass Connections Gateway	Patrick James Herron	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
Q	<b>Cultural Anthropology</b>			
54	CULANTH 105-01	INTRO INTO AFRICAN STUDIES	Charles D Piot	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.
55	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
56	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)	Eli L Meyerhoff	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
57	CULANTH 236-01	FARM WORKERS IN NC: POVERTY (SEM)	Christopher Wilson Sims	Focus on those who bring food to our tables, particularly those who labor in the fields of North Carolina and the Southeast. Students will learn about farm work from the plantation system and slavery to sharecropping and up to the migrant and seasonal farmworker population today. Study and analysis of media representations of farmworkers and agricultural issues as well as historical and contemporary documentary work and its contributions to farmworker advocacy. Includes a service-learning component involving work in the community.
58	CULANTH 278 - 01 (Cross-listed: WOMENST 278-01, NEUROSCI 278-01, PSY 226-01, SXL 278-01)	SEX/GENDER - NATURE/NURTURE	Ara A Wilson, Christina Williams	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
59	CULANTH 290S-02	WATER AND SOCIETY LATIN AMER		Same as Cultural Anthropology 290 except instruction is provided in seminar format.
60	CULANTH 290-07	RIGHTS AND ENVIRONMENT	Robin Kirk	
R	<b>Doc Studies</b>			
61	DOCST 290-07	SPECIAL TOPICS IN DOC STUDIES - RIGHTS AND ENVIRONMNET	Robin Kirk	



S	Economics			
62	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
63	ECON 212	ENGR SYSTEM OPTIM AND ECON	Mark Borsuk	Introduction to mathematical optimization, engineering economic analysis, and other decision analysis tools used to evaluate and design engineering systems. Application of linear and nonlinear programming, dynamic programming, expert systems, simulation and heuristic methods to engineering systems design problems. Applications discussed include: production plant scheduling, water resources planning, design and analysis, vehicle routing, resource allocation, repair and rehabilitation scheduling and economic analysis of engineering design alternatives. Pratt students may not use this course toward the SS/H degree requirement. Corequisite: Mathematics 216.
64	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
65	ECON 351S-01	ECO/POL PERFORMANCE CIVILIZATIONS	Timur Kuran	Critical survey of theories concerning the economic and political development of major civilizations, with an emphasis on the causes of differences that took shape and persisted over long time periods. The theories covered address the roles of institutions, cultures, legal systems, beliefs, family structures, religions, institutions, technologies, geography, and natural resources. Interactions between economic and political development.
66	ECON 369-01	PEOPLE & POVERTY: POLICYMAKING	Xiao Yu Wang	Students will use a combination of news articles and research papers to study the problems faced by the world's poor and to analyze specific policies that have been designed to resolve them. The broad goal of this course is to learn how to use econ models, empirical analysis, and experiments "in the field" to gain a deeper understanding of poverty, in order to design and implement more effective policies in the future. Prerequisite: Economics 201D and calculus.
T	Education			
67	ED 111FS-01	RETHINKING SCHOOL: SOCIAL JUSTICE	David Michael Malone, Jan Riggsbee	In 1954 the Supreme Court case Brown versus the Board of Education forever changed American schools by ending segregation and creating educational equity. Or did it? Are today's schools any more inclusive or socially just than schools were 50 years ago? Examination of ways schools may or may not perpetuate and reproduce social inequities. Focus on recent efforts to imagine and create socially-just schools. Discussion of our ethical responsibilities as civically engaged citizens to work towards educational equality and provide support of schools that are inclusive, culturally responsive, and democratic. Required service-learning experience working with children in a Durham public school.
68	ED 201S-01	ENGAGED CITIZENS/SOCIAL CHANGE	Eric J. Mlyn	Introduction to key concepts, theories, and critiques of civic engagement and social change, with a focus on competing notions of democratic citizenship. Examination of voluntarism, philanthropy, community service, political participation, social activism and other forms of community engagement. Critical reflection on ethical issues related to community engagement and social change, including critiques of progressivism and service. Students will also be asked to apply these various approaches to pressing social issues of our time, such as income inequality, environmental justice, education reform and gender and race equality.

