MARINE SCIENCE (MSC)

MSC 101. Survey of Oceanography. 3 Credit Hours.
Introduction to the oceans and their significance to mankind, encompassing geological, physical, chemical, and biological processes; man's role in and on the sea, including fisheries, pollution, and ocean management. Not for major or minor.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MSC 102. Introduction to Weather and Climate. 3 Credit Hours.
The structure, physics, dynamics and thermodynamics of the atmosphere. Weather, weather forecasting, climate and climate change.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 103. Survey of Modern Meteorology. 3 Credit Hours.
Dynamics and thermodynamics of the atmosphere as they relate to contemporary issues in meteorology. Overview of numerical weather prediction techniques and new technologies for monitoring weather and climate. Open to majors or minors with permission of instructor.
Prerequisite: MTH 108.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 104. Molecules Of Life. 3 Credit Hours.
Topics include: basic composition and chemistry of the atmosphere; chemical processes involved in regional air pollution and acid rain; health effects of air pollution; global change in the composition and climate of the atmosphere; stratospheric ozone, and global warming. The treatment will only utilize basic pre-calculus mathematics and high-school level chemistry.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 107. Life in the Sea. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 108. Environmental Oceanography. 3 Credit Hours.
This course will focus on environmental issues facing the oceans today, including global climate destabilization, the impact of population growth on coastal environments, marine pollution, and the state of marine fisheries. An active learning approach will be adopted, with emphasis on case studies and critical analysis. Marine environmental issues will be presented in self-contained analytical exercises. Basic math needed to quantify environmental issues will be introduced. Information and questions on sustainability will be integrated throughout the course and students will be asked to think critically about these pressing concerns.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MSC 109. Marine Policy. 1-5 Credit Hours.
Content varies by semester and is indicated in parentheses following course number and title in class schedule.
Components: THI.
Grading: GRD.

MSC 110. Marine Science in Laboratory. 3 Credit Hours.
Prerequisite: BIL 311, PSY 204 or equivalent).
This introductory course provides an overview of parametric and nonparametric statistics with an emphasis on applications in the analysis of environmental data. (Not open to students with credit in MTH 224, BIL 311, PSY 204 or equivalent).
Components: LEC.
Grading: GRD.

MSC 111. Introduction to Marine Science. 3.00 Credit Hours.
Geological, physical, chemical and biological processes of the world's oceans. The role of the oceans in global dynamics and man's role in and on the sea, including fisheries, pollution and ocean management. Enrollment limited to Marine Science/Marine Affairs majors and minors. Lecture and discussion, 3 hours. Field trips.
Components: DIS.
Grading: GRD.
Typically Offered: Fall.

MSC 115. Tropical Marine Biology. 3 Credit Hours.
a field and lecture study of selected marine environments around South Florida, with emphasis on the interaction between organisms and the geological, physical, and chemical environment. Field trips. Fee required.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

MSC 172. Special Topics in Marine Science. 2-6 Credit Hours.
Content varies by semester and is indicated in parentheses following course number and title in class schedule.
Components: THI.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MSC 180. Seminar In Marine Science. 1 Credit Hour.
Components: LEC.
Grading: GRD.

MSC 190. Studies in Marine Science. 1-5 Credit Hours.
Components: LEC.
Grading: GRD.

MSC 191. Studies in Marine Policy. 1-5 Credit Hours.
Components: LEC.
Grading: GRD.

MSC 204. Environmental Statistics. 3 Credit Hours.
This introductory course provides an overview of parametric and nonparametric statistics with an emphasis on applications in the analysis of environmental data. (Not open to students with credit in MTH 224, BIL 311, PSY 204 or equivalent).
Components: LEC.
Grading: GRD.

