MAR

Marine Sciences

MAR 101-E Long Island Sound: Science and Use
An introduction to one of the region’s most important coastal marine environments-Long Island Sound. The course traces the origin and development of the Sound; presents an overview of the natural physical, biological, chemical, and geological processes that characterize it; explores its importance to society and assesses how society’s uses of the Sound have affected it; evaluates attempts to manage it; and looks at the future of the Sound.
3 credits

MAR 104-E Oceanography
An examination of the World Ocean and the processes that control its major features and the life that inhabits it. Suitable for non-science majors.
3 credits

MAR 301 Environmental Microbiology
Microbiological mediation of natural processes in marine, freshwater, soil, and groundwater habitats, as well as microbial potential for remediation of pollutants and public health issues. The course includes a survey of taxonomic and metabolic diversity, elementary cell biology, nutrition, environmental controls on physiology and adaptations, biogeochemical cycles, and modern methods of sampling and analysis. Not for credit in addition to BIO 357.
Prerequisites: BIO 202; CHE 131 or 141
4 credits

MAR 302 Marine Microbiology and Microbial Ecology
Introduction to the evolution, diversity, and importance of the microbial flora of the sea. Lectures highlight the physiological distinctions and ecological functions of each of the major microbial groups (viruses, bacteria, fungi, protozoans, algae). Particular emphasis is placed on the role these microorganisms play in the elemental (biochemical) cycles of the oceans. Aspects of the microbiota as agents of environmental pollution or detoxification are also discussed.
Prerequisites: BIO 201 and 202; CHE 132 or 142
Advisory Prerequisite: MAR 301
3 credits

MAR 303 Long Island Marine Habitats
The study of six representative marine environments around Long Island. Students visit the sites on Saturday field trips, measuring environmental parameters and identifying common plants and animals. Using qualitative and quantitative methods in the field and in two weekly laboratory sessions, the class determines major factors that control the biological community in each habitat.
Prerequisites: U3 or U4 standing; BIO 201
Advisory Prerequisites: AMS 110 or other statistics course; MAR 101 or 104 or 333
4 credits

MAR 304-E Waves, Tides, and Beaches
A survey of water waves and tides, including both a description of the phenomena and the basic theory of waves and sediment transport. This background forms the basis for a description of shore processes including beaches, shoreface dynamics, and coastal erosion. Areas of current research are also discussed.
Prerequisites: MAT 127 or 132 or 142 or AMS 161
Advisory Prerequisites: MAR 101 or 104 or 333; PHY 122/124 or 126 or 132/134 or 142
3 credits

MAR 305 Experimental Marine Biology
Students design and conduct experiments in the laboratory and at local field sites, collect and analyze data, and use scientific literature to interpret and present results in papers and oral presentations.
Prerequisites: U3 or U4 standing; BIO 201
Advisory Prerequisites: CHE 131 or 141; AMS 110 or other statistics course; MAR 101 or 104 or 333
3 credits

MAR 308 Principles of Instrumental Analysis
The development of familiarity in the laboratory with the techniques and instrumentation used in environmental analytical chemistry, emphasizing determination of trace inorganic species. Primary emphasis on applications utilizing the absorption of electromagnetic radiation. Topics include metal determinations in sediment and in river water using molecular ultraviolet-visible and atomic absorption spectrometry.
Prerequisites: CHE 132/134 or 142/144
3 credits

MAR 315-H Conservation Biology and Marine Biodiversity
The fundamental concepts of Conservation Biology, a new synthetic field that incorporates principles of ecology, biogeography, population genetics, systematics, evolutionary biology, environmental sciences, sociology, anthropology, and philosophy toward the conservation of biological diversity. Examples drawn from the marine environment emphasize how the application of conservation principles varies from terrestrial, aquatic, and marine realms.
Prerequisite: BIO 351 or 353
3 credits

MAR 318 Engineering Geology and Coastal Processes
Fundamental concepts of soil, sediment, and rock mechanics and the physics of surficial processes. Application is made to problems of geotechnical and coastal engineering. Topics include consolidation, loose boundary hydraulics, slope stability, under-ground excavations and beach and tidal inlet stability, and channel sedimentation. This course is offered as both GEO 318 and MAR 318.
Prerequisites: GEO 102 or 101; CHE 132 or 142 or AMS 161
3 credits

MAR 320 Limnology
The physical, chemical, and biological aspects of lakes and ponds. The morphology of lake basins, physics of water movement, water chemistry, and ecology of organisms are explored through lecture and laboratory instruction. The laboratory portion of the course includes field sampling to investigate temporal variation in water chemistry and plankton biology and laboratory experiments to demonstrate important concepts.
Prerequisites: BIO 201; CHE 131 or 141
3 credits

MAR 333-H Coastal Oceanography
Aspects of physical, biological, chemical, and geologic processes that characterize coastal marine environments. Topics include such natural phenomena as upwelling, particle transport, benthic/pelagic coupling, and barrier island processes, as well as the impacts of society on the Coastal Ocean.
Prerequisites: MAT 125 or 131 or 141 or AMS 151; completion of D.E.C. category E
3 credits