69	ED 220-01	RACE, POWER, AND IDENTITY	Martin Paul Smith	Exploration of historic and contemporary psycho-social and socio-cultural aspects of the African American sport experience. Examination of research that addresses the effect of physical differences, racial stereotyping, identity development, gender issues, and social influences on African American sport participation patterns. Analysis of sport as a microcosm of society with an emphasis on examining associated educational and societal issues.
70	ED 430-01	WOMEN AND THE PROFESSIONS	Colleen M Scott, Stephanie Helms Pickett	Interdisciplinary analysis of the history of ideas about women and the professions with emphasis on women's actions, past, present and future. The changing status of women in professional life; ethical and political implications of public and personal decision-making. Study of research and writing by and about women in professional fields; interviews with working women. Research paper integrating students' major, the internship experience and their future goals required. Senior seminar open only to Baldwin Scholars
U	<b>Engineering</b>			
71	EGR 95FS - 01	MATERIALS & TECH ENERGY FUTURE	Nico Hotz	
72	EGR 95FS - 02	ENERGY SYSTEMS	Walter Neal Simmons, Josiah Knight	
73	EGR 95FS - 03	SUS ERGY: ENG DESIGN & COMM	Sophia T Santillan	
74	EGR 101 L	ENGR DESIGN & COMM		
75	EGR 305	ENGRY SYSTEM OPTIM AND ECON	Mark Borsuk	Introduction to mathematical optimization, engineering economic analysis, and other decision analysis tools used to evaluate and design engineering systems. Application of linear and nonlinear programming, dynamic programming, expert systems, simulation and heuristic methods to engineering systems design problems. Applications discussed include: production plant scheduling, water resources planning, design and analysis, vehicle routing, resource allocation, repair and rehabilitation scheduling and economic analysis of engineering design alternatives. Pratt students may not use this course toward the SS/H degree requirement. Corequisite: Mathematics 216.
V	<b>Engineering Management</b>			
76	ERGMGMT 560	PROJECT MANAGEMENT	Steven Delgrosso	Projects are one of the key mechanisms for achieving organizational goals and implementing change, whether it is the design and launch of a new product, the construction of a new building, or the development of a new information system. This course will focus on defining project scope, developing project plans, managing project execution, validating project performance and ensuring project control. Additional topics covered include decision making, project finance, project portfolio selection and risk management
77	ERGMGMT 562	OPERATIONS MANAGEMENT	Cecil Chester Bozarth	Operations management involves planning and controlling the processes used to produce the goods and services provided by an organization. In essence, it is the management of all activities related to doing the actual work of the organization. Managing these processes can be quite challenging - they are often very complex, and can involve large numbers of people and facilities, huge volumes of materials and great distance. Objectives of the course are to: i) Introduce students to the functional area of operations and to increase their awareness of how a firm's operations interface with the other functional areas of the organization, ii) Familiarize students with the various issues and problems that traditionally arise in the management of operations within both manufacturing and service organizations, iii) Acquaint students with some of the terminology, modeling, and methodologies that often arise in the handling and resolution of operations issues and problem
W	<b>Energy</b>			
78	ENERGY 231-01 (Cross-listed: ENVIRON 231-01, EOS 231-01)	ENERGY AND 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

79	ENERGY 390S-01	SPECIAL TOPICS - ENERGY POLICY ANALYSIS/WRITING	Jack Zhou	
X	ENERGY 520	RESOURCE AND ENVIRON ECON 1	Lori S Bennear	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.
80	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
81	ENERGY 635-01 LEC	ENERGY ECONOMICS AND POLICY	Lori S Bennear	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
82	ENERGY 711-01 LEC (7176)	ENERGY & ENVIRONMENT (LEC)	Timothy L Johnson	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
83	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
84	ENERGY 790-01	ENERGY POL ANALYSIS & WRITING	Menglin Zhou	
85	ENERGY 790-02	RENEWABLES & THE WORLD'S POOR	Timothy Profeta and James Rogers	
86	ENERGY 790-03	TRANS OF THE US ELEC POWER SECTOR	Brian C Murray, James Rogers	
87	ENERGY 811-01 (Cross-listed: ENVIRON 811-01)	Business and Environment (Lec)	Deborah Rigling Gallagher	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.
Y	<b>ENERGY ENGINEERING</b>			
88	ENRGYGEGER 490 01-02	SPECIAL TOPIC - MODERN POWER SYSTEMS	Walter Neal Simmons	
Z	<b>Environment</b>			

89	ENVIRON 89S-01	FIRST-YEAR SEMINAR (TOP) (SEM) CLIMATE CHANGE	Prasad S Kasibhatla, Chantal D Reid	Topics vary each semester offered. Instructor: Staff
90	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
91	ENVIRON 216S	ENVIRON & CONFLICT	Erika S Weinthal	Environmental and natural resources as a source of conflict and/or peacebuilding between and within nations and states. Analysis of the role of the environment in the conflict cycle and international security. Topics include refugees, climate change, water, and infectious disease. Particular focus on post-conflict and rebuilding in war-torn societies. Examination of the role of international organizations, non-governmental organizations, and emerging standards for environmental management.
92	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
93	ENVIRON 228S	HOW PLANS FEED/FUEL THE WORLD	Chantal Reid	Covers primary physiological processes from subcellular to whole plant that affect plant growth in a changing environment. Processes include photosynthesis, respiration, water relations, nutrient and carbohydrate allocation, signaling, and stress responses to various biotic and abiotic factors for a range of plant species adapted to different environments. Applications include plant improvement for food and biofuel production, management of plant growth in response to global change. Offered through the DukeImmerse program. Will include travel to farms in NC locally, to the mountains, and to the coast. Prerequisite: Biology 201L or 202L. Instructor consent required.
94	ENVIRON 231	ENERGY AND ENVIRONMENT	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.
95	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
96	ENVIRON 273LA	MARINE ECOLOGY	Brian Silliman	Factors that influence the distribution, abundance, and diversity of marine organisms, including a survey of the major flora and fauna in the marine environment. 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. Lectures, field excursions, lab exercises and an independent project. Taught in Beaufort fall, spring, and summer; spring semester offering requires travel to Caribbean. Prerequisite: AP biology, introductory biology, or instructor consent; not open to students who have taken Biology 773LA.
97	ENVIRON 274	PEOPLE, PLANTS, AND POLLUTION	William Wilson	Cities turn natural lands into impervious surfaces, like roofs and parking lots, while trees, forests, and grass decrease. Course covers urban environmental issues, including energy and carbon, air, heat, and water pollution, the health and welfare of people, and changes in other species and regional/global climatic patterns. Examines costs/benefits of urban nature on solving urban environmental problems, including enhancing the social welfare of people's lives.
98	ENVIRON 286A-01 (Cross-listed: PUBPOL 281A-01)	MARINE POLICY (LEC)	Grant Murray	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
99	ENVIRON 290-07	Rights and the Environment: Bass Connections	Robert Kirk	
100	ENVIRON 290S	Politics of Climate Change	Emily Pechar	
101	ENVIRON 338	Food System Lifecycle Analysis	Dalia Patino Echeverri	This DukeImmerse course introduces fundamental concepts and methods to conduct Environmental Life Cycle Assessments (LCA) to identify magnitude, type, and location of environmental impacts by food production from input for crops to the disposal of the final products. Discuss the Economic-Input Output LCA (EIO-LCA). Emphasis in understanding and estimation of the environmental impacts associated to the production, transportation, storage, and waste of food for human consumption, paying special attention to the water and energy use associated to these processes. Instructor consent required.
102	ENVIRON 360S	GLOBAL APPLE : Life and Death and the Digital Revolution	Ralph Litzinger	

103	ENVIRON 390-01	Water and Society Latin America		Content to be determined each semester. Instructor: Staff
104	ENVIRON 390-03	SP TOP ENVIRON SCI/POL (LEC): Forest Elephant Working Group	John Randolph Poulsen	Content to be determined each semester.
105	ENVIRON 390-126	SP TOP ENVIRON SCI/POL (LEC): Big Cats Decline, Africa & Asia	Stuart L Pimm	Content to be determined each semester.
106	ENVIRON 445A	MARINE CLIMATE CHANGE (LEC)	Chen-Yi Wu, David W Johnston	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 ecosys and mar 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 incl consequences of sea level rise and potential increases in disease due to climate change. Taught in Beaufort. Grad students responsible for research paper.
107	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
108	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
109	ENVIRON 520-01	RESOURCE & ENVIRON ECON I (LEC)	Lori S Bennear	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
110	ENVIRON 521-01 (Cross-listed: ECON 531-01, PUBPOL 584-01)	RESOURCE & ENVIRON ECON II (LEC)	Martin D Smith	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
111	ENVIRON 538	ENVIRON HEALTH: ECON AND POLICY	Subhrendu Pattanayak	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.
112	ENVIRON 542	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.
113	ENVIRON 549	California Water Crises	David E Hinton	Reviews history of California's water dependent economy, leading to a capture, storage system with conveyances extending thousands of miles to deliver water for agriculture, industry and homes. Examines recent political change coupled with chronic issues of a water-rich north, an expanding urban population and a water-poor but politically strong south. Emphasis includes climate change, seismic vulnerability, redirection of river flows, and large scale water reuse. Course will cover specific water crises in other states and nations, providing in depth coverage of aspects of the international crisis in quantity and quality of freshwater.
114	ENVIRON 552 - 01	Climate and Society	Drew Shindell	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
115	ENVIRON 559 - 001	Fundamentals of Geographic Information Systems and Geospatial Analysis	Patrick N Halpin, Peter A Harrell	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
116	ENVIRON 563	COST-BENEFIT ANALYSIS / HEALTH & ENV	March Jeuland	Course considers the importance of economic analysis, or cost-benefit analysis (CBA), for public policy assessments. Specific focus is on health and environmental policy, and the steps in identification / cataloguing, quantification, and monetization of impacts of potential policies and projects. Covers: Economic rationale for CBA; Basic principles for assessing the economic effects of projects; Techniques for valuing health and environmental impacts; Intergenerational/philosophical concerns related to CBA; Social discounting; Risk and uncertainty; Comparisons of CBA with other approaches (i.e. cost effectiveness analysis, multi-objective analysis)
117	ENVIRON 590-03 LEC 8946	SPECIAL TOPICS (LEC): Forest Elephant Working Group	John Randolph Poulsen	Content to be determined each semester. May be repeated. Instructor: Staff

118	ENVIRON 630-01	TRANSPORTATION AND ENERGY	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.
119	ENVIRON 635	ENERGY ECONOMICS AND POLICY	Lori S Bennear	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.
120	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
121	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
122	ENVIRON 710 - 001	Applied Data Analysis for Environmental Science	John Randolph Poulsen, Elizabeth Albright	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
123	ENVIRON 711-01	ENERGY & ENVIRONMENT	Timothy L Johnson	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.
124	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

125	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
126	ENVIRON 745A	MARINE CLIMATE CHANGE (LEC)	Chen-Yi Wu, David W Johnston	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 ecosys and mar 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 incl consequences of sea level rise and potential increases in disease due to climate change. Taught in Beaufort. Grad students responsible for research paper.
127	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
128	ENVIRON 755-01	COMMUNITY-BASED ENV MGMT (LEC)	Rebecca L Vidra	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
129	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
130	ENVIRON 811	SUSTAINABLE SYSTEMS THEORY AND DRIVERS	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.
131	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

132	ENVIRON 829-01	NATURAL RESOURCES ECONOMICS	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
133	ENVIRON 847S - 01 (Cross-listed: PHARM 847S-01)	SEMINAR IN TOXICOLOGY	Joel N Meyer	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
134	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
135	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
136	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
137	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
138	ENVIRON 898-03	PROGRAM AREA SEMINAR (LEC) ECOSYSTEM SCIENCE & CONSERVATN	Ram Oren	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
139	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
140	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
141	ENVIRON 898-05	PROGRAM AREA SEMINAR (LEC) ENVIRONMENTAL ECON & POLICY	Departmental Staff	Required symposium in each program area. Students present master's project research. Pass/fail grading only. Instructor: Staff
142	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
143	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
144	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
145	ENVIRON 960 - 01	Duke Environmental Leadership: Orientation Course: Making a Difference in the World	Rebecca L Vidra	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



146	ENVIRON 962-01	DUKE ENVIRONMENTAL LEADERSHIP: ECONOMICS OF ENVIRONMENTAL MANAGEMENT	Thomas Holmes	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.
AA	<b>Earth and Ocean Sciences</b>			
147	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
148	EOS 102	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.
149	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
150	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
151	EOS 231-01	ENERGY AND THE ENVIRONMENT	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.
152	EOS 550-01	CLIMATE AND SOCIETY (LEC)	Drew Shindell	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 affect future climate as well as factors influencing those choices, including risk analyses, geoengineering proposals, intergenerational equity, climate metrics and the media.
AB	<b>The Study of Ethics</b>			
153	ETHICS 129FS	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 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.

154	ETHICS 160 FS	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.
AC	<b>Focus</b>			
155	FOCUS 195-19	Ethics, Leadership, Global Citizen	Christian Paul Ferney	
156	FOCUS 195-12	Global Energy	Nico Hotz	
157	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
158	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
AD	<b>RESEARCH IN EPI &amp; PUBLIC HEALT</b>			
159	EPH 301B - 16	RESEARCH IN EPI & PUBLIC HEALTH	David Edelman, Kathryn M Andolsek	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.
AE	<b>Global Health</b>			
160	GLHLTH 101D - 001	Fundamentals of Global Health	Sarah LeGrand	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
161	GLHLTH 189FS - 01	GLOBAL HEALTH AND PROGRESS (SEM) GLOBAL HEALTH AND PROGRESS	Amy L Hall	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. Instructor: Hall

162	GLHLTH 210-01	GLOBAL HEALTH ETHICS	Kathryn Whetten	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
163	GLHLTH 303 - 01	Global Health Systems and Policy	David C Toole	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
164	GLHLTH 326 - 02	HEALTH, CULTURE, LATINO COMMUNITY	Rosa Solorzano, Bethzaida Fernandez	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
165	GLHLTH 395 - 01	Connections in Global Health: Interdisciplinary Team Projects	Deborah K Attix	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
AF	<b>Latin American Studies</b>			
166	LATAMER 320S-01	Social Movements/Social Media	Negar Mottahedeh	Examines uses and abuses of social media by social movements. Interested in a broader historical study of mediating technologies and oppositional public sphere, course considers the uses of cameras, phones, cassette players, radio, and social media platforms, but also books, bodies, art, fashion, and automobiles as oppositional technologies. Studies political and ethical uses of technologies in social unrest. Investigates impact of technologies on social movements and social transformations in contemporary history. Student driven case studies will highlight contemporary engagement with social media by networked social movements
167	LATAMER 390-91	WATER AND SOCIETY LATIN AMER		Same as Cultural Anthropology 290 except instruction is provided in seminar format.
AG	<b>Linguistics</b>			
168	LINGUIST 451-01	Language and Society	Dominika Marta Baran	Course examines language as a social practice, focusing on different aspects of its role in social life. Topics addressed include: language and social identity, such as ethnicity, social class, age, and gender; variation in language, including dialects, accents, and registers; multilingualism and language contact; new languages such as pidgins and creoles; language, culture, and intercultural communication; language and ideology; language in education and in the media. Through the discussion of these topics and homework including reading and small research projects, students are introduced to key concepts, theories, and methods in sociolinguistics and linguistic anthropology. Instructor: staff
AH	<b>Latino Studies Global South</b>			

169	LSGS 306	Health, Culture, and the Latino Community	Bethzaida Fernandez	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
170	LSGS 332S	Farmworkers in North Carolina: Roots of Poverty, Roots of Change	Christopher Wilson Sims	Focus on those who bring food to our tables, particularly those who labor in the fields of North Carolina and the Southeast. Students will learn about farm work from the plantation system and slavery to sharecropping and up to the migrant and seasonal farmworker population today. Study and analysis of media representations of farmworkers and agricultural issues as well as historical and contemporary documentary work and its contributions to farmworker advocacy. Includes a service-learning component involving work in the community. Instructor: Thompson or Sims
AI	<b>Mechanical Engr/Materials Sci</b>			
171	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
172	ME 555-12	Advanced Topics: Thin-Film Photovoltaics	David Mitzi	Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Approval of director of undergraduate or graduate studies required. Instructor: Staff
173	ME 555-03	SOLAR THERMAL ENERGY APPLS		
AJ	<b>Molecular Genetics and Microbiology</b>			
174	MGM 702-01	Scientific Writing	Douglas A Marchuk	Introduction to grant and fellowship writing; writing assignment of two proposal topics; evaluation and critique of proposal by fellow students. Instructor: Marchuk
AK	<b>Pharmacology</b>			
175	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
AL	<b>Philosophy</b>			
176	PHIL 110-01	Information, Society & Culture: Bass Connections Gateway	Patrick James Herron	Topics vary each semester offered. Instructor: Staff
177	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
AM	<b>Physical Education</b>			
178	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

179	PHYSEDU 207-01	Exercise and Mental Health	Kim N. McNally	Examines the neural and psychological correlates of exercise that influence mental and cognitive health. Explores exercise guidelines and theories of exercise behaviors. Topics include exercise and depression, anxiety, stress, self-esteem, body image, circadian rhythms, learning, dementia, and mental states and performance. Instructor: Murphy/McNally
AN	<b>Political Science</b>			
180	POLSCI 213S - 01	Introduction to Engaged Citizenship and Social Change	Eric J. Mlyn	Introduction to key concepts, theories, and critiques of civic engagement and social change, with a focus on competing notions of democratic citizenship. Examination of voluntarism, philanthropy, community service, political participation, social activism and other forms of community engagement. Critical reflection on ethical issues related to community engagement and social change, including critiques of progressivism and service. Students will also be asked to apply these various approaches to pressing social issues of our time, such as income inequality, environmental justice, education reform and gender and race equality. Consent of instructor is required. Instructor: Mlyn
181	POLSCI 367S	Environment and Conflict	Erika Weinthal	Environmental and natural resources as a source of conflict and/or peacebuilding between and within nations and states. Analysis of the role of the environment in the conflict cycle and international security. Topics include refugees, climate change, water, and infectious disease. Particular focus on post-conflict and rebuilding in war-torn societies. Examination of the role of international organizations, non-governmental organizations, and emerging standards for environmental management. Examples drawn from conflicts such as Rwanda, Israel/Palestine, Nepal, Sierra Leone and others.
AO	<b>Psychology</b>			
182	PSY 106-001	Biological Bases of Behavior: Introduction and Survey	Karen L Murphy	An introduction to the methods, models, and reasoning that have led to discoveries about brain-behavior relations, and a critical evaluation of the current theories that guide our thinking about the neurobiology, development and evolution of sensory and cognitive processes, sleep, pain, emotion, hunger, and thirst as well as maternal and sexual behavior patterns. Recommended background: AP Biology or strong Biology background. Psychology 101 recommended for Psychology majors. Instructor: Williams, Murphy or Staff
AP	<b>Public Policy</b>			
183	PUBPOL 209-07	Rights and the Environment	Robin Kirk	
184	PUBPOL 445A - 01	Marine Climate Change	David W Johnston, Chen-Yi Wu	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 in Beaufort. Instructor: Johnston
185	PUBPOL 576 - 01	Resource & Environmental Economics I	Lori S Bennear	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
186	PUBPOL 584	Resource & Environmental Economics II	Lori S Bennear	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
187	PUBPOL 590-03	ECON OF ENERGY AND DEV	Robyn Meeks	
188	PUBPOL 598 - 01	Economic Growth and Development Policy	Fernando R Fernholz	

189	PUBPOL 723 - 01	Poverty Reduction and the International Financial Institutions	Phyllis R Pomerantz	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
190	PUBPOL 761 - 01	Human Rights and Conflict	Catherine Admay	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
191	PUBPOL 849A -01	Marine Policy	Grant Murray	Formal study of policy and policy-making concerning the coastal marine environment. History of specific marine-related organizations, legislation, and issues and their effects on local, regional, national, and international arenas. Topics explored through use of theoretical and methodological perspectives, including political science, sociology, and economics. Consent of instructor required. Taught in Beaufort. Instructor: Murray
192	PUBPOL 890-13	Special Topics: Behavior Economics for Municipal Policy	Ryan P Smith, Mariel E Beasley	Contents and methods vary with instructors and from semester to semester. Instructor: Staff
AQ	<b>Sociology</b>			
193	SOCIOL 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
194	SOCIOL 255-01	Immigration and Health	Jen'nan G Read	An in-depth exploration of how global migration processes impact population health with particular attention to the social determinants of health. Course focuses on different immigrant groups in U.S. as well as refugee and migrant labor populations in other parts of the world, namely Middle East. Descriptive assessments of immigrant health inequalities and analytic examinations of mechanisms that contribute to disparities will be covered. Readings selected from sociological and medical writings; no prerequisites required. Instructor: Read
AR	<b>Spanish</b>			

195	SPAN 306	Health, Culture, and the Latino Community	Bethzaida Fernandez	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.
196	SPAN 313 - 01	Bridging Cultures: Latino Lives and Experiences	Bethzaida Fernandez	Exploration of key issues surrounding Latino communities in Durham and beyond, focusing on issues of culture and immigration, health, education, economy. Course includes a minimum of 15 hours of service learning with a local organization, plus other out-of-class and weekend community trips. Projects promote the development of intercultural competence, as well as facilitate opportunities for building bridges with the local community. Assessment based on knowledge of content, oral and written Spanish, and community engagement. Previous 300-level course is recommended before taking this class. Minimum requirement: Spanish 204 or equivalent. Instructor: Fernandez or Staff
AS	<b>University Program in Ecology</b>			
197	UPE 703S-01	Ecology Seminar	James S Clark, Kathleen Donohue	Presentation of current research by faculty and students in the University Graduate Program in Ecology. Instructor: Staff
AT	<b>Writing</b>			
198	WRITING 101-01	Academic Writing: Student Activism	Jennifer S Ahern-Dodson	Instruction in the complexities of producing sophisticated academic argument, with attention to critical analysis and rhetorical practices. Topics vary by section. Instructor: Staff
199	WRITING 101	Communicating Science	Miranda E Welsh	
200	WRITING 101	Saving Nature Saving Humans?	Paolo Bocci	
201	WRITING 101	Science and Social Justice	Amber Carr	
202	WRITING 101	Urban Wildlife Conservation	Lindsey W Smith	
203	WRITING 101	Writing and Mindfulness	Denise K Comer	
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