MSC 205. Mathematical Methods for Marine Science. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MSC 210. The Dynamic Oceans. 3 Credit Hours.
The course will describe the principal means of observing and quantifying oceanic circulation and will include descriptive treatments of ocean circulation at various time and length scales, including eddies, gyres, and strong currents such as the Gulf Stream. The course covers sea water properties, water masses and their distributions. The main concepts introduced are conservation principles and forcing mechanisms of the ocean circulation. The role of the oceans in earth's climate and climate variability are also treated.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.
MSC 215. Chemical Oceanography. 3 Credit Hours.
An introduction to the chemistry of the oceans. Descriptive chemical oceanography of the components of ocean waters (metals, gases, organic compounds and nutrients). Biogeochemical cycles in oceanic systems.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 216. Chemical Oceanography Laboratory. 1 Credit Hour.
Chemical and physical methods in chemical oceanography. Analytical and instrumental techniques used to determine density, salinity, chlorinity, dissolved oxygen, nutrients and components of the carbonate system. Corequisite: MSC 215.
Components: LAB.
Grading: GRD.
Typically Offered: Spring.

MSC 220. Climate and Global Change. 3 Credit Hours.
The Earth’s climate system and the role of natural and anthropogenic processes in shaping climate change.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 222. Earth’s Climate: Past And Future. 3 Credit Hours.
According to the recent reports from the Intergovernmental Panel on Climate Change (IPCC), there is mounting evidence that human activities have increasingly played a significant role on the Earth’s climate change over the last few centuries. While there is disagreement on the magnitude of these changes, it is widely accepted in the scientific community that the effects of anthropogenic forcing on climate will propagate into the future, with potentially dire socio-economic and environmental consequences. In spite of compelling instrumental and proxy data that document climate change on scales relevant to human societies, as well as a sharp increase in public dissemination of this information in recent years, the general public and many students of higher education remain skeptical and unconvinced about the primary driver(s) of global warming during the Anthropocene.
Prerequisite: MSC 111, and GSC 110 or GSC 111. Or Requisite: Permission of Instructor.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 230. Introduction to Marine Biology. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 232. Introduction to Marine Biology Laboratory. 1 Credit Hour.
Ecology, physiology, and behavior of marine organisms in south Florida marine habitats. Laboratory Techniques.
Components: LAB.
Grading: GRD.
Typically Offered: Fall.

