

Water-Related Coursework at ECU

ANTHROPOLOGY (ANTH)

2005. Environmental Anthropology (3) FC:SO)

Human adaptation to different environments from prehistoric to modern times.

BIOLOGY (BIOL)

1060. Environmental Biology (4) (F,S,SS) (FC:SC)

May not count toward BIOL major or minor. Interrelationships of organisms with each other and with their environment and human factors. Basic ecological problems, principles, and solutions.

1061. Environmental Biology Laboratory (1) (F,S) (FC:SC)

1 3-hour lab or field excursion per week. May not count toward BIOL major or minor. Optional lab or field course offered to provide a more in-depth look at habitats.

4320. Ecological Responses to Global Climate Change (3) (S)

P: BIOL 2250, 2251. Theory and practical examination of effects of climate change. Predicted and present environmental influences on ecosystems, communities, populations and organisms.

4300, 4301. Ecosystem Ecology (4,0) (WI) (F)

P: BIOL 2250, 2251. In-depth examination of ecosystem processes. Primary production, decomposition, and nutrient cycling as influenced by biotic and environmental controls in terrestrial, aquatic, and wetland ecosystems.

5220, 5221. Limnology (4,0)

3 lectures and 1 3-hour lab per week. P: BIOL 2250, 2251; or consent of instructor. Physical, chemical, and biological factors of inland waters and their influence on aquatic organisms.

5400. Wetland Ecology and Management (3)

P: BIOL 2250, 2251; or consent of instructor. Marshes, swamps, bogs, fens, and other intermittently flooded ecosystems. Emphasis on classification, ecosystem processes, structure, and management of freshwater and saltwater wetlands.

5401. Wetland Ecology Laboratory (1)

P: BIOL 2250, 2251; C: BIOL 5400. Application of methods to measure ecological properties, assess the functioning, identify plant communities, and understand landscape interaction of wetland ecosystems.

5750, 5751. Introduction to Regional Field Ecology (2,0) (5750:WI)

For science and environmental studies teachers. 20 hours of lecture and 32 hours of field trips. May not count toward MS in BIOL or molecular biology/biotechnology. Major regional ecosystems.

COASTAL AND MARINE STUDIES (COAS)

2150, 2151. Boating Skills and Seamanship (1,1)

C for 2150: COAS 2151; C for 2151: COAS 2150. Knowledge and skills needed to safely use a small boat, following the United States Coast Guard Auxiliary standards.

4000. Scientific Diving and Underwater Research Techniques (3) (F, S)

P: Basic SCUBA certification (or equivalent) and consent of instructor. Fundamentals of scientific diving, including the use of Nitrox, specialized diving equipment, emergency procedures, sampling techniques, and the history and policies related to scientific diving. Fee required.

4001. Scientific Diving and Underwater Research Techniques Lab (1) (S)

2 pool hours per week. P: Basic SCUBA certification (or equivalent) and consent of instructor. P/C: COAS 4000. Required confined water training for scientific diver certification.

4002. Scientific Diver Qualification (1) (SS)

P: Basic SCUBA certification (or equivalent), COAS 4000, 4001 (or equivalent), and consent of instructor. Required openwater training for scientific diver certification. Successful completion of this qualification, associated course, and lab may be used to meet American Academy of Underwater Sciences (AAUS) and ECU scientific diver certification requirements.

5000. Scientific Diving and Underwater Research Techniques (5)

4 lecture and 2 lab hours per week. P: Consent of instructor. Fundamentals of scientific diving, including the use of Nitrox, specialized diving equipment, emergency procedures, sampling techniques, and a review of basic scuba diving skills.

CONSTRUCTION MANAGEMENT (CMGT)

2700. Soils and Foundations (3)

2 lecture hours per week. P: Minimum overall GPA of 2.0; GEOL 1500, GEOL 1501; C: CMGT 2701. Fundamentals of soil mechanics as related to soil classification and construction of earthwork and foundations.

2950. Construction Surveying (3)

2 lecture hours per week. P: Minimum overall GPA of 2.0; CMGT 2600; C: CMGT 2951. Construction aspects of surveying with field and classroom exercises in use of transit, level, tape, and related surveying equipment. Problems and exercises in traverse closure and pipeline, grading, street, curve, and building layout.

ECONOMICS (ECON)

3855. Environmental Economics (3)

P: ECON 2133. Application of microeconomic analysis to environmental problems such as air and water pollution and formation of environmental policy.

4850. Resource Economics (3)

P: ECON 2133, 3144. Applies microeconomic analysis and benefit-cost analysis to problems of allocation of natural resources.

5170. Resources I (3)

P for undergraduate students: ECON 3144. Applies microeconomic analysis to study of allocation of natural resources.

ENGINEERING

ENGR 3034. Thermal and Fluid Systems (4)

3 lecture and 2 lab hours per week. P: ENGR 2450; P/C: MATH 2154. Ideal gas law; conservation of mass and energy in steady-state incompressible fluids; friction losses in a pipe; one-dimensional steady-state conduction; and convective heat transfer for simple geometries. Design, conduct, analysis, and interpretation of laboratory studies.

ENVE 3103. Water Quality (3)

2 lecture and 3 lab hours per week. P: CHEM 1160, CHEM 1161. Methods for determining and characterizing water quality, and an introduction to common chemical reactions occurring in natural and engineered water systems.

ENVE 3203. Water and Wastewater Treatment (3)

3 lecture hours per week. P: ENVE 3103. Engineering and design of physical, chemical and biological processes for the centralized treatment of drinking water and waste water to meet regulatory standards.

ENVE 4103. Engineering Surface Water Hydrology (4)

3 lecture hours per week. P: ENGR 3034. Calculation and numerical modeling of hydrologic processes used in water resources engineering, design, flood routing, and storm water management: precipitation, runoff, infiltration, evaporation, and transpiration.

ENVE 4203. Engineering Groundwater Hydrology (3)

2 lecture and 3 lab hours per week. P: ENGR 3034. Groundwater flow processes in engineering: modeling and design using calculus and differential equations applied to aquifer withdrawals, water supply projections, groundwater recharge, subsurface flow, contaminant transport, and groundwater remediation.

ENGLISH (ENGL)

3660. Literature and Film of Environmental Crisis (3) (WI)

P: ENGL 1100. Introduction to discursive and narrative representations of environmental crisis in various texts.

3820. Scientific Writing (3) (WI) (F,S)

P: ENGL 1200. Practice in assimilation and written presentation of scientific information.

ENVIRONMENTAL HEALTH (EHST)

2110, 2111. Introduction to Environmental Health Sciences and Laboratory (3,0) (F,S) 2 lecture and 2 lab hours per week.

Principles of environmental health practices along with lab and field techniques. Emphasis on air quality, safe water, food safety, industrial hygiene, radiation, vectors, and solid and hazardous waste disposal.

3060, 3061. Environmental Issues in Construction (4,0) (F,S)

3 lecture and 2 lab hours per week P: GEOL 1500, 1501. Comprehensive overview of environmental impact of construction processes, including legislative and regulatory requirements.

3350. Safe Water (4) (F)

P: BIOL 2110, 2111; CHEM 1160, 1161; C: EHST 3351. Fundamentals of safe water and principles of drinking water treatment and supply

ENVIRONMENTAL HEALTH CONT.

3351. Safe Water Laboratory (1) (F)
P: BIOL 2110, 2111; CHEM 1160, 1161; C: EHST 3350. Practical aspects of drinking water treatment and supply.
3370. Waste Water Management (3) (S)
P: EHST 3350, 3351; C: EHST 3371. Fundamentals of waste water production, collection, treatment, and safe disposal.
3371. Waste Water Management Laboratory (1) (S)
P: EHST 3350, 3351; C: EHST 3370. Practical aspects of waste water characteristics and safe disposal.
4010. Toxicological Foundations of Risk Assessment (3) (S)
P: BIOL 2130; CHEM 2650, 2651. Undesirable biological responses to physical and chemical agents. Mechanisms of action at the molecular, cellular, and organ levels.
4200. Environmental Health Management and Law (3) (WI) (S)
P: EHST major or minor. Processes involved in planning, facilitating, executing, evaluating, and controlling environmental health services.
- 5010, 5011. Principles of Toxicology and Laboratory (3,1)
For EHST majors but other majors accepted. P: Senior or graduate standing; 8 s.h. of general chemistry; 6 s.h. of biology, including BIOL 2130; or consent of instructor. Basics of toxicology such as physiological response and environmental sources as well as specifics of major toxins.
5020. Environmental Toxicology (3)
P: EHST 5010, 5011; or consent of instructor. Effect of anthropogenic and naturally occurring toxins on environment. Toxin sources, distribution, and bioaccumulation. Covers pesticides, metals, solvents, radioactive isotopes, food additives, air pollutants, and natural plant/animal toxins.
- 5800, 5801. Solid and Hazardous Waste Management and Laboratory (3,0)
2 lecture and 2 lab hours per week. P: CHEM 1160, 1161 or consent of instructor. Problems associated with collection, treatment, and disposal of municipal solid waste and hazardous wastes in the United States.

GEOGRAPHY (GEOG)

1250. The Water Planet (3) (F,S) (FC:SO)
Importance of water in natural world. Cultural, economic, and legal issues associated with human uses of water.
1300. Weather and Climate (4) (F,S,SS) (FC:SC)
Introductory survey of meteorology including weather and climate principles, processes, and patterns, at a variety of scales from local to global.
2300. Geography of Environmental Resources (3) (F)
May not count toward foundations curriculum social sciences requirement. Location and development of environmental resources at world and national levels.
2350. Climate Change: Science and Society (3) (FC:SO)
Explores societal aspects of climate change science, relevant social science debates, human adaptation, mitigation strategies, and international policy.

GEOGRAPHY CONT.

2400. Spatial Data Analysis (3) (F,S)

May not count toward foundations curriculum social sciences requirement. Foundation for data management and analysis in geographic information science. Introduces quantitative expressions common to geographic information science and descriptive and inferential spatial statistics.

2410. Fundamentals of GIS (3) (F,S) Formerly GEOG 3410.

May not count toward foundations curriculum social sciences requirement. Foundations for understanding and using geographical information systems. Emphasis on creation, visualization, and analysis of geographically referenced data.

2500. Map and Aerial Photo Interpretation (3) (F,S,SS)

4 lecture hours per week. May not count toward foundations curriculum social sciences requirement. Principles of map reading and aerial photo interpretation as information sources on natural and manmade environment.

3220. Soil Properties, Surveys, and Applications (3) (F)

Saturday field trip may be required. P: GEOG 2250. Physical and chemical properties of soil, soil-water relationships, soil-forming factors, county soil reports, and soil applications that involve land management decisions.

3230. Global Climates (3) (S)

May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 1065; or consent of instructor. Variation in global climates as related to atmospheric circulation patterns and processes.

3250. Environmental Hazards (3) (F)

May not count toward foundations curriculum social sciences requirement. P: GEOG 1300 or 2250. Various ways people and governments respond to natural and human-induced extreme events, human behavior in threatening or actual hazards, and public policies and programs designed to control or alleviate hazards.

3420. Remote Sensing of the Environment I (3) (F)

May not count toward foundations curriculum social sciences requirement. P: GEOG 2410 or equivalent. Basic understanding of digital image data and tools required to process, analyze, and interpret digital images.

3430. Geographic Information Systems I (3) (F,S)

May not count toward foundations curriculum social sciences requirement. P: GEOG 2410 or equivalent. Computer-based decision support systems. Involves integration of spatially referenced data in problem-solving context. Concepts and application of GIS include data capture, storage, analysis, and display.

3450. Introduction to the Global Positioning System (3) (S)

May not count toward foundations curriculum social sciences requirement. P: GEOG 2410 or equivalent. Techniques for spatial referencing via a satellite-based navigation system.

3460. GIS Applications Programming (3) (F)

May not count toward foundations curriculum social sciences requirement. P: GEOG 2410; BITE 2212 or CSCI 1610 or MIS 2223 or consent of instructor. Introduces GIS applications design, development, and deployment. Focuses on custom mapping user interfaces; programmable solutions for spatial data display, analysis and manipulation; and custom GIS applications development.

GEOGRAPHY CONT.

3510. Physical Meteorology (3) (F)

May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 1065; or consent of instructor. Basic principles of atmospheric hydrostatics, thermodynamics, cloud and precipitation processes, and radiative transfer.

3520. Dynamic Meteorology (3) (S)

May not count toward foundations curriculum social sciences requirement. P: GEOG 1300; MATH 2172, PHYS 2360; or consent of instructor. 3 lecture hours per week. Basic concepts and techniques of mathematics, thermodynamics, mechanics and fluid dynamics in the study of atmospheric motions and weather systems.

3550. Principles of Synoptic Meteorology (3) (F)

P: GEOG 3520; or consent of instructor. Basic concepts of synoptic scale atmospheric phenomena, including upper level waves and mid-latitude weather systems.

4210. Fluvial and Hydrological Processes (3) (S)

May not count toward foundations curriculum social sciences requirement. P: GEOG 1300, 2250; or consent of instructor. Comprehensive examination of principles of surface water hydrology and fluvial geomorphology. Application of principles to environmental problems.

4250. Environmental Impact Analysis

P: GEOG 1000, GEOG 2300 or PLAN 1900. Evolution of the practice of environmental analysis in regulatory and decision-making contexts, with emphasis on the U.S. National Environmental Policy Act.

4270. Water Resources Management and Planning

P: PLAN 1900; or GEOG 1000 or GEOG 1250. Spatial and temporal characteristics of water. Consideration of hydrologic, engineering, economic, and institutional aspects of water management.

4540. Coastal Storms (3) (NS)

P: ATMO 1300 or GEOG 1300; or consent of instructor. Basic dynamics, analysis, and forecasting of extratropical and tropical storms; history of storms in the Carolinas and current mitigation plans.

4580. Radar and Satellite Meteorology (3) (NS)

P: ATMO 1300 or GEOG 1300; ATMO 2510 or GEOG 2510 ; or consent of instructor; RP: GEOG 3420. History, theory and applications of radar and satellite meteorology, with a focus on techniques of satellite image interpretation and radar data processing applied to severe weather forecasting and climate analysis.

GEOLOGICAL SCIENCES (GEOL)

1400. Bays and Beaches Around the World: Geological Form and Function (3) (GE)
Introduction to fundamental geologic concepts and the scientific method via coastal geological and hydrological processes of beach and estuarine systems around the world.
1550. Oceanography (3) (GE)
Introductory survey of geological, biological, chemical, and physical characteristics of the oceans, and the interaction between people and the ocean.
2600. Analysis Techniques and Methods of Coastal Ocean Research
RC: GEOL 2501. Lab and field methods used to examine oceanographic processes and introduction to coastal ocean research.
3209. Environmental Forensics (3)
P: CHEM 1150, 1151, 1160, 1161; or equivalent; or consent of instructor. Identification of environmental pollutants, estimation of their source(s), quantification of how long the pollution has persisted, and assessment of human health and ecosystem exposure. Investigation of common environmental contamination within air, water, soil, groundwater, sediments, and biota.
3500. Hydrogeology and the Environment (3)
Hydrogeology with emphasis on environmental water resources issues.
3700. Advanced Oceanography (3)
P: GEOL 1550 or equivalent; or consent of the instructor. An in-depth examination of the structure and formation of ocean basins, the role of oceans in the hydrological cycle, the physical properties of seawater, atmospheric and ocean circulation, waves and tides. Emphasis is placed on key scientific studies, research methods, data analysis and quantitative problem solving.
5150. The Geologic Component of Environmental Science (3)
P: Introductory GEOL course or consent of instructor. Basic geologic knowledge and insights that support sound, rational, and science based environmental decisions and policies in regard to land and water use. Topics include pollution abatement, clean up, and prevention; resource extraction, use, and conservation; and hazardous geologic processes
5300. Geology of Coastal Processes and Environments (3)
May include field trips to various coastal systems. P: GEOL 1550, GEOL 4010, GEOL 4011; or consent of instructor. Modern coastal systems. Diversity and distribution, complexity and dynamics of interacting processes and responses, origin and evolutionary history, and role of man as major modifying force.
5450. Introduction to Aqueous Geochemistry (3)
2 lectures and 1 3-hour lab per week. P: CHEM 1150, 1151, 1160, 1161; or equivalent.
Application of chemical principles to study of elements at earth's surface; their transportation in aqueous solutions; and weathering, groundwater, and surface water chemistry, geochemical cycles, and distribution of stable isotopes.
- 5700, 5701. Geohydrology of Drainage Basins (3,0)
2 lectures and 1 3-hour lab per week. P: GEOL 1500, 1501; or consent of instructor. Drainage basin geology and hydrology. Emphasis on quantitative analysis, evaporation, streamflow, and hydrologic parameters of surface water and ground water basins.
- 5710, 5711. Ground Water Hydrology (3,0)
2 lectures and 1 3-hour lab per week. P: GEOL 1500, 1501; or consent of instructor. Origin, occurrence, movement, quality, regional analysis, and management of ground water.
Interrelationship of ground and surface water. Lab emphasis on aquifer test data collection and interpretation.

MECHANICAL ENGINEERING (MENG)

4153. Engineering Fluid Mechanics (4) 3 lecture and 2 lab hours per week
3 lecture hours per week. P: ENGR 2450 and ENGR 3034, both with a minimum grade of C (2.0); MATH 2154. Static fluid forces; conservation of mass, conservation of energy, and Newton's second law for flowing fluids; internal and external flow; and flow systems and machinery.

POLITICAL SCIENCE (POLS) (banked)

3256. Environmental Politics (3)
Energy and environmental policies, especially governmental responses to conflicting goals of clean environment and energy sufficiency.

RECREATION AND LEISURE STUDIES (RCSC)

2600. Outdoor Recreation Activities (3)
Knowledge and skills related to outdoor recreation activities for lifetime leisure skill development. Choose two areas: backpacking, sea kayaking, whitewater kayaking, caving, surfing, or canoeing. Three field trips required. Requires additional fees. May be repeated up to 6 s.h. with different skills areas by permission of instructor.

5100. Aquatic Facility Management (3)
Operation, maintenance, and management of aquatic facilities used for recreation, exercise, therapy, competition, education programs, and other aquatic-related programs.