

OCEANOGRAPHY AND COASTAL SCIENCES • OCS

General education courses are marked with stars (★).

- ★ **1005 Introduction to Oceanography (3)** An honors course, OCS 1006, is also available. The world's oceans, their origin and evolution; interactions between physical, geological, chemical, and biological processes in the marine environment; use and abuse of oceans.
- ★ **1006 HONORS: Introduction to Oceanography (3)** Similar to OCS 1005 with special honors emphasis for qualified students. Interaction of physical, geological, chemical, and biological processes of the ocean; effect of human activities.
- 2008 Introduction to Marine Sciences: Life Processes (4) S 3 hrs. lecture; 3 hrs. lab.** Does not satisfy major field course requirement for students in natural science curricula. Also offered as BIOL 208 at Southern University in Baton Rouge. Life and environmental processes in marine and aquatic settings; their influence on coastal Louisiana.
- 2009 Introduction to Marine Sciences: Geological and Physical (3)** 3 hrs. lecture; 1 hr. lab. Does not satisfy major field requirements for students in natural sciences curriculum. Geological and physical processes in marine and aquatic environments; their influence on coastal Louisiana.
- 2010 Introduction to Waves and Beaches (3)** Introduction to the physical and geological coastal oceanographic processes that shape the coastal zone; various coastal environment types; and coastal processes and human interaction with these environments.
- 2095 Introduction to Marine Sciences (4) Su only** Prereq.: introductory science course. Four weeks at Louisiana Universities Marine Consortium coastal laboratories. Physical, chemical, geological, and biological processes in the oceans and coastal environments and their interactions; interrelationships of man and the marine environment.
- 3103 Global Environmental Cycles (3)** Prereq.: CHEM 1201 and MATH 1550; credit or registration in BIOL 1201. Major hydrologic and elemental cycles on the planet, global change and processes, energy balance, including problems associated with climate, pollution, population, and resources.
- 3200 Hurricanes and Typhoons (3)** Comprehensive introduction to hurricanes as a multi-faceted phenomenon; hurricane meteorology and climate variability, oceanographic response and coastal impacts, storm deposition, ecological effects, geological and historical records, and societal impacts and response.
- 4001 Special Topics in Oceanography and Coastal Sciences (1-6) V** May be taken for a max. of 9 sem. hrs. of credit when topics vary.
- 4005 Special Field Topics in Oceanography and Coastal Sciences (1-6) Su only** May be taken for a max. of 9 sem. hrs. of credit when topics vary. Variable number of weeks at Louisiana Universities' Marine Consortium (LUMCON) or Gulf Coast Research Laboratory (GCRL).
- 4010 Marine Science for Teachers (4) Su only** Four-week short course offered at various locations by Louisiana Universities Marine Consortium. Credit not applicable to a degree in marine sciences. Survey of the marine sciences; secondary and elementary school levels.
- 4012 Biology of Marine Vertebrates (3)** Prereq.: 8 sem. hrs. of introductory zoology or biology with laboratory. Evolution, life history, ecology, and management of marine fishes, reptiles, birds, and mammals.
- 4015 Oceans to Estuaries I: Geology and Physics (5) F** Prereq.: Two semester introductory courses in physics and geology, MATH 1550 and 1552. Major geological and physical processes and products within the world's oceans, including the open ocean, continental margins, estuaries, and intertidal areas.
- 4016 Oceans to Estuaries II: Chemistry and Biology (5) S** Prereq.: CHEM 1201 and 1202, BIOL 1201 and 1202, MATH 1550 and 1552. Major chemical and biological processes within the world's oceans, including the open ocean, continental margins, estuaries, and intertidal marshes.
- 4021 Weather Analysis and Satellite Meteorology (3) F** Diagnostic studies of surface and upper-air observational data using isoplething charts and satellite images to represent the state of the atmosphere over both land and sea; the use of satellite technology in weather forecasting including cloud identification, wind direction, storm development, and air quality.
- 4024 Coastal Morphodynamics (3)** Prereq.: MATH 1021, 1022, or 1023. Also offered as GEOG 4024. Basic morphodynamic processes operative along coasts; emphasis on modern coastal process response systems.
- 4030 Techniques of Research Presentation (1) F,S** Pass-fail grading. May be taken for a max. of 2 hrs. of credit when topics vary. Guidelines for effective scientific seminar presentations.
- 4040 Environmental Pollution Transport Processes (3)** Prereq.: CHEM 1201, MATH 1550, and PHYS 2001. Application of fluid-earth physical principles to characterize pollutant dispersion and transport processes in atmospheric, oceanic, and terrestrial environments, particularly across the coastal zone.
- 4041 Salt Marsh Ecology (4) Su only** Prereq.: general plant biology and 10 semester hours of biology. Four weeks at Gulf Coast Research Laboratory, Ocean Springs, Mississippi. Botanical aspects of local marshes; plant identification, composition, structure, distribution, and development of coastal marshes; biological and physical interrelationships; primary productivity and relation of marshes to estuaries and associated fauna.
- 4052 Phycology (4)** Prereq.: BIOL 1202 and 1209. 2 hrs. lecture; 2 hrs. lab. See BIOL 4052.
- 4090 Marine and Environmental Microbiology (3) F-O** Prereq.: BIOL 2051 or equivalent. Also offered as BIOL 4090. Characterization and ecology of estuarine, open-ocean, and terrestrial microorganisms and the role these microbes play in cycling organic and inorganic compounds; microbial activity in biogeochemical cycles extreme environments and organic pollutants; indicator species; pathogenic bacteria and their transmission in the environment and seafood-related contamination.
- 4095 Marine Field Ecology (4) Su only** Prereq.: general biology, invertebrate or vertebrate zoology, introductory chemistry, and consent of instructor. Five weeks at Louisiana Universities Marine Consortium coastal laboratory. Relationships of marine and estuarine organisms to environmental factors; interactions among organisms; ecological processes of energy and materials flow; field studies of communities and ecosystems of the Louisiana coastal zone.
- 4126 Chemical Oceanography (3) S** See GEOL 4081.
- 4128 Wetland Hydrology and Hydrodynamics (3) F** Prereq.: MATH 1550, 1552, GEOL 1001 or equivalent. Basic surface water and ground water hydrology in wetland environments with an emphasis on hydrologic principles, application of hydrologic techniques to wetlands, and understanding of hydrodynamics in these ecosystems.
- 4164 Deltaic Processes and Products (3)** Prereq.: consent of instructor. River delta formation and associated sedimentary processes with special emphasis on the Mississippi River delta and adjoining coastal, shelf-edge, and slope regions; comparisons of the Mississippi delta with other modern deltas.
- 4165 Environmental Chemistry of Wetlands (3) F,O** Prereq.: CHEM 2060 or equivalent. Transformations of pollutants and toxic substances that affect the solubility, bioavailability, fixation, and degradation of organic and inorganic substances in wetlands; emphasis on biological and physiochemical properties of wetlands that enhance this degradation and fixation.
- 4166 Wetland Delineation and Functional Assessment (3) F,O** Prereq.: one semester course in soils, biology or ecology or consent of instructor; 2 hrs. lecture; 3 hrs. lab. Delineation of jurisdictional wetlands covering wetland soil chemistry, soil taxonomy, hydric soil indicators, hydrophytic plant communities, wetland hydrology; use and interpretation of federal and state wetland delineation procedures; field measurement techniques; wetland functions; functional assessment methodologies in wetland evaluation and mitigation.
- 4170 Physical Oceanography (3) S** Prereq.: CE 2200 and graduate standing or consent of instructor. Physics of the ocean; with emphasis on dynamical problems; physical properties of sea water, marine instrumentation, flow dynamics in the earth's rotating coordinate system, water waves, general circulation.
- 4210 Geological Oceanography (3) F** Prereq.: two-semester introductory course in geology. Principles of marine geology; sediments and sedimentation in the marine environment from the near shore zone to the abyssal plain; geological effects of bottom currents; sea-level history; geophysical techniques; continental drift and sea-floor spreading; tectonic history of the oceanic crust.
- 4308 Plants in Coastal Environments (3) V** Prereq.: one-semester course in biology or ecology; or consent of instructor. 3 hrs. lecture; weekend field trips as needed. Also offered as BIOL 4308. Ecology of Louisiana's major coastal plant communities; emphasis on influence of environmental factors controlling plant distribution and productivity; physiological, morphological, and anatomical mechanisms aiding plant survival; man's impact on Louisiana's coastal plant communities.
- 4372 Estuarine Ecology (4) F** Prereq.: graduate standing or consent of instructor. 3 hrs. lecture; 2 hrs. lab. Preparation of field trips; synthesis and presentation of data collected on field trips to coastal areas. Ecological processes in estuaries, shallow coastal waters, and associated coastal environments; training and field use of equipment required for estuarine research.
- 4410 Ecosystem Modeling and Analysis (3) F** Prereq.: MATH 1552 and knowledge of a programming language. Mathematical description and analysis of ecological systems; emphasis on systems approach using matter and energy flow models for quantifying and analyzing interdependence and dynamics in ecosystems; linear flow models, dynamic nonlinear models, optimization models, stochastic models, and computer techniques for modeling, validation, sensitivity analysis, and parameter optimization.
- 4465 Coastal Zone Management (3) S-O** Also offered as LAW 5803. Nonlaw students encouraged to participate. Written and oral presentation required; special projects relating to the primary field of interest permitted. Resources allocation and environmental quality issues in coastal and estuarine zones of the U.S.; evaluating alternative solutions to topical coastal zone issues; preparing legal devices for meeting the issues, such as legislation, regulations, contract provisions, and deed restrictions; traditional law courses in water law, environmental law, natural-resources law, and land-use planning.
- 4500 Fisheries Acoustics (3)** Prereq.: 8 sem. hrs. of introductory biology or zoology with laboratory; 6 sem. hrs. of physics. 1 hr. lecture; 6 hrs. lab and field work. Theory and application of acoustics in the study and assessment of living marine resources.
- 4550 Biological Oceanography (3) S-O** Prereq.: two-course undergraduate science sequence above 2000 level, or graduate student status in science department. Participation in oceanographic cruise is generally required. Biology of open oceans, continental shelves, and large river deltas.
- 4560 Wetland Loss, Restoration, and Management (3)** Prereq.: two-course sequence in science above the 2000 level. Participation in field trips to local wetlands and management agencies is required. Coastal wetland loss, restoration, and management; wetland values, use, and potential management issues.
- 4666 Coastal Field Geology (4) Su only** See GEOL 4666.
- 7001 Advanced Topics in Marine Sciences (1-6) V** May be taken for a max. of 9 sem. hrs. when topics vary.
- 7010 The Concepts of the Ecosystem (3) S-O** Prereq.: one-semester course in ecology or consent of instructor. Structure, function, diversity, and succession of ecosystems viewed as a whole and as applied to major biomes.

7020 Marine Microbial Ecology (3) S-O Prereq.: one-semester course in microbiology and consent of instructor. Also offered as BIOL 7022. Microbial ecosystems and population dynamics; response of marine microorganisms to physicochemical factors and environmental alterations; microbial interactions; nutrient regeneration processes; nutritional requirements and micro-environments; modeling and systems analysis in marine microbial ecology.

7028 Numerical Modeling of Ocean Circulation (3) V Prereq.: OCS 4170 and ME 4563 or equivalent. Numerical modeling of ocean dynamics; numerical methods; parameterization schemes; review of state-of-art models.

7110 Toxicology of Aquatic Environments (3) See ENV5 7110.

7112 Concepts in Marine Ecotoxicology (3) Prereq.: ENV5 7100 and 7110. See ENV5 7112.

7120 Dynamical Oceanography (3) Prereq.: consent of instructor. Dynamics of rotating, stratified, incompressible fluids with particular application to the oceans; conservation equations and boundary conditions, surface and internal gravity waves, vorticity, geostrophic adjustment, coastal trapped waves, Rossby waves, wind-driven ocean circulation.

7121 Ecology and Management of Tropical Estuaries (3) Su Prereq.: 6 hrs. in marine ecology and consent of instructor. Two-week field trip/lecture at the Centro de Investigaciones y Estudios Avanzados in Merida, Mexico. 20 hrs. per week. Intensive field course concerning aspects of ecology and management of tropical estuaries; plankton systems, sea grasses, mangroves, benthos, nekton, and macroalgae; emphasis on human impact and management, global change issues, and use of modeling.

7122 Gravity Waves in Shallow Water (3) V Prereq.: MATH 1550, 1552; PHYS 2101, 2102. Linear and nonlinear theories of water gravity waves considered by classical mathematical derivation and numerical methods; wave transformation in shallow water; characteristics of boundary layer under wave action; wave-related phenomena in near shore zone.

7123 Oceanographic Data Analysis (3,3) F,S Prereq.: MATH 1550 and EXST 2055 or equivalent. Statistical techniques for analysis of oceanographic time and space series data; spectrum analysis; objective analysis; empirical orthogonal functions and Kalman filters.

7124 Applied Coastal Plant Ecology (3) S Prereq.: 6 sem. hrs. in biology or environmental science. Field trips included. Students are responsible for paying for travel expenses associated with the course. Concepts of applied coastal plant ecology; field experiences in coastal habitat restoration and management; applied wetlands' functions, wet-land classification, evaluation and delineation; and environmental assessment monitoring.

7125 Estuarine Dynamics (3) V Prereq.: consent of instructor. Wind-driven and mass-driven currents in estuaries, turbulence and mixing in estuaries, seiches, storm surges, internal waves, salt balance, and inlet flows.

7126 Circulation and Mixing in Coastal Waters (3) V Prereq.: OCS 4170. Mechanics of circulation in coastal currents; buoyancy driving, wind driving, coastal jets, long shore pressure gradients; physical conditions controlling hypoxia; classification of coastal currents; mixing and dispersion of pollutants and oil slicks for environmental management.

7127 Dynamics and Sedimentary Response Features of Coastal Environments (3) Su-O Interactions between major dynamical forcing mechanisms and sedimentary-geomorphic responses in major types of coastal environments (deltas, sandy coasts, and coral reef coasts); variability of physical processes and corresponding response features.

7129 Global Climate Change and Wetlands (2) Prereq.: consent of instructor. Impact of projected global climate change on stability and functioning of coastal and interior wetland ecosystems; feedback of biogeochemical changes in wetlands caused by climate change.

7130 Marine Isotope Biogeochemistry (3) (F) Prereq.: graduate standing or consent of instructor. Concepts and laboratory principles for stable and radioactive isotopes, first-hand experience interpreting isotopic data, modern applications in oceanography and biogeochemistry.

7131 Marine Geochemistry (3) S Geochemical processes in the marine environment, including water column geochemistry, pore water processes and interactions across the sediment-water interface, and early diagenesis; emphasis uranium-thorium decay series radionuclide applications in marine geochemistry.

7132 Coastal Physical/Chemical Systems: Analytical Methods (3) F-O Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab. Sampling techniques; proper handling and preservation of samples; sample processing for analysis; application of spectroscopy and chromatography analytical instrumentation for the determination on nutrients, trace and toxic metals, synthetic organics (pesticides and industrial organics), and petroleum hydrocarbons in water, soil, and sediment samples; techniques presented in terms of application of analytical chemistry to environmental and natural systems.

7165 Biogeochemistry of Wetland Soils and Sediments (3) S-O Same as AGRO 7165. Microbial and redox chemistry processes in fresh water, brackish water, and estuarine-flooded soils and sediments affecting the transformations of nutrients and toxic materials.

7170 Satellite Oceanography (3) F Prereq.: OCS 4170 or equivalent. Oceanographic measurements and observations using satellite-borne sensor systems; radiation-ocean-atmosphere interactions, satellite systems, sensor design, and data types; analysis of infrared, visible, and microwave data for deep ocean, coastal, and estuarine phenomena.

7311 Marine and Estuarine Plankton (3) S-E Prereq.: background in ecology, invertebrate zoology, limnology, or phycology; and consent of instructor. Structure and function of marine plankton populations; changes related to various environmental factors such as temperature, nutrients, radiation, transparency, currents, and water-masses; phytoplankton, zooplankton and ichthyoplankton food webs, trophic dynamics and case studies; life history, and biodemographic features; sampling theory, collecting techniques, distribution, abundances, production, analytical models, and economic significance.

7317 Marine Ecology (3) V See BIOL 7120.

7320 Fisheries Oceanography (3) Also offered as RNR 7320. Relationships between marine fish abundance and distribution and nonanthropogenic physical and biological processes; spatial and temporal scales; analytical methods and sampling strategies; marine fish life histories as related to oceanographic processes; marine ecosystem.

7370 Seminar: Theoretical Concepts of Ecology (1) S Prereq.: one-semester course in ecology or consent of instructor. May be repeated for credit. Announced topics.

7976 Seminar in Physical Oceanography and Meteorology (3) May be taken for a max. of 9 hrs. of credit when topics vary. Air-sea interaction, synoptic meteorology, tropical meteorology, geophysical fluid dynamics, ocean-atmosphere interaction related to climate change.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

8900 Advanced Reading and Literature Research (1-6) May be taken for a max. of 6 sem. hrs. of credit.

8901 Advanced Field Research (1-6) May be taken for a max. of 6 sem. hrs. of credit.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.