MSC 240. Introduction To Marine Geology. 3 Credit Hours.
The principal marine geological environments of the world, their substrate, their sediments, their flora and fauna, and their evolution through time.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 264. Tropical Coastal Ecosystems. 3 Credit Hours.
This course will cover basic concepts of the ecology, management, conservation, and restoration of tropical marine ecosystems. The ecosystems and habitats to be discussed include coral reefs, seagrass beds, and mangrove forests. Given the importance of these ecosystems and their recent declining trajectories, we will discuss status and trends as well as disturbance factors affecting these resources. In addition to the ecology and conservation of these systems, we will cover basic concepts of population and community ecology, sampling design, and monitoring methods. Special attention will be given to the management tools presently used to protect and recover these resources, including the design and implementation of Marine Protected Areas and advances in the field of Restoration Ecology. Assigned readings will come from the two textbooks as well as the primary literature. The grading in this course will be based on two exams (midterm and final) as well as an oral or multimedia presentation.
Prerequisite: MSC 230.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 265. Tropical Coastal Ecosystems: Lab and Field Methods. 1 Credit Hour.
This 1-credit course will complement the lecture-based MSC 264 (Science, Conservation, and Restoration of Tropical Coastal Ecosystems) by providing students with hands-on experience on common field survey methodologies used to assess the health of coastal ecosystems like seagrass beds and coral reefs and the opportunity to conduct a lab experiment on the effects of stressors like salinity, sedimentation, or nutrients on the growth and survivorship of the target organisms.
Prerequisite: MSC 264. Or Corequisite: MSC 264. Or Requisite: Instructor Permission.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 300. Water Resources: History, Management, and Policy. 3 Credit Hours.
An overview of the issues and problems surrounding the management of aquatic resources in the broadest sense including water quality of natural waters, drinking water, water pollution, water quantity and supply issues, watershed management, wetland protection, and coastal management.
We will explore the available strategies to wisely manage the various aquatic resources, policy options and their socio-economic aspects, legal frameworks, and institutional arrangements. The examples and cases discussed in the course will largely come from China, Vietnam, and the US.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.
MSC 301. Introduction to Physical Oceanography. 3 Credit Hours.
Application of the laws of physics to the study of the properties and circulation of the world's oceans and atmosphere.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 302. Introduction To Physical Oceanography Lab. 1 Credit Hour.
Laboratory exercises and field work on basic fluid mechanics applicable to the ocean. These include buoyant convection and double diffusion, methods for measuring flows, gravity wave experiments in the lab and field, diffusion studies and rotating tank investigations as an analog for planetary flows.
Prerequisites: MSC 301 or ATM 405. Or Corequisites: MSC 301 or ATM 405.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MSC 307. Introduction to the physics of climate. 3 Credit Hours.
The physical mechanisms which govern the earth's climate and climate variability.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 310. Living Resources of the Ocean. 3 Credit Hours.
Marine fish and shellfish of major commercial and recreational value: biology, techniques of harvesting, and resource management.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 313. Coastal Law. 3 Credit Hours.
Basic doctrines and public policy related to the use and regulation of the United States coastal zone and seabed.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 314. Ocean Law. 3 Credit Hours.
The principles of international ocean law regarding ocean management; ocean delimitation and issues of environmental ocean regulation within international legal framework.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 323. Invertebrate Zoology. 4 Credit Hours.
Biology of invertebrates, with emphasis on tropical and subtropical marine forms. Field work and combined lecture-laboratory sessions.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MSC 324. The Biology of Fishes. 3 Credit Hours.
Selected topics on the ecology and physiology of fishes. Lectures on reproduction, respiration, osmoregulation, sense systems, hormonal control.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MSC 325. Biological Oceanographic Techniques. 3 Credit Hours.
Field sampling for plankton biomass and productivity; benthic biomass, and of selected physical parameters. Applications of molecular techniques and remote sensing to oceanographic problems.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 326. Marine Genomics. 3 Credit Hours.
Intensive lecture/laboratory course with emphasis on using genomic tools to address an independent research project of importance in the marine sciences.
Components: LAB.
Grading: GRD.
Typically Offered: Spring.

