MARINE SCIENCES (MAR)

Courses and Descriptions

MAR 120 Oceanography 3 Credits
In this course, students will investigate the geological, chemical, physical, and biological processes that shape the ocean. Emphasis will be placed on how these processes interact with each other and with human populations. These interactions influence important global phenomena that impact all our lives, including weather and climate, the distribution of marine organisms and other natural resources, and coastal processes. Understanding these phenomena will enable students to make more informed decisions and contribute to serious global marine issues. Students will learn through a combination of hands-on exercises designed to foster a deeper understanding of the scientific content as well as the scientific process, practical experiences with real data, readings, and some lectures. CLAS general education areas addressed: DP & GP.

MAR 121 Introductory Oceanography Lab 1 Credits
This lab course introduces students to the fundamental aspects of geological, chemical, physical and biological oceanography. Students learn through inquiry-based, hands-on exercises and activities using actual data collected in the lab and in the field. Independent projects and local field trips during lab and on weekends may be required. One three-hour lab per week. This course counts towards the fulfillment of the Disciplinary Perspectives element of the CLAS general education curriculum.
Corequisite(s): MAR 120 or GLS 120 or as prerequisite(s).

MAR 210 Marine Life through Time 4 Credits
Survey of the important developments in marine life over the last three billion years from the Pre-Cambrian evolution of one-celled organisms, through the Cambrian explosion of complex marine invertebrate life and subsequent diversification of backboned organisms in the Ordovician time, to the colonization of marginal marine and freshwater habitats in the Silurian-Devonian geological periods, and ultimately to extinctions during global crises of the late Devonian, Permian, Triassic, Cretaceous, and Pleistocene time intervals. The emphasis is on evolutionary adaptive breakthroughs within each phylum, particularly the significant morphological and anatomical innovations, and the subsequent radiation of these higher taxa into new habitats and niches through geologic time. Three hours of lecture and one three-hour lab per week.
Prerequisite(s): GEO 100 & GEO 102; or GEO 113 & GEO 102 (can be signed in to take 102 with 113); or BIO 115; or BIO 116; or permission of instructor.

MAR 210L Marine Life through Time Lab 0 Credits
This lab is a co-requisite and must be taken with the corresponding course. Corequisite(s): MAR 210.
Prerequisite(s): GEO 100 & GEO 102; or GEO 113 & GEO 102 (can be signed in to take 102 with 113); or BIO 115; or BIO 116; or permission of instructor.

MAR 290 Directed Research and Study in Marine Sciences 1-4 Credits
Provides an opportunity for freshman and sophomore students to gain hands-on research experience in the marine sciences. This is an individual program of study and each student will work with a selected faculty member on a topic of mutual interest. The course consists of a combination of project meetings, supervised research, and guided readings. The focus will be on formulating research questions, designing and conducting experiments, collecting the necessary data, reviewing the scientific literature as it relates to each student's research topic in a weekly meetings with the instructor, and communicating the findings by writing a final project report.

MAR 300 Introduction to Field Marine Science 4 Credits
In this two-week field course, students will explore various topics in marine science through practical, hands-on, inquiry-based exercises and activities. The course will focus on the biological, geological, chemical, and physical processes that influence diverse marine flora and fauna found in selected marine environments, emphasizing shallow subtidal and intertidal environments such as coral reefs, sandy beaches, turtle grass beds, rocky intertidal pools, coastal wetlands, mangrove swamps, etc. Topics will be examined using field team exercises, a group mapping project, and individual research projects. Activities will help students develop their skills in research, use of field and laboratory equipment, computer analysis of data, and scientific writing, along with gaining content knowledge about the components and processes of environments studied. The course is taught at an appropriate marine field station at a U.S. or international location. Field portion of course is completed during the summer. Additional travel costs vary, depending on location.
Prerequisite(s): BIO 115 or 116 or any 200 or higher level lab science class; and MAR 120; and permission of instructor.

MAR 325 Marine Vertebrates 4 Credits
A survey of the biology of marine vertebrate animals, including fish (jawless fish, sharks, rays, and bony fish), reptiles (sea turtles and sea snakes), sea birds, and mammals (manatees, seals, and whales). The evolution, physiology, natural history, ecological relationships, and human interactions of these groups are emphasized. Three hours of lecture and one three-hour lab per week. Field trips may be required. Prerequisite(s): BIO 272 and BIO 272L.
Corequisite(s): MAR 325L.

MAR 325L Marine Vertebrates Lab 0 Credits
This lab is a co-requisite and must be taken with the corresponding course.
Corequisite(s): MAR 325.

MAR 340 Marine Processes and Environments: Seminar 3 Credits
This course is designed as a seminar course. Therefore, students will learn to lead class discussions, to analyze and critique peer-reviewed journal articles, and to enhance their presentation skills. Students will interpret graphical, spatial, and numerical data to support their positions. Content will emphasize the interactions among marine processes, biological features, and geologic landforms.
Prerequisite(s): MAR 120 or GEO 100; GEO 306.

MAR 360 Plankton Ecology 4 Credits
Examines the diversity, physiology, and ecology of marine phytoplankton and zooplankton. Students will survey the dominant plankton groups, their distribution, nutritional requirements, growth kinetics, and behavior. Planktonic predator/prey interactions and food web dynamics will be discussed. Students will also examine the interdisciplinary nature and role of plankton in biogeochemical cycles. Three hours of lecture and one three-hour lab per week. Weekend field trips may be required. Prerequisite(s): MAR 120 and MAR 121; or BIO 116.
Corequisite(s): MAR 360L.

MAR 360L Plankton Ecology Lab 0 Credits
This lab is a co-requisite and must be taken with the corresponding course.
Corequisite(s): MAR 360.

MAR 380 The Learning and Teaching of Marine Science 4 Credits
This field-based course provides a practical experience in integrating marine science with pedagogical concepts. Students will use scientific methodology to explain marine ecosystems through specially designed, inquiry-based exercises. During these activities, students will address the process of applying college-level content to their own classroom settings, considering national and state standards. Hands-on, field-based exercises will provide experience with a diversity of marine habitats and the biological, geological, hydrological, and physical processes that influence them. Visited habitats can include rocky intertidal, salt marsh, tidal flat, beach and channel sand bars. As a result, students will develop field and laboratory skills in marine science and use them in designing materials for their own classroom use.

MAR 401 Marine Ecology 4 Credits
The purpose of this course is to introduce students to fundamental principles in ecology, as it relates to marine systems. Topics include the marine environment and its influence on the organisms living there; biodiversity and speciation; factors regulating population dynamics in marine systems; larval and fisheries ecology; species interactions such as predation, competition, and symbiosis; factors regulating productivity and energy flow in marine systems; and marine conservation. Hands-on laboratory exercises will provide students with the opportunity to design and conduct experiments related to marine ecology, and to collect, analyze, and interpret data from those experiments. Ecosystem modeling will also be introduced. Three hours of lecture and one three-hour lab per week. Weekend field trips may be introduced. Prerequisite(s): BIO 272, BIO 272L.
Corequisite(s): MAR 401L.

MAR 401L Marine Ecology Lab 0 Credits
This lab is a co-requisite and must be taken with the corresponding course.
Corequisite(s): MAR 401.

MAR 410 Physical Oceanography 3 Credits
Introduction to the physical aspects and processes of the oceans and their influence on marine ecosystems and Earth processes. Topics include distribution of salinity and water temperature and their effect on water movement, the oceanic heat budget, atmospheric and oceanic interactions, ocean currents including surface and deep water circulation, waves, tides, and medium- to small-scale circulation features. Throughout the course, emphasis is placed on how these physical processes affect the biology and chemistry of the ocean. Three hours of lecture per week. Weekend field trips may be required.
Prerequisite(s): MAR 120.

MAR 480 Senior Thesis 3 Credits
A senior thesis is optional for marine sciences majors. However, a senior thesis is required for eligibility to graduate with honors in marine sciences. The topic for investigation will be chosen by the student in consultation with the faculty of the Department of Geological, Environmental, and Marine Sciences. The student must initiate consideration of a proposal to the Department. The proposal must contain a discussion of the proposed project and a timetable to be followed in the study. A departmental committee consisting of a major and minor advisor will evaluate the written paper submitted at the conclusion of the study or other approved venue. An oral presentation before the department at the conclusion of the semester in which the study is completed is required. Proposals must be submitted in final form no later than the end of the ninth week of the semester prior to the semester in which the study is undertaken.
Prerequisite(s): senior standing in the marine sciences major and permission of department chair.

MAR 490 Independent Study: Research and Creative Expression 1-4 Credits
Immerses the student in field or laboratory research. The student learns to organize material, use the literature, make precise measurements, and obtain reproducible data. If possible, the student will publish the results or present them at a scientific meeting.

MAR 491 Internship in Marine Sciences 1-4 Credits
A supervised work experience in an approved organization where qualified students gain real-world knowledge and utilize their academic training in a professional environment. Placements may be in private, public, non-profit, or governmental organizations. These can include consulting firms, regulatory agencies, advocacy groups, and educational or research institutions. Normally, 50 hours of internship per credit is required. A mutually agreed upon method of evaluation will be formalized prior to the approval of the internship by the sponsoring faculty and could include a term paper or project report and a poster presentation.
Prerequisite(s): 2.5 GPA and permission of instructor.