MAR 334-E Remote Sensing of the Environment
A study of the theory of remote sensing and its application in the fields of atmospheric science and oceanography. A discussion of the interaction of electromagnetic radiation with rough surfaces and the atmosphere is followed by a treatment of sensors and platforms. The remainder of the course is devoted to data processing techniques involved in remote sensing.
Prerequisite: One of the following: ENS/PHY 119, PHY 127, PHY 132/134, or PHY 142
3 credits

MAR 336 Marine Pollution
A review of the sources, transport, and fate of toxic and non-toxic contaminants in the ocean. The interactions of biological, chemical, and physical processes that control the cycling and toxicity of contaminants are considered. Contaminants include metals, oil, halogenated hydrocarbons, radioactive wastes, excess nutrients, plastics, and solid wastes.
Prerequisites: BIO 201, CHE 131 or 141; MAR 333
3 credits

MAR 340-H Environmental Problems and Solutions
A detailed examination of the scientific, social, and legal aspects of important environmental problems, including global climate change, the depletion of atmospheric ozone, acid rain, rain forests and the loss of biodiversity, and energy conservation, as well as case histories of problems such as the use of DDT, environmental carcinogens, and lead poisoning.
Prerequisites: U3 or U4 standing; one course in chemistry or biology
3 credits

MAR 346 Marine Sedimentology
A study of sedimentology in the marine environment, including an introduction to fluid mechanics, sediment transport theory, quantitative models of sedimentation, and dynamic stratigraphy.
Prerequisites: GEO 102 or 122; PHY 126 or 132/134 or 142
3 credits

MAR 349 Introduction to Biological Oceanography
An examination of the processes producing and maintaining the abundances, composition, and temporal variations of organisms in the ocean. The role of biological processes in global cycles and the food chain, beginning with microbes and processing through fisheries, are also covered. Weekly three-hour laboratory or field sessions present methods used in observational and experimental studies.
Prerequisites: CHE 131, CHE 132, and BIO 201
5 credits

MAR 350 Introduction to Ocean Physics
An introduction to hydrodynamics, contemporary ideas on ocean circulation, and the application of acoustics and optics to ocean technologies.
Prerequisites: ENS/PHY 119 or PHY 121/123 or 125 or 131/133 or 141; MAT 127 or 132 or 142 or AMS 161
2 credits

MAR 351 Introduction to Ocean Chemistry
Chemical principles applied to the study of the oceans. How chemical tracers are used to determine the geological, physical, and biological characteristics of present and past oceans. Other topics include physical marine chemistry, nutrient and carbon cycling, organic geochemistry, isotope geochemistry, sediment chemistry and diagenesis, air-sea exchange and controls on carbon dioxide, and estuarine geochemistry.
Prerequisites: CHE 132; MAR 101 or 104 or 333
3 credits
MAR 366 Plankton Ecology
An introduction to the biology of the plant and animal plankton present in the sea. Techniques of collection, enumeration, and identification of phytoplankton and zooplankton are described. Life histories are studied and factors that influence seasonal changes in species and biomass are examined.
Prerequisites: BIO 201 and 202
3 credits

MAR 370 Marine Mammals
The biology of the major groups of marine mammals, including cetaceans, pinnipeds, and sirenians. Topics include evolutionary history and adaptation, thermoregulation, locomotion and foraging, diving physiology and behavior, communication and sensory systems, social behavior, reproduction, energetics, distribution patterns, exploitation and conservation.
Prerequisites: BIO 201, BIO 203
3 Credits

MAR 371 The Biology and Conservation of Marine Birds and Sea Turtles
A survey of the basic biology of marine birds and sea turtles, with an emphasis on species endemic to the Northeast U.S. Topics covered include origins, taxonomy, anatomy, organ systems, reproduction, nutrition, migration, and conservation status. Weekly lectures will be supplemented with three field trips, of which the student must attend at least two.
Prerequisites: BIO 201, BIO 203
3 Credits

MAR 380 Ichthyology
The biology of fishes. This course focuses on the diversity of fishes and the physiological, anatomical, ecological, and behavioral adaptations that allow them to populate a wide range of niches and environments. Field and laboratory work provide students with practical experience in collecting, identifying, and studying fish.
Prerequisites: BIO 201, BIO 328 or 344 or 346
2 credits

MAR 385 Principles of Fishery Biology and Management
The theory, techniques, history, and practical problems of fishery management, with emphasis on Long Island fisheries. Three field trips outside regularly scheduled class meetings are required.
Prerequisites: BIO 201; MAT 125 or 131 or 141 or AMS 151
3 credits

MAR 392-H Waste Management Issues
Conventional and innovative approaches to waste reduction, recycling, and reuse. The environmental impacts of waste on the terrestrial and marine environment are introduced as are the complex social, political, and scientific issues of making sound policy decisions.
Prerequisites: GEO 101; CHE 131 or ENS/PHY 119
3 credits

MAR 394-H Environmental Toxicology and Public Health
Principles of toxicology are presented and problems associated with major classes of toxic chemicals to human and environmental health are examined. Case studies dealing with current waste management issues are also discussed. This course is offered as both BCP 394 and MAR 294.
Prerequisites: BIO 201; CHE 131 or 141
Advisory Prerequisite: CHE 321
3 credits