MSC 327. Marine Animal Neurophysiology and Behavior. 3 Credit Hours.
This course will look at neural and endocrine systems in a variety of marine animal invertebrate and vertebrate models and how these systems work together to control elements of physiology, sensation and perception of the environment and behavior.
Prerequisite: BIL 230 or MSC 230, and BIL 255.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.
MSC 328. Introduction To Aquaculture. 3 Credit Hours.
This course will provide an introduction to the field of aquaculture, which represents one of the fastest growing industries in food production in the world and is a field that offers exciting job opportunities in science, business, marketing, resource management, and socioeconomics. This course will provide students with a sound background in aquaculture prior to engaging in higher-level courses in this field.
Prerequisites: MSC 111 or MSC 230. Corequisite: MSC 230.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 329. Marine Vertebrate Zoology. 3 Credit Hours.
The course will be a comprehensive examination of the form and function of the vertebrate lineage of marine animals from early chordates to the evolution of cartilaginous and bony fish and the emergence of tetrapods, those that evolved from marine ancestors and have since returned to the sea. A comparative point of view will be used to assess the anatomy and physiology of each taxonomic group as well as behavioral and ecological adaptations related to their life history. Specifically, the course will cover the emergence of the vertebrate body plan and the evolution of fish from agnathans through modern teleosts, as well as the tetrapod lineage of marine reptiles, marine birds, and marine mammals. We will examine critical points in vertebrate evolution where genome-wide duplication events occurred as well as instances of convergent evolution in various lineages.
Prerequisite: MSC 230.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 333. Ocean Human Health. 3 Credit Hours.
The focus of this course is on the present, future, and potential effects of oceanic processes and marine organisms on human health and wellbeing and on human impacts on the marine environment. Prerequisite MSC 230.
Prerequisite: MSC 230 or BIL 230.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 340. Ocean Policy. 3 Credit Hours.
Analysis of ocean policy issues in US fisheries, marine conservation and marine protected areas, marine pollution, coastal management and regulation of offshore oil and gas activities.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 342. Decision Making And The Environment. 3 Credit Hours.
A basic, critical appreciation of interdisciplinary decision theory as applied to natural resources management. Specific goals include comprehension of decision making under uncertainty, evolutionary social science, managing common pool resources, and behavioral economics.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 345. Economics of Natural Resources and the Environment. 3 Credit Hours.
A comprehensive overview of the economics of national, international, and global environmental problems. A unifying theme throughout is sustainable development defined as "maximizing the net benefits of economic development while maintaining the services and quality of natural resources over time". We will use economic reasoning to examine causes and consequences of environmental and resource problems, and measures for dealing with them.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 346. Climate Science and Policy. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 350. Survey of Marine Mammals. 3 Credit Hours.
The evolution and ecology of the cetaceans, pinnipeds, manatees, and allies: Natural history, zoogeography, physiology, husbandry, and biomedical aspects.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 351. Physical-Biological Interaction In Ocean Ecosystems I. 3 Credit Hours.
Part 1 of a 2 course sequence encompassing physical oceanography, marine ecosystems and fisheries. Prerequisite: MTH 162 or MTH 172.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 352. Physical-Biological Interaction In Ocean Ecosystems li. 3 Credit Hours.
Part 2 of a 2 course sequence encompassing physical oceanography, marine ecosystems and fisheries. Prerequisite: MSC 351. Corequisite: MSC 204.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 355. Limnology. 3 Credit Hours.
This course is an introduction to the physical, chemical, and biological properties of freshwater ecosystems. It is intended as an upper level course for juniors and seniors. It emphasizes the ecological process of lakes, rivers, and to less extent, streams. The role of watershed processes is considered in the context of management of rivers and estuaries. Case studies integrate the scientific understanding of freshwater ecosystem function with management decisions. Applied aspects of freshwater systems are included.
Prerequisite: MSC 230. Or Requisite: Permission of Instructor.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.
MSC 364. Life in Moving Fluids. 3 Credit Hours.
The physical characteristics of air and water are described in relation to various flow phenomena that play a part in life functions. Adaptations of form and function reflect the very different properties of the media (air and water) of terrestrial and aquatic life. Energy conversion and transfer limit form and function and enable a wide variety of survival strategies.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 370. Current Research in Marine Biology: Seminars and Discussion. 2 Credit Hours.
These discussions and seminars comprising a 2 cr course provide well-prepared undergraduate students interested in marine research with an introduction to graduate student-presented science in the specialization of marine biology.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 371. Readings in Marine Science. 1-3 Credit Hours.
Library research with faculty supervision. Bibliography to be submitted in preparation for laboratory and/or field research project.

Components: DIS.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MSC 372. Special Topics in Marine Science. 1-6 Credit Hours.
Content varies by semester and is indicated in parentheses following course number and title in class schedule.

Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MSC 380. Field Studies In Marine And Aquatic Science. 1-4 Credit Hours.
Field course to selected marine, estuarine and/or aquatic sites in the United States and abroad. Travel fee may be required.

Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MSC 381. Marine Field Ornithology. 1-4 Credit Hours.
Waterbirds such as seabirds, shorebirds, and wading birds are key components of the marine ecosystem, including pelagic, coastal, and estuarine communities. As ecological indicators waterbird abundance provides a proxy for the health of these environments. Waterbirds have also served as important model systems for studies of behavior, evolutionary biology, and ecological theory. This course will provide an introduction to waterbird biology and conservation, including a variety of different field trips to waterbird communities.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MSC 390. Advanced Studies in Marine Science. 1-5 Credit Hours.
Components: LEC.
Grading: GRD.

MSC 391. Advance Studies In Marine Policy. 1-5 Credit Hours.
Components: LEC.
Grading: GRD.

MSC 403. Marine Environmental Toxicology. 3 Credit Hours.
This course will provide an introduction to the principles of environmental toxicology with an emphasis on marine ecosystems, considering a variety of different classes of toxicants, how they can impact marine organisms, the scientific methods used to assess impacts, and the regulatory frameworks used to monitor and manage their release to the environment.

Prerequisites: BIL 255, CHM 111, CHM 112.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 404. Marine Org. & Env Health. 1 Credit Hour.
This 1 credit course will complement salt water semester courses. (Must have taken MSC403 or MSC333 and either MSC466 or MSC326 and MSC463). Students will be required to collect and analyze samples, interpret their findings and present them in a formal laboratory report due two weeks after the trip. Students will also be required to give a presentation they have prepared before the trip and attend two seminars on Marine Organismal and Environmental Health topics.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 410. Marine Conservation Science. 3 Credit Hours.
Nature of marine biodiversity, what threatens it, and what can be done to recover the biological integrity of estuaries, coastal seas, and oceans. Topics include: distinctive aspects of marine populations and ecosystems; threats to marine biological diversity, singly and in combination; place-based management of marine ecosystems; and the human dimensions of marine conservation.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 411. Projects in Marine Science. 1-4 Credit Hours.
Individual, independent research projects with faculty supervision. A formal written report is required.

Components: THI.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MSC 415. Coral Reef Science and Management. 3 Credit Hours.
The interdisciplinary nature of coral reef science and management: biological, environmental, ecological and socioeconomic aspects of coral reef science, coral reef management problems and approaches at local to global scales, and the implications of climate change for coral reef science and management.

Components: LEC.
Grading: GRD.
Typically Offered: Spring.
MSC 417. Marine Biota And Biogeochemical Cycles. 3 Credit Hours.  
The distribution of dissolved particulate materials in the sea is not uniform in time or space. Variability in these reflects the diverse biological sources, transformations, and sinks of chemical constituents in the sea. This course focuses on the role of marine organisms in marine biogeochemical cycling, with particular emphasis on the marine carbon and the nutrients. We visualize and query the ocean system using publicly available global ocean data sets and the application Ocean Data View. The material is presented as a capstone to your training in marine sciences, bringing together the physical, chemical and biological dynamics of the ocean as a single system.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 420. Political Ecology of the Galapagos. 3 Credit Hours.  
This field course in the Galapagos National Park offers a rare chance to examine the human interactions in this highly politicized landscape of conservation. Students practice the political ecology approach for doing ethnographic field work and explore how it can lead to wiser resource management. Part of UGalapagos semester.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 421. Terrestrial Biology and Adaptations of the Galapagos.. 3 Credit Hours.  
This course will examine the terrestrial plant and animal life of Isabela Island, discuss the biology and how it adapted to life on Isabela. Through field and laboratory exercises we will explore the power of organisms' DNA in shaping life into unique forms like those famously present in today's Galapagos. Part of UGalapagos semester.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 422. Marine Ecology of the Galapagos. 3 Credit Hours.  
This course focuses on marine ecosystems of the Galapagos, emphasizing near-shore environments. Topics will include how the unique location and oceanography of the Galapagos have shaped the species composition of resident and migrant marine animals. The role of genetic drift, local habitat characteristics and natural selection on marine ecosystems will be examined. This is a field intensive course with time spent in intertidal, near-shore and off-shore island environments. Part of UGalapagos semester.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 423. Marine Conservation Biology & Fisheries of the Galapagos. 3 Credit Hours.  
The Galápagos are located in a uniquely productive area of the sea, which has allowed the development of rich and unique marine biota. The first week of the course will carry the students through the dynamic, climatic, and oceanographic circumstances that determine the unique character of the Galapagos. The second week will cover scientific evaluation of the threats to the marine biodiversity of the Galