

This table contains sustainability-related course information. For up-to-date course information, visit Connect Carolina. If a course has more than one Gen Ed with the "FC" prefix, the course likely fulfills one OR the other "FC" Gen Ed.

Course	Title	Credits	Description	Gen Ed
AMST 175, NUTR 175, ANTH 175	Introduction to Food Studies: From Science to Society	3	Introduction to food studies covering a variety of topics including how food was consumed over history, land use and aquaculture, food in the arts, food and culture in the American South, food politics, and nutrition science.	GL, NA, FC-GLOBAL, FC-PAST
AMST 276	Food and American Culture: What We Eat and Who We Are	3	This course will take students on a journey through some of the key moments in "American" food studies and its beginnings across a range of disciplinary homes: the study of nutrition and food security; the study of food systems and the vocabularies that subtend them.	CI, US
AMST 375, FOLK 375	Southern Food Studies	3	Explores the historical arc and study of food in America and how culinary cultures reflect regional, national, and global narratives, challenges, and identities. As an intriguing lens on to the American experience, food reveals how race, class, gender, and place are entwined in cuisine, food economies, and interactions.	SS, US, FC-KNOWING, FC-POWER
AMST 460	Rising Waters: Strategies for Resilience to the Challenges of Climate and the Built Environment	3	This service-learning seminar examines water threats to port cities and low-lying areas from sea-level rise, extreme weather, and inadequate infrastructure. The focus is on the Americas, small and barrier islands, and high hazard regions including the South East and Gulf Coast communities. The APPLES project will focus on North Carolina resilience strategies. Recommended for juniors and seniors. Permission of the instructor for first year students. Honors version available	SS, CI, EE- Service Learning, FC-CREATE, FC-GLOBAL, HI-SERVICE

ANTH 143	Human Evolution and Adaptation	3	Evolutionary and ecological approach to understanding the human species' past and contemporary human variation. Emphasis on evolutionary processes, biological adaptation, and biocultural interactions with diverse environments.	PL
ANTH 151	Anthropological Perspectives on Food and Culture	3	Anthropological perspectives on foodways. This course examines the biological basis of human diets as well as the historical and cultural contexts of food production, preparation, presentation, and consumption.	HS, FC-GLOBAL, FC-PAST
ANTH 194	Anthropology and Community Development	3	The course examines ethnographic, theoretical, practical, and policy approaches to community development and community organizations in America and the English-speaking Caribbean. Students can work with a local community organization.	US, FC-KNOWING, FC-VALUES
ANTH 237, ENEC 237	Food, Environment, and Sustainability	3	Explores the nexus of agricultural, ecological, and food systems as they dynamically interact. The class examines case studies from North Carolina and other parts of the world. Themes include nutrition, food security, agroecology, and sustainable livelihoods. Students engage in readings, class projects, and hands-on activities in a laboratory setting.	FC-KNOWING
ANTH 320	Anthropology of Development	3	Critical exploration of current debates in the anthropology of Third World development, the production of global inequality, and the construction of parts of the world as underdeveloped through discourses and practices of development.	SS, GL

ANTH 439	Political Ecology	3	Examines environmental degradation, hunger, and poverty through the lens of power relationships, particularly inequality, political and economic disenfranchisement, and discrimination. Discussion of global case studies, with a Latin American focus.	SS, CI, GL, FC-POWER
ANTH 540	Planetary Crises and Ecological and Cultural Transitions	3	Analysis of the social-environmental crisis and approaches to redress it, particularly those that posit ecological and cultural transitions beyond current globalization models. Participants will construct their own scenarios for transitions to sustainable and pluralistic societies. The course will have an in-built, collective research component. Intended for upper-division undergraduates.	GL
ANTH 60H	First-Year Seminar: Crisis & Resilience: Past and Future of Human Societies	3	Adopting a long view of human societies, students examine responses to crises engendered by political, economic, and environmental factors. Perspectives on societal change - apocalyptic, transformational, and resilient - undergo scrutiny.	HS, BN, CI, FY-SEMINAR
BIOL 201	Ecology and Evolution	4	Principles governing the ecology and evolution of populations, communities, and ecosystems, including speciation, population genetics, population regulation, and community and ecosystem structure and dynamics. Three lecture hours and one recitation-demonstration-conference hour a week. Honors version available	PL, QI

BIOL 217	The Physician's Garden	3	First-year transfer students only. This course combines human cell biology and classical botany elaborating the mode of action of plant metabolites in humans. Hands-on experience includes visits to a pharmaceutical company, a botanical garden, and maintaining the campus medicinal garden.	
BIOL 221	Seafood Forensics	3	In this Course-based Undergraduate Research Experience (CURE) class, students will use forensic sciences (primarily DNA barcoding technology) to quantify seafood mislabeling. Students will learn the importance of food labeling as well as its impact on marine ecosystems and human health.	RESEARCH
BIOL 256, ENEC 256	Mountain Biodiversity	4	Introduction to the new field of biodiversity studies, which integrates approaches from systematics, ecology, evolution, and conservation. Taught at off-campus field station.	
BIOL 272, ENEC 272	Local Flora	4	Open to all undergraduates. North Carolina's flora: recognition, identification, classification, evolution, history, economics, plant families, ecology, and conservation. Three lecture and three laboratory hours per week.	PX
BIOL 350, MASC 401, ENVR 417, GEOL 403	Oceanography	3	Required preparation, major in a natural science or two courses in natural sciences. Studies origin of ocean basins, seawater chemistry and dynamics, biological communities, sedimentary record, and oceanographic history. Term paper. Students lacking science background should see MASC 101. Students may not receive credit for both MASC 101 and MASC 401.	

BIOL 452, MASC 446	Marine Microbial Symbioses: Exploring How Microbial Interactions Affect Ecosystems and Human Health	3	Course material covers host-microbe and microbe-microbe interactions found in marine ecosystems, including beneficial and parasitic relationships among viruses, microbes, marine animals, and humans. Limited to upper-level undergraduate science majors and graduate students.	PL
BIOL 456, MASC 444, ENEC 444	Marine Phytoplankton	3	Permission of the instructor. For junior and senior science majors or graduate students. Biology of marine photosynthetic protists and cyanobacteria. Phytoplankton evolution, biodiversity, structure, function, biogeochemical cycles and genomics. Harmful algal blooms, commercial products, and climate change. Three lecture/practical session hours per week.	
BIOL 457, MASC 442	Marine Biology	3	Recommended preparation, BIOL 201 or 475. A survey of plants and animals that live in the sea: characteristics of marine habitats, organisms, and the ecosystems will be emphasized. Marine environment, the organisms involved, and the ecological systems that sustain them.	PL
BIOL 462, MASC 440	Marine Ecology	3	Survey of the ecological processes that structure marine communities in a range of coastal habitats. Course emphasizes experimental approaches to addressing basic and applied problems in marine systems.	PL
BIOL 464	Global Change Ecology	3	Responses of plants, animals, and communities to climate and other global changes, emphasizing ecology, physiology, behavior, and evolution. Investigation of past responses and tools for predicting future responses.	

BIOL 465	Global Biodiversity and Macroecology	3	We will explore global patterns of diversity of plants, animals, fungi, and microbes, and the insights gained by taking a statistical approach to describing these and other broad-scale ecological patterns.	
BIOL 53	First-Year Seminar: Biotechnology: Genetically Modified Foods to the Sequence of the Human Genome	3	Restricted to first-year students. Introduction, in a first-year seminar, to recent advances in genetics and cell biology, and discussion and debate concerning how these advances are changing medicine, agriculture, and other aspects of our lives.	PL, FY-SEMINAR, FC-NATSCI
BIOL 561	Ecological Plant Geography	3	Description of the major vegetation types of the world including their distribution, structure, and dynamics. The principal causes for the distribution of plant species and communities, such as climate, soils, and history will be discussed.	
BIOL 562, ENEC 562	Statistics for Environmental Scientists	4	Introduction to the application of quantitative and statistical methods in environmental science, including environmental monitoring, assessment, threshold exceedance, risk assessment, and environmental decision making.	
BIOL 565	Conservation Biology	3	The application of biological science to the conservation of populations, communities, and ecosystems, including rare species management, exotic species invasions, management of natural disturbance, research strategies, and preserve design principles. Honors version available	

BUSI 507H	Sustainable Business and Social Enterprise	3	This course concentrates on sustainability in existing businesses of all sizes, rather than starting new entrepreneurial ventures. Students will learn what full triple bottom line sustainability means when applied to business and will explore how business fits into the sustainability landscape.	
COMM 82	First-Year Seminar: Food Politics from an Organizational Communication Perspective	3	This course provides an applied introduction to food politics by adopting a critical organizational communication lens on our globalized food system. We explore food system labor practices, the role of multinational companies and global commodity chains, the status of hunger and food deserts, the role of food marketing and consumption practices, and the growth of local and sustainable movements devoted to food justice.	SS, CI, EE- Service Learning, FY-SEMINAR, FC-POWER, HI-SERVICE
ECON 455	Environmental Economic Theory	3	A rigorous economic analysis of environmental issues, with particular emphasis on the problem of designing appropriate institutions and regulations under private information and the interaction between economic and ecological systems. Topics include emission fees and marketable permits, pollution models, carbon regulation, and ecosystem service markets.	
ENEC 201	Introduction to Environment and Society	4	Human-environment interactions are examined through analytical methods from the social sciences, humanities, and sciences. The focus is on the role of social, political, and economic factors in controlling interactions between society and the environment in historical and cultural contexts. Three lecture hours and one recitation hour a week. Honors version available	SS, GL, FY-LAUNCH, FC-GLOBAL, FC-POWER

ENEC 202	Introduction to the Environmental Sciences	4	Examines fundamental processes governing the movement and transformation of material and energy in environmental systems. Focuses on the role of these processes in environmental phenomena and how society perturbs these processes. Integrates methods from a range of scientific disciplines. Three lecture hours and three computer laboratory hours a week.	PX, FC-NATSCI, FC-LAB
ENEC 203	Introduction to Environmental Science Problem Solving	3	A quantitative introduction to selected topics in environmental sciences with an emphasis on developing and solidifying problem-solving skills.	FC-NATSCI, FC-QUANT
ENEC 204	Environmental Seminar	1-3	This course will provide an intellectual focus on the interface between environment and society by examining the relationship among science, policy, and actual management practices on a chosen topic.	
ENEC 210	Energy in a Sustainable Environment Seminar	1	This seminar series will provide a general introduction to energy sources, resources, technologies, and societal use from a sustainability perspective.	
ENEC 220, MASC 220	North Carolina Estuaries: Environmental Processes and Problems	3	Natural processes and human impacts on estuarine systems using the Neuse River estuary as a case study. Course includes one week of intensive field work based at the Institute of Marine Sciences. A student may not receive credit for this course after receiving credit for ENEC 222.	PX, EE- Field Work

ENEC 222	Estuarine and Coastal Marine Science	4	Introduction to the estuarine and coastal environment: geomorphology, physical circulation, nutrient loading, primary and secondary production, carbon and nitrogen cycling, benthic processes, and sedimentation. Consideration given to human impact on coastal systems with emphasis on North Carolina estuaries and sounds. Includes a mandatory weekend field trip and laboratory.	PL, QI
ENEC 241	Energy and Culture Seminar for the Thailand Field Site	1	This one credit hour course meets the semester before UNC students go to study abroad at the Institute for the Environment Thailand Field Site. The course will prepare students for the research portion of the program. Student should be applying to the field site when taking this course.	
ENEC 254, POLI 254	International Environmental Politics	3	Covers the politics of environmental issues, with a focus on issues that have become internationalized. It focuses on the special problems that arise in creating rules for environmental management and regulation when no single government has authority to enforce those rules.	SS, GL
ENEC 259	Coral Reef Ecology and Management	1	The course familiarizes students with the natural history, ecology, and physical and chemical characteristics of the coral reef environment. Policy and management issues are also examined.	EE- Field Work
ENEC 264, GEOG 264	Conservation of Biodiversity in Theory and Practice	3	This course will give students a multidisciplinary introduction to growing field of biodiversity preservation.	

ENEC 304	Restoration Ecology	4	Explores ecological theory and its application to the restoration of terrestrial, aquatic, and marine ecosystems. Requires 30 hours of service to a local restoration project in which students will collect ecological data for a final case study project.	EE- Service Learning, EE- Mentored Research
ENEC 307	Energy and Material Flows in the Environment and Society	3	Examines regional to global scale flow of materials and energy through materials extractions, processing, manufacturing, product use, recycling, and disposal, including relevance to policy development. Reviews natural cycles, basic physics, and technology of energy production.	
ENEC 309	Environmental Values and Valuation	3	Introduction to the methods for assigning value to aspects of the environment and to interhuman and human-environment interactions. The approach is interdisciplinary, drawing on methods from philosophy, ecology, psychology, aesthetics, economics, religion, etc. Online course.	SS
ENEC 324, GEOL 324	Water in Our World: Introduction to Hydrologic Science and Environmental Problems	3	This introductory course will cover two broad themes: the physical processes of the hydrologic cycle and how human use (and abuse) of freshwater resources can lead to major environmental problems. PX credit for ENEC/GEOL 324 + 324L. PL credit for ENEC/GEOL 324.	PX, FC-NATSCI
ENEC 325	Water Resource Management and Human Rights	1-4	This course explores logistical, political, social, and economic challenges in supplying every human with adequate access to clean water, the most basic human right. Honors version available	PH, GL, FC-POWER, FC-VALUES

ENEC 330, PLAN 330	Principles of Sustainability	3	This course introduces students to theories, principles, and measurement of sustainability. It also provides an overview of sustainability in national and international contexts.	SS, GL
ENEC 350	Environmental Law and Policy	3	This course gives students an overview of environmental law and some practical experience in environmental policy making.	FC-VALUES
ENEC 351	Coastal Law and Policy	3	The utilization of common coastal resources, the management of fisheries, and coastal zone management guide an examination of coastal laws, policies, and regulations at the federal, state, and local levels. Taught at off-campus field station.	
ENEC 352, MASC 352	Marine Fisheries Ecology	3	Gives students a foundation in population biology and the ecological processes that influence populations of economically important fish and shellfish. Students will gain practical quantitative skills including statistical analyses, model development, and data visualization. Familiarity with introductory statistics concepts is preferred but not necessary.	
ENEC 368, PHIL 368	Living Things, Wilderness, and Ecosystems: An Introduction to Environmental Ethics	3	The meaning of environmental values and their relation to other values; the ethical status of animals, species, wilderness, and ecosystems; the built environment; environmental justice; ecofeminism; obligations to future generations.	PH, GL, FC-VALUES
ENEC 370	Agriculture and the Environment	3	Introduction to the ecology of agricultural practices and the impact of food production on the environment. Particular attention will be paid to the constraints on agriculture which must be overcome to feed the planet's growing population. Honors version available	

ENEC 372, PLCY 372	Global Environment: Policy Analysis and Solutions	3	Explores linkages among nations, global environmental institutions, and the environmental problems they cause and seek to rectify. Introduces pressing challenges of the global environment such as China and India's energy and climate policies, the environmental impacts of coal, nuclear energy, shale gas and fracking, and marine pollution. Discusses perspectives of nations, the role of financial markets and NGOs, and the international community involved in crafting policy solutions.	SS
ENEC 380	Environmental Economics	3	This course develops a set of core principles that are essential to understand and evaluate environmental policy and renewable resource use. These principles are primarily economic, but our discussion will also include insights from politics and ethics.	SS
ENEC 393	Internship in Sustainability	3	Permission of the instructor. This course provides an internship with an organization on sustainability topics and public engagement. Pass/Fail only.	EE- Academic Internship, HI-INTERN
ENEC 395	Research in Environmental Sciences and Studies for Undergraduates	1-3	Permission of the instructor. Research in an area of environmental science or environmental studies.	EE- Mentored Research, RESEARCH
ENEC 396	Directed Readings	1-4	Permission of the instructor. A specialized selection of readings from the literature of a particular environmental field supervised by a member of the Carolina Environmental Faculty group. Written reports on the readings or a literature review paper will be required. Cannot be used as a course toward the major.	

ENEC 403, ENVR 403	Environmental Chemistry Processes	3	Required preparation, a background in chemistry and mathematics, including ordinary differential equations. Chemical processes occurring in natural and engineered systems: chemical cycles; transport and transformation processes of chemicals in air, water, and multimedia environments; chemical dynamics; thermodynamics; structure/activity relationships.	
ENEC 405	Mountain Preservation	4	Introduces students to approaches used to preserve the natural and cultural heritage of the Southern Appalachians. Taught at off-campus field station.	
ENEC 415, GEOL 415, MASC 415	Environmental Systems Modeling	3	This course explores principles and strategies for studying environmental phenomena, and presents methods for developing explanatory and predictive models of environmental systems, e.g., predator-prey, estuaries, greenhouse gases, and ecosystem material cycles.	
ENEC 420, PLAN 420	Community Design and Green Architecture	3	The impact of building on the environment and health will be examined by looking at the major areas of: land use planning, water resource use, energy, materials and indoor environment.	
ENEC 431	Sustainable Cities: Exploring Ways of Making Cities More Sustainable	3	Recommended preparation, ENEC 330. For the first time in history, a majority of the world's people live in cities with huge implications for sustainability. Students will examine the factors driving the trend toward urbanization worldwide, the challenges posed by this trend, and the efforts by cities to become more sustainable.	

ENEC 433, MASC 433	Wetland Hydrology	3	Study of wetland ecosystems with particular emphasis on hydrological functioning, the transition from terrestrial to aquatic systems, wetlands as filtration systems, and exchange between wetlands and other environments.	
ENEC 441, MASC 441	Marine Physiological Ecology	3	This course introduces students to the physiological, morphological, and behavioral factors employed by marine organisms to cope with their physical environment. Emphasis will be placed on the response of marine organisms to environmental factors such as seawater temperature, light, water salinity, ocean acidification, etc.	
ENEC 448, MASC 448	Coastal and Estuarine Ecology	4	A field-intensive study of the ecology of marine organisms and their interactions with their environment, including commercially important organisms. Laboratory/recitation/field work is included and contributes two credit hours to the course.	
ENEC 450, GEOL 450, MASC 450	Biogeochemical Processes	4	Principles of chemistry, biology, and geology are applied to analysis of the fate and transport of materials in environmental systems, with an emphasis on those materials that form the most significant cycles. Three lecture hours and one laboratory hour a week.	PL
ENEC 461, BIOL 461	Fundamentals of Ecology	4	Students will develop a comprehensive understanding of the field of ecology, including modern and emerging trends in ecology. They will develop literacy in the fundamental theories and models that capture ecological processes; emphasis will also be placed on the relevance of ecology and ecological research for human society.	

ENEC 462	Ecosystem Management	3	Explores the ecological concepts underlying ecosystem management (e.g., genetic and species diversity, stability, resilience, landscape ecology, etc.), the tools used in the approach, and case studies of how communities are implementing ecosystem management.	
ENEC 471, MASC 471	Human Impacts on Estuarine Ecosystems	4	A cohesive examination of the human impacts on biological processes in estuarine ecosystems. Laboratory/recitation/field work is included and contributes two credit hours to the course. Taught at off-campus field station.	EE- Field Work
ENEC 474	Sustainable Coastal Management	3	This course explores the environmental history of the Albemarle estuary and its larger watershed and explores ways in which humans can utilize this region in a more sustainable manner. Taught at off-campus field station.	
ENEC 475H, PLCY 475H	The Political Economy of Food	3	This course examines the political and economic dimensions of the food we eat, how it is produced, who eats what, and related social and environmental issues, both domestic and international, affecting the production, pricing, trade, distribution, and consumption of food.	SS, GL
ENEC 479	Landscape Analysis	3	This course utilizes GIS, GPS, and remote sensing technologies to gather data on geology, watersheds, soils, integrated moisture indices. The class also develops habitat maps and derives species diversity indices. Taught at off-campus field station.	EE- Field Work
ENEC 481	Energy Economics	3	This course develops a core set of principles to understand and evaluate energy markets, policies, and regulations. Topics include oil markets, electric vehicles and CAFÉ standards, pollution permit markets and CO2 regulations, and electricity markets.	SS

ENEC 482	Energy and the Environment: A Coastal Perspective	3	Explores coastal and offshore energy issues, including energy demand, present-day and innovative sources of energy to meet that demand, economics, policy, and environmental and human health outcomes of different energy sources. Summer session only; online and field trip hybrid course, with a mandatory 8-day field site component on the Outer Banks. Housing and field activities arranged by the instructor, which will carry a fee. Taught at off-campus field station.	EE- Field Work
ENEC 485	Coastal Resource Economics and Policy	1-4	This course develops and applies core principles essential to understanding and evaluating coastal environmental policy and renewable resource use. The principles include the economics of pollution, public choice, information and cost-benefit analysis, property rights, incentive-based regulation, and the economics of renewable resources. Includes insights from politics and ethics. Taught at off-campus field station.	
ENEC 489	Ecological Processes in Environmental Systems	4	Principles of analysis of the structure and function of ecosystems are applied to environmental phenomena. The link between the biosphere and other environmental compartments is explored through case studies of environmental issues. Three lecture hours and one laboratory hour a week. Taught at off-campus field station.	
ENEC 490	Special Topics in Environmental Science and Studies	1-12	Advanced topics from diverse areas of environmental science and/or environmental studies are explored. Honors version available	

ENEC 492	Social Science Research Methods	3	Students learn quantitative, qualitative, and mixed methods research skills and their application to public policies and management of natural resources.	SS, EE- Mentored Research
ENEC 493	Environmental Internship	1-4	Permission of the instructor. This course provides an internship with an organization related to environmental sciences or studies. Pass/Fail only.	EE- Academic Internship, HI-INTERN
ENEC 547, PLAN 547	Energy, Transportation, and Land Use	3	This course explores the reciprocal connections between energy (production/conversion, distribution, and use), land use, environment, and transportation. Evaluation of federal, state, and local policies on energy conservation and alternative energy sources are emphasized. Students gain skills to analyze impacts, interdependencies, and uncertainties of various energy conservation measures and production technologies.	
ENEC 567	Ecological Analyses and Application	3	This course provides an overview of natural and social science approaches to addressing biodiversity conservation and resource management. Concepts and methods from population biology, evolutionary ecology, community ecology, and conservation biology will be complemented with approaches from common property theory, indigenous resource management, and human evolutionary ecology.	
ENEC 569	Current Issues in Ecology	3	Required preparation, previous course work in ecology. Permission of the instructor. Topics vary but focus on interdisciplinary problems facing humans and/or the environment. May be repeated for credit.	

ENEC 593	Environmental Practicum	1-3	Permission of the instructor required. Students receive service-learning credit through active participation in a community, campus, or other approved group project.	EE- Academic Internship, HI-INTERN
ENEC 641, PLAN 641	Watershed Planning	3	This course explores the functions of ecosystems, land development activities that impact such functions, and the land use management tools to create strategies for mitigating and restoring environmental damage. Course goals include understanding the ecological context of planning and how ecological principles may inform planning decisions. Prepares planners to engage effectively with biologists, natural resource managers, park managers, and other professionals from the natural sciences.	
ENEC 693H	Honors Research in Environmental Sciences and Studies	3	Permission of the director of undergraduate studies. First of two course sequence leading to the honors designation.	EE- Mentored Research, RESEARCH
ENEC 694H	Honors Project in Environmental Sciences and Studies	3	Permission of the director of undergraduate studies. Independent project leading to the honors designation. Includes weekly research seminar.	EE- Mentored Research, RESEARCH
ENEC 698	Capstone: Analysis and Solution of Environmental Problems	3	Interdisciplinary, team-based analyses of environmental phenomena are performed and applied to problems of the selection of effective environmental strategies. Students may select from a wide range of examples and venues.	EE- Mentored Research

ENVR 205	Engineering Tools for Environmental Problem Solving	3	Introduction to mass, energy, and momentum transport applied to environmental problem solving. Students ask and answer policy-oriented questions (define systems, document assumptions, explain the value and limitations of quantitative answers). They will apply these tools to the design of engineered solutions and characterization of natural and perturbed systems.	PL, CI, QI
ENVR 230	Environmental Health Issues	3	Examines key events that have shaped our understanding of the impacts of environmental agents on human health and uses them to introduce basic concepts in environmental health.	
ENVR 296	Readings in Environmental Sciences and Engineering	1-9		
ENVR 404	Life Cycle Assessment: Energy and the Environment	3	A systems approach to dealing with environmental pollution problems is highlighted and Life Cycle Assessment (LCA) is introduced as an assessment tool. Topics include basic environmental interactions; biogeochemical cycles and environmental impacts (global, regional, and local); and application of LCA to waste management and energy conversion systems; are addressed.	
ENVR 412	Ecological Microbiology	3	Required preparation, one course in general microbiology. A description of microbial populations and communities, the environmental processes they influence, and how they can be controlled to the benefit of humankind.	

ENVR 416	Aerosol Physics and Chemistry	4	Permission of the instructor for nonmajors. Physical and chemical principles underlying behavior of particles suspended in air. Topics include rectilinear and curvilinear motion of the particles in a force field, diffusion, evaporation, and condensation, electrical and optical properties, and particle coagulation. Three lecture hours a week and two laboratory sessions.	
ENVR 421	Environmental Health Microbiology	3	Required preparation, introductory course in microbiology or permission of the instructor. Presentation of the microbes of public health importance in water, food, and air, including their detection, occurrence, transport, and survival in the environment; epidemiology and risks from environmental exposure. Two lecture and two laboratory hours per week.	
ENVR 430	Health Effects of Environmental Agents	3	Required preparation, basic biology, chemistry through organic, calculus. Permission of the instructor for students lacking this preparation. Interactions of environmental agents (chemicals, infectious organisms, radiation) with biological systems including humans, with attention to routes of entry, distribution, metabolism, elimination, and mechanisms of adverse effects. Three lecture hours per week.	
ENVR 442, BIOC 442, TOXC 442	Biochemical Toxicology	3	Required preparation, one course in biochemistry. Biochemical actions of toxicants and assessment of cellular damage by biochemical measurements. Three lecture hours per week.	

ENVR 451	Elements of Chemical Reactor Engineering	3	Focuses on chemical reaction rates and reaction mechanisms. Covers mole balances, rate laws, chemical kinetics, and reactor design. Principles are applied to any environmental system where chemical transformations must be described. Three lecture hours per week.	
ENVR 453	Groundwater Hydrology	3	Required preparation, math through differential equations and some familiarity with fluid mechanics. Conservation principles for mass, momentum, and energy developed and applied to groundwater systems. Scope includes the movement of water, gas, and organic liquid phases, the transport and reaction of contaminants. Three lecture hours per week.	
ENVR 468, ENEC 468	Temporal GIS and Space/Time Geostatistics for the Environment and Public Health	3	Reviews geographical information systems (GIS). Covers geostatistics theory for the interpolation of environmental and health monitoring data across space and time. Uses publicly available water and air quality monitoring data to create maps used for environmental assessment, regulatory compliance analysis, exposure science, and risk analysis.	
ENVR 470, ENEC 470	Environmental Risk Assessment	3	Required preparation, one course in probability and statistics. Use of mathematical models and computer simulation tools to estimate the human health impacts of exposure to environmental pollutants. Three lecture hours per week.	

ENVR 475	Global Climate Change: Interdisciplinary Perspectives	1	This class addresses the complexity and importance of global climate change from several disciplines. A top expert will lecture each week, addressing several themes including the science of human influences on climate, impacts and adaptation, global energy and technology, communication, and economics and international solutions. Pass/Fail only.	
ENVR 500	Environmental Processes, Exposure, and Risk Assessment	3	Environmental chemical and biological transport and transformation, exposure to environmental contaminants, and environmental risk assessment.	
ENVR 520, MASC 504, BIOL 657	Biological Oceanography	4	For graduate students; undergraduates need permission of the instructor. Marine ecosystem processes pertaining to the structure, function, and ecological interactions of biological communities; management of biological resources; taxonomy and natural history of pelagic and benthic marine organisms. Three lecture and one recitation hours per week. Two mandatory weekend fieldtrips.	PL
ENVR 570	Methods of Environmental Decision Analysis	3	Required preparation, one course in probability and statistics. Use of quantitative tools for balancing conflicting priorities (such as costs versus human health protection) and evaluating uncertainties when making environmental decisions.	

ENVR 575	Global Climate Change: Science, Impacts, Solutions	3	This class addresses the importance of climate change in its entirety. The first half of the course addresses climate science, followed by climate change impacts, energy and mitigation technologies, economics, and international politics. Improving communication and quantitative skills is emphasized through homework, in-class presentations, and a research paper.	
ENVR 580	Policy Design for Environmental Health Solutions	3	Students will be introduced to the types of policy instruments that can be used to solve environmental health problems. The course provides a framework for understanding the tasks involved, the main institutions responsible, and an in-depth description of the policy instruments used to tackle environmental health problems.	
ENVR 582	Sanitation for Development	3	Over a million children die yearly from diarrhea, in part because 2.0 billion humans do not have access to a basic toilet. This course presents the problems and context of inadequate sanitation in the developing world, and, more importantly, the types of solutions and approaches available to reduce these problems.	PL, GL
ENVR 593	Undergraduate Practicum in Environmental Health Sciences	1-3	A practical experience in a setting relevant to environmental health.	EE- Academic Internship
ENVR 600	Environmental Health	3	This course examines the relationship between environmental quality, human health and welfare, with particular attention to contamination in human environment; physical, biological, and social factors; trade-offs regarding prevention and remediation measures. Satisfies core School of Public Health requirement. Three lecture hours per week.	

ENVR 601	Epidemiology for Environmental Scientists	3	An introduction to relevant epidemiologic concepts that inform environmental science research. Learning objectives include discussing basic epidemiologic concepts and measures of disease occurrence in populations, explaining epidemiological study designs for studying associations between risk factors or exposures in populations, evaluating epidemiologic evidence, and comprehending basic ethical principles.	
ENVR 610	Global Perspectives on Environmental Health Inequalities	3	Students will learn about how social, economic, and political factors impact environmental health outcomes and will be introduced to theories and methods for incorporating social determinants frameworks into environmental health research, as well as the role of environmental justice movements.	
ENVR 630	Systems Biology in Environmental Health	3	Required preparation, one year of biology. Environmental systems biology examines how environmental stressors influence the components of a biological system, and how the interactions between these components result in changes in the function and behavior of that system.	
ENVR 640	Environmental Exposure Assessment	3	Permission of the instructor for nonmajors. The course material introduces the general concepts of assessing environmental exposures to chemicals in human populations. This includes the design of ecologic and personal monitoring studies, the techniques and equipment used for sampling and analysis, and interpretation of data.	

ENVR 650	Principles of Chemical Carcinogenesis	2	Required preparation, organic chemistry. Bioactivation of carcinogens, interaction of activated metabolites with DNA, and their effects on DNA structure, replication, repair, and the control of these processes during development of chemically induced carcinogenesis. Two lecture hours per week.	
ENVR 672	Environmental Physics II	3	Second part of a graduate-level sequence in physical principles relevant to environmental systems. Topics include turbulence, conservation of energy, multiscale methods, and thermodynamics. Applications are considered from natural and engineered systems and across all relevant media. Focus is on development of mechanistic representation of environmental systems.	
ENVR 675	Air Pollution, Chemistry, and Physics	3	This class is designed for graduate students planning for research in air pollution, emphasizing chemical kinetics and engineering approaches to problem solving in addition to atmospheric structure, meteorology, and modeling. We address problems of stratospheric and tropospheric ozone, particulate matter, and acid rain. We emphasize quantitative problem solving in homework.	
ENVR 684	Water-Health Research II	2	Permission of the instructor for undergraduates and nonmajors. Familiarizes students with the principles of scientific communication with an emphasis on scientific writing and oral presentations. Using their own water and health research, students learn how to communicate effectively in informal settings and how to prepare for interviews with the media.	

ENVR 685, PLAN 685	Water and Sanitation Planning and Policy in Less Developed Countries	3	Permission of the instructor. Seminar on policy and planning approaches for providing improved community water and sanitation services in developed countries. Topics include the choice of appropriate technology and level of service, pricing, metering, and connection charges; cost recovery and targeting subsidies to the poor; water venting; community participation in the management and operation of water systems; and rent-seeking behavior in the provision of water supplies.	
ENVR 695	Undergraduate Research	1-3	Directed readings or laboratory study. Written reports are required. May be taken more than once for credit. Three to nine hours per week.	EE- Mentored Research
ENVR 698	Senior Capstone Course	3	This capstone course covers a range of issues in public health ethics, particularly focused on environmental health. Students will work on a team-based project over the course of the semester. The projects will be focused on topics that have ethical relevance and will integrate students' knowledge in environmental health.	EE- Mentored Research
ENVR 705, PUBH 705	One Health: Philosophy to Practical Integration	1-3	This course explores the intersection of human, animal, and environmental health and facilitates the understanding of health as an inexorably linked system requiring multidisciplinary collaborative efforts. The One Health concept demonstrates the importance of a holistic approach to disease prevention and the maintenance of human, animal, and environmental health.	

ENVR 755	Analysis of Water Resource Systems	3	Permission of the instructor for nonmajors. Use of mathematical models to design and evaluate regional water supply and treatment systems. Engineering and economic methods are incorporated into quantitative analyses of regional scenarios. Social and political aspects also discussed. Three lecture hours per week.	
ENVR 756	Physical/Chemical Treatment Processes	3	Principles of disinfection, oxidation, coagulation, precipitation, sedimentation, filtration, adsorption, ion exchange, and membrane processes; applications to water and wastewater treatment. Three lecture hours per week.	
ENVR 760	Uncertainty Quantification for Environmental Systems	3	Quantitative assessment of how uncertainty in mechanistic models (subsurface, ocean, atmosphere, global climate), parameters, and auxiliary conditions of a model is manifest in uncertainty in model predictions. Topics include: model formulations, statistical tools, Monte Carlo methods, moment methods, estimation methods, statistical simulation methods, reduced order models, and data assimilation approaches.	
ENVR 765	Space Time Exposure Mapping and Risk Assessment	3	Theory and MATLAB numerical implementation of linear geostatistics (simple/ordinary/universal kriging) and modern geostatistics (Bayesian Maximum Entropy) to map environmental and health processes varying across space and time. Applications in exposure assessment, environmental epidemiology, medical geography, and risk assessment.	

ENVR 770	Biological Monitoring	3	This course provides both practical and theoretical information on biological monitoring of chemical exposures and how to evaluate and interpret exposure data. Three lecture hours per week and a term paper (three credit hours).	
ENVR 773	Modeling Atmospheric Chemistry	3	Air pollution is formed through thousands of chemical reactions. Computer models are used to simulate this complex chemistry and used to make policy. Current computational restraints force a simplified representation of atmospheric chemistry in these models, and the focus of this course is the implications of this on predictions.	
ENVR 775	Global Climate Change: Interdisciplinary Perspectives	1	This class addresses the complexity and importance of global climate change from several disciplines. A top expert will lecture each week, addressing these themes: the science of human influences on climate; impacts and adaptation; global energy and technology; communication; and economics and international solutions.	
ENVR 787, PUBA 787, PLAN 787	Applied Environmental Finance: How to Pay for Environmental Services	3	How can governments, communities, organizations, and businesses fund environmental services? This applied course reviews the diverse tools and strategies that environmental service providers use to pay for programs. The course will focus on environmental services related to: drinking Water, wastewater, storm-water, watershed protection, energy efficiency, renewable energy, sustainability, and wetlands.	

ENVR 788	Managing Environmental Financial Risk	3	As society's exposure to environmental risks grows, it has become increasingly important to find innovative tools for mitigating these risks. This course is designed to introduce students to the fundamentals of financial risk management within an environmental context, with an emphasis on developing coupled environmental-financial systems models.	
ENVR 789	International Field Research	2	Course offers theoretical foundations in cultural sensitivity, personal security, communication, organization and research along with guided practical exercises in conducting international field research. The result is the development of cross-cultural and applied research skills that prepare the student to conduct successful field research.	
ENVR 890	Problems in Environmental Sciences and Engineering	1-21	For students who wish to undertake individual or special topics study of a specific problem in environmental sciences and engineering. The subject and requirements of the project are arranged with the faculty in each individual instance. One or more hours per week. Permission of the department.	
ENVR 981	Environmental Sciences Practicum	1-9	A practical experience in public health/environmental health sciences.	
ENVR 991	Research in Environmental Sciences and Engineering	1-9	Consultation with the faculty and approval of subject and proposed program required. Permission of the instructor. May be repeated. Hours and credits to be arranged.	
ENVR 992	Master's Technical Report	3	The technical report requirement for M.S.P.H., M.P.H., and M.S.E.E. candidates is satisfied by the extensive study of a problem in environmental sciences and engineering.	

GEOG 110	The Blue Planet: An Introduction to Earth's Environmental Systems	3	Emphasizes geographic patterns and interrelationships in energy, climate, terrain, and life. Develops integrative view of how atmospheric, hydrologic, geomorphic, and biotic processes create global patterns in the environment. Incorporates influence of human activities on earth. Class will help students understand the natural environment, both globally and in North Carolina. Honors version available	PL
GEOG 111	Weather and Climate	3	An introduction to the nature and causes of weather variability and climate change and their impact on human activity. No laboratory. (Core)	PL, FC-NATSCI
GEOG 115	Maps: Geographic Information from Babylon to Google	3	Introduces the science and art of map making and will lay the conceptual foundation necessary to understand how and why maps are made and used.	
GEOG 120, PWAD 120	World Regional Geography	3	A survey of the geographic structure of human activity in major world regions and nations. Emphasizes current developments related to population, urbanization, and economic activity. (Core)	SS, GL, FC-POWER
GEOG 121	Geographies of Globalization	3	This course examines places and the connections between places to build critical understandings of the role of human geographies in global economic, political, social, and cultural systems. (Core)	SS, GL, FC-GLOBAL, FC-POWER
GEOG 123	Cultural Geography	3	How population, environment, and human culture is expressed in technology and organization interact over space and time. (GHA)	SS, FC-KNOWING, FC- POWER

GEOG 130	Development and Inequality: Global Perspectives	3	An introduction to historical and contemporary ideas about practices and meanings of development. Students will explore "development" in a global landscape of poverty, power, and struggles over inequality. Honors version available	SS, GL, FY-LAUNCH, FC-GLOBAL, FC-POWER
GEOG 210, GLOBL 210, ANTH 210, HIST 210, POLI 210	Global Issues and Globalization	3	Survey of international social, political, and cultural patterns in selected societies of Africa, Asia, America, and Europe, stressing comparative analysis of conflicts and change in different historical contexts. LAC recitation sections offered in French, German, and Spanish.	GL, FC-GLOBAL, FC-POWER
GEOG 212	Environmental Conservation and Global Change	3	Survey of environmental change as driven by physical processes and human activity. Problem-solving methods are explored. Focus on issues such as global warming, ozone depletion, deforestation, extinction, pollution, wetland loss. This course will provide significant background in physical geography in the context of today's most pressing environmental concerns and with reference to the societal implications and management strategies. (No lab.) (Core)	PL, GL, FC-GLOBAL, FC-NATSCI
GEOG 225, WGST 225	Space, Place, and Difference	3	Gender, race, and class are examined in terms of the spatial patterns of everyday life, regional patterns, and global patterns. (GHA)	SS
GEOG 228	Urban Geography	3	Explores the evolution, patterns, and processes of urbanization and the development of cities and city systems. Emphasis on the origin, growth, and spatial distribution of cities and on the internal spatial organization of activities within cities. (GHA)	SS, FC-POWER, FC-VALUES

GEOG 230	The World at Eight Billion	3	Approximately eight billion people live on the Earth. How did we get here? What have been the consequences for us and the planet? What will the future bring? To answer these questions, we will draw on population and human-environment geography and on an abundance of new data sources.	SS, GL
GEOG 232	Agriculture, Food, and Society	3	A study of environmental parameters, cultural preferences, technological developments, and spatial economic infrastructure that result in world patterns of food consumption, production, and distribution. (GHA)	SS, FC-PAST, FC-VALUES
GEOG 259	Society and Environment in Latin America	3	This survey course examines political, cultural, and biophysical dimensions of human- environment relations across the ecologically diverse and historically rich region of Latin America. It draws on multiple data sources, perspectives, and media to explore sub-regions and their biocultural histories, including the Caribbean, Andes, Amazon, Central and North America, and their relationship with the United States.	SS, BN, FC-GLOBAL, FC-POWER
GEOG 262	Geography of North Carolina	3	A survey of the cultural, economic, and physical diversity of North Carolina. Emphasizes regional patterns, historical changes, and the appearance of the landscape. (Regional)	NA
GEOG 267, ASIA 267	South Asia	3	Introduces students to the geography of South Asia, including an overview of the physical environment, cultural practices, and economic development. Emphasizes the political geography of South Asia and political and social processes such as nationalism and colonialism that have played a formative role in the region.	BN, FC-GLOBAL, FC-POWER

GEOG 269	Human-Environment Interactions in the Galapagos Islands	3	The Social and ecological implications of resource conservation and economic development in a World Heritage Site are examined in the Galapagos Islands of Ecuador.	PL, BN, FC-GLOBAL, FC-NATSCI
GEOG 270	Geography of Contemporary China	3	This course provides a systematic introduction to China as an emerging political and economic power. From a geographic perspective, this course addresses uneven human and physical landscapes, the historical evolution and current status of the natural environment, economic development, and human well being.	SS, GL
GEOG 410	Modeling of Environmental Systems	3	Uses systems theory and computer models to understand ecosystem energy and matter flows, such as energy flow in food webs, terrestrial ecosystem evapotranspiration and productivity, related to climate, vegetation, soils, and hydrology across a range of spatial and temporal scales.	QI, FC-NATSCI, FC-QUANT
GEOG 414	Climate Change	3	An investigation of the scientific basis of climate change (past, present, and future), the current state of knowledge concerning future projections, and the implications of climate change for society and the environment.	FC-NATSCI, RESEARCH
GEOG 416	Applied Climatology: The Impacts of Climate and Weather on Environmental and Social Systems	3	Applied climatology involves the interdisciplinary application of climate data and techniques to solve a wide range of societal and environmental problems. This projects-based course investigates how climate impacts a range of sectors, including water resources, urban environments, ecosystems, and human health.	PL, FC-NATSCI, RESEARCH, COMMBEYOND

GEOG 428, PLAN 428	Global Cities: Space, Power, and Identity in the Built Environment	3	This course addresses questions of power, politics, and identity in the urban environment, with a focus on the emergence of key selected global cities and the processes that both created them historically and which are currently transforming them locally and globally.	FC-GLOBAL, FC-VALUES, RESEARCH
GEOG 429	Urban Political Geography: Durham, NC	3	An interdisciplinary exploration of urban social problems, bridging the literature on urban geography with that on urban politics. Students will be required to complete 30 hours of service for an organization that works on an urban social issue.	SS, EE- Service Learning, FC-POWER, FC-VALUES, RESEARCH, HI-SERVICE
GEOG 435	Global Environmental Justice	3	This advanced course brings geographical perspectives on place, space, scale, and environmental change to the study of environmental justice. In lectures, texts, and research projects, students examine environmental concerns as they intersect with racial, economic and political differences. Topics include environmental policy processes, environmental justice movements, environmental health risks, conservation, urban environments, and the role of science in environmental politics and justice. (GHA)	SS, GL, FC-GLOBAL, FC-POWER, RESEARCH
GEOG 437, ENEC 437	Social Vulnerability to Climate Change	3	How does climate change affect vulnerable human populations? We will attempt to answer a shared research question on this topic by reading the peer-reviewed literature and by conducting a semester-long data analysis project incorporating social and climate data from around the world. This is a course-based undergraduate research experience (CURE).	EE- Mentored Research, GL, FC-GLOBAL, RESEARCH

GEOG 440, GEOL 502	Earth Surface Processes	3	This course will focus on the processes of soil formation, erosion, and landform evolution with an emphasis on the interaction of geomorphic processes with surface hydrology and ecosystems. (EES)	PL
GEOG 441	Introduction to Watershed Systems	3	Introduction to hydrologic and geomorphic processes in watersheds as applied to problems in flood analysis, water quality, and interactions of hydrology and environmental sciences. Drainage networks, nested catchments, and distribution and controls of precipitation, evaporation, runoff, and groundwater flow. Includes local field trips. (EES)	PL, EE- Field Work
GEOG 444	Landscape Biogeography	3	This course is concerned with the application of biogeographical principles and techniques to the study of natural and human-modified landscapes. It includes local and extraregional case studies. (EES)	
GEOG 451, ENEC 451	Population, Development, and the Environment	3	Introduction to contemporary and historical changes in human population, international development, and the global environment and how these processes interact, drawing on population geography as an organizing framework. Previously offered as GEOG 450.	GL, FC-GLOBAL
GEOG 457	Rural Latin America: Agriculture, Environment, and Natural Resources	3	This course explores a systems and cultural-ecological view of agriculture, environment, natural resource, and rural development issues in Latin America. It serves as a complement to GEOG 458 Urban Latin America. (Regional)	FC-CREATE, FC-POWER, RESEARCH

GEOG 477	Introduction to Remote Sensing of the Environment	3	Covers fundamental theory and mechanics of remote sensing, related theoretical aspects of radiation and the environment, and remote-sensing applications relating to terrestrial, atmospheric, and marine environments. Hands-on experience for application and information extraction from satellite-based imagery through biweekly laboratory assignments. Prepares students for GEOG 577. (GISc)	FC-QUANT
GEOG 803	Research Seminar in Nature-Society Studies and Human-Environment Interactions	3	An in-depth seminar devoted to contemporary faculty research topics in nature-society studies and human-environment interactions. Topics and instructors vary.	
GEOG 811	Seminar/Readings in Earth System Science and Biophysical Geography	3	An in-depth seminar devoted to contemporary readings in earth system science and biophysical geography. Topics and instructors vary.	
GEOG 813	Seminar/Readings in Nature-Society Studies and Human-Environment Interactions	3	An in-depth seminar devoted to contemporary readings in nature-society studies and human-environment interactions. Topics and instructors vary.	
GEO 103, MASC 101	The Marine Environment	3	Introduction to marine sciences emphasizing physical, chemical, biological, and geological phenomenon in oceanic and coastal environments. Human use of, and impact on, marine resources. Science majors should take MASC 401. Students may not receive credit for both MASC 101 and MASC 401.	PL, FC-NATSCI
GEO 108, MASC 108, PHYS 108	Climate and Energy Transitions: Understanding the Forecasts	4	This course examines uncertainties in projecting future fossil fuel consumption and impact on global climate by quantifying how effectively alternative power-generation and energy-storage technologies can scale to meet needs in developing and developed nations, and by understanding past and present climates.	PX, GL

GEOL 200	The Solid Earth	3	An introduction to the solid earth, and with GEOL 201 is an overview of earth systems for students continuing in geological, environmental, and other sciences. Topics include synthesis of the elements, formation of the solar system and earth, plate tectonics, earth materials, internal energy, magnetism, geochemical cycles, and earth resources.	PL, FC-NATSCI
GEOL 201	Earth's Surface: Processes, Landforms, and History	3	This course focuses on the biological, chemical, and physical processes that shape the surface of the earth. Major points of emphasis will include earth's climate, the global water cycle, geomorphic processes and the landforms they create, sedimentology and depositional environments, and elements of earth history recorded by earth surface processes.	PL
GEOL 202	Earth Systems History	3	Required preparation, one introductory geology course numbered below GEOL 202, except first-year seminar. History of the earth (including its oceans, atmosphere, and life forms) as deciphered from the geologic record. Birth of continents/oceans; evolution and extinction of life forms; the changing global environment.	PL, FC-NATSCI
GEOL 310, ENEC 310, MASC 316	Coastal Environmental Change	3	An exploration of the large-scale evolution of coastal environments, including relevance of geologic setting, wave and sediment transport processes, the evolution of beach and barrier island morphology, and issues of coastal environmental management.	

GEOL 315	Energy Resources	3	Required preparation, one geology course numbered below GEOL 202 or ENEC below 203, except first-year seminar. Considers the distribution, extraction, economics, and demand for mineral resources. Treats the impact of the mineral industry on industrial and preindustrial economies, economic factors, maldistribution and depletion of resources, and the environmental impact of the mineral extraction industry. Previously offered as GEOL 215.	PL
GEOL 406	Introduction to Geophysics	3	Introduction to the fundamentals of global geophysics: gravity, seismology, magnetism, heat, and plate tectonics. Both shallow and deep processes are considered. Emphasis is aimed at problem solving by applying concepts. Previously offered as GEOL 515.	
GEOL 432	Paleoclimatology	3	Introduction to mechanisms that drive climate. Examination of past climate reconstructions using ecological and geochemical proxies. Utility of computer models to reconstruct past climates and predict future climate change. Emphasis placed on late Quaternary.	
GEOL 433	Paleoceanography	3	Origin and distribution of pelagic sediments. Review of the major Mesozoic and Cenozoic events in the world oceans. Glacial/interglacial changes in the ocean/atmosphere system.	
GEOL 436	Geochemistry of Natural Waters	3	Required preparation, one introductory geology course. Survey of processes affecting the compositions of streams, lakes, the ocean, and shallow ground waters. Previously offered as GEOL 510.	QI

<p>GEOL 483, MASC 483</p>	<p>Geologic and Oceanographic Applications of Geographical Information Systems</p>	<p>4</p>	<p>Required preparation, four GEOL courses or permission of the instructor. Focus is on applying GIS concepts and techniques to mining and petroleum geology, resource assessment, hydrogeology, coastal and marine geology, physical oceanography, engineering geology, and a geologic perspective on land use. Three lecture and two laboratory hours a week.</p>	
<p>GEOL 503, MASC 503</p>	<p>Marine Geology</p>	<p>4</p>	<p>For graduate students; undergraduates need permission of the instructor. Investigates formation of the oceans, plate tectonics, carbonate reefs and platforms, sediment transport from the land to deep-sea fans, glacial-marine geology, marine records of changes in sea level and climate, and the evolution of barrier islands, estuaries, and deltas. Mandatory weekend field trip to the Southern Outer Banks.</p>	<p>PL</p>
<p>GEOL 508</p>	<p>Global Hydrology</p>	<p>3</p>	<p>An introduction to methodologies and instrumentation for quantifying the movement of water in the earth system focusing on components of the hydrologic cycle.</p>	
<p>GEOL 580</p>	<p>Evolution of Earth's Surface Environment</p>	<p>3</p>	<p>The course combines geology, climatology, hydrology, and soil science to explore the evolution of the surface environment of the earth from the Archean to the present, including the great oxidation event and modern ocean anoxia. Students will read research papers and will be encouraged to question and debate course topics.</p>	

GEOL 710, MASC 730, ENEC 710	Advanced Coastal Environmental Change	3	Focuses on biological-physical couplings that shape coastal environments (i.e. coastal 'ecomorphodynamics') and determine how these environments change with climate and land use. Environments include: barrier islands, open ocean coastlines, and tidal wetlands. Grading based on presentations, participation, and a research proposal.	
GEOL 72H	First-Year Seminar: Field Geology of Eastern California	3	This seminar provides a hands-on introduction to active geologic and environmental processes in eastern California, including active volcanoes, earthquake-producing faults, and extreme climate change.	PL, EE- Field Work, EE- Mentored Research, FY-SEMINAR
GEOL 76	First-Year Seminar: Energy Resources for a Hungry Planet	3	Discussions are centered on the most pressing issues of our time: environmental deterioration and construction of a sustainable (livable) world during and after the depletion of traditional energy resources.	PL, FY-SEMINAR
GEOL 77	First-Year Seminar: Volcanoes and Civilization: An Uneasy Coexistence	3	Volcanoes provide a breathable atmosphere, a habitable climate, and precious ores, but they have the potential to destroy civilization. This seminar will explore the uneasy coexistence of volcanoes and civilization.	PL, FY-SEMINAR
HBEH 610	Alternative Spring Break	2	This course will explore issues, theories, and experiences relevant to social action, coalition building, and social change. The content of this course will be examined by confronting the possibilities and limitations of service and service-learning as it relates to APPLES Alternative Spring Break experiences.	EE- Service Learning

HIST 63H	First-Year Seminar: Water, Conflict, and Connection: the Middle East and Ottoman Lands	3	Water has played pivotal roles in the histories, societies, and politics of Middle Eastern peoples. This course will survey the role of water in religious and cultural practices, technological innovations that facilitate agriculture, public health issues arising from water-borne diseases, and the contribution of water scarcity to cross-border political conflicts.	BN, GL, FY-SEMINAR
MASC 310	Our Changing Planet: Science, Social Impacts, Solutions	3	An overview of the scientific basis for global warming, current and future impacts on society, options for mitigation and adaptation, and the role of politics and the media.	PL
MASC 314	Earth Systems in a Changing World	3	This course presents an integrated view of our planet, how it evolved during the past, why it has changed (and continues to change), and what makes Earth a habitable planet.	FC-NATSCI
MASC 395	Undergraduate Research in Marine Sciences	1-3	Permission of a faculty research director. Directed readings with laboratory study on a selected topic.	EE- Mentored Research, RESEARCH
MASC 432	Major World Rivers and Global Change: From Mountains to the Sea	3	What are the linkages between rivers and global change? This course examines the hydrological, geological and biogeochemical processes that control material flux from land to the oceans via rivers.	
MASC 490	Special Topics in Marine Sciences for Undergraduates and Graduates	1-3	Directed readings, laboratory, and/or field study of marine science topics not covered in scheduled courses.	

MASC 505, ENVR 505, GEOL 505	Chemical Oceanography	4	Graduate students only; undergraduates must have permission of the instructor. Overview of chemical processes in the ocean. Topics include physical chemistry of seawater, major element cycles, hydrothermal vents, geochemical tracers, air-sea gas exchange, particle transport, sedimentary processes, and marine organic geochemistry. Three lecture and two recitation hours per week.	PL
MASC 51	First Year Seminar: Global Warming: Science, Social Impacts, Solutions	3	Students will examine evidence that human activity has caused global warming, investigate scientists' ability to predict climate change, and discuss the political and social dimensions of global climate change.	PL, QI, FY-SEMINAR
MASC 52	First-Year Seminar: Living with Our Oceans and Atmosphere	3	Modern theories of changing weather, severe weather events, oceanic hazards, interactions between the oceans and atmosphere, and changes that are linked to human activity.	PL, FY-SEMINAR
MASC 53	First-Year Seminar: The Ends of the Earth: Polar Oceanography and Exploration	3	What explains the "pull of the poles"? This seminar combines a modern survey of polar oceanography with historical views of early polar explorations, as reported by the explorers themselves.	PL, FY-SEMINAR
MASC 55	First-Year Seminar: Change in the Coastal Ocean	3	This course provides an opportunity to explore changes in marine and closely linked terrestrial environments caused by the interactions of fascinating oceanographic processes. Introductory presentations and discussions will focus on published works of active marine scientists who combine disciplinary training with knowledge and skills from other fields.	PL, FY-SEMINAR

MEJO 560, HBEH 660, HPM 550	Environmental and Science Journalism	3	Prepare students to work as environmental and science journalists. The course emphasizes writing skills in all delivery formats and interpreting environmental, science, and medical information for consumers. Honors version available	
MEJO 565, ENEC 565	Environmental Storytelling	3	An interdisciplinary course for students interested in environmental issues or journalism to produce stories about environmental issues that matter to North Carolinians. Students learn to identify credible sources, manage substantial amounts of information, and find story focus as they report on technical and often controversial subjects in a variety of media.	
NUTR 245	Sustainable Local Food Systems: Intersection of Local Foods and Public Health	3	Examines the intersection of local foods and public health with respect to nutrition and environmental, economic, and community issues. Students explore impacts and potential solutions of the increasingly industrialized and centralized food system, while assisting community partners to increase opportunities for farmers, local food marketers, distributors, and entrepreneurs.	EE- Service Learning
PHIL 165	Bioethics	3	An examination of ethical issues in the life sciences and technologies, medicine, public health, and/or human interaction with nonhuman animals or the living environment. Honors version available	PH, FC-VALUES
PHYS 131	Energy: Physical Principles and the Quest for Alternatives to Dwindling Oil and Gas	3	A quantitative exploration of the physical principles behind energy development and use within modern civilization, the stark impact of depleted fossil fuel reserves, and alternative sources.	PX, QI

PLAN 101	Cities and Urban Life	3	This course will introduce students to the topic of cities and urban life. Over 80% of the United States' population lives in cities or their suburbs, and over half of the world's population lives in urban areas. Studying cities and urban life is important to understanding how human societies have developed, how our households live and function, how our economies grow and innovate, how our culture develops and influences, and an array of other topics.	SS, US, FC-KNOWING, FC-POWER
PLAN 246	Cities of the Past, Present, and Future: Introduction to Planning	3	Introduction to the evolution of cities in history, to the concept of urban morphology or form, and to the different elements or subsystems of the urban system and how they have changed over time.	SS, FC-PAST
PLAN 247	Solving Urban Problems	3	Introduction to methods used for solving urban problems. Covers methods employed in subfields of planning to develop an ability to critically evaluate different techniques and approaches used within these disciplines.	SS,FC-VALUES, RESEARCH
PLAN 317	Introduction to Site Planning and Urban Design	3	This course examines site planning as a process of creating the built environment. A site planner considers many things, including site hydrology, topography, building form, access, and regulation. Students will review the theories of urban design that guide site planning, conduct a site analysis and propose a site plan.	
PLAN 636	Urban Transportation Planning	3	Fundamental characteristics of the urban transportation system as a component of urban structure. Methodologies for the analysis of transportation problems, planning urban transportation, and the evaluation of plans.	

PLAN 637	Public Transportation	3	Alternative public urban transportation systems including mass transit, innovative transit services, and paratransit, examined from economic, land use, social, technical, and policy perspectives.	
PLAN 638	Pedestrian and Bike Transportation	3	This graduate-level course examines the importance of multimodal transportation planning and provides a comprehensive overview of best planning practices to support increased walking and bicycling.	
PLAN 651	Urban Form and the Design of Cities	3	Lecture course on comparative urbanism and the global evolution of the city form. Examines values and ideals embedded in urban landscapes, seeking to understand how social, economic, and political forces have influenced the development of cities through history.	
PLCY 371, ENEC 371	Energy Policy	3	This course will provide an overview of some of the most challenging energy issues of the 21st century and will cover the tools and perspectives necessary to analyze those problems.	SS, FC-GLOBAL
PLCY 51	First-Year Seminar: The Global Environment in the 21st Century	3	This seminar explores linkages among nations, global environmental institutions, and the environmental problems they cause and seek to rectify. The course will examine how global environmental policy is made, with specific attention to the roles of institutions, nations, commercial and nonprofit entities.	GL, FY-SEMINAR, FC-GLOBAL
POLI 248, AMST 248, ENGL 248, WGST 249	Intersectionality: Race, Gender, Sexuality, and Social Justice	3	The first goal of this super course is to give students real tools for how to address multiple modes of difference and identity formations like race, gender, class, and sexuality.	CI, US, FC-POWER

SOCI 121	Population Problems	3	Social and economic causes of population structure and change. Illustrations drawn from developing countries and the less developed regions and sections of the United States.	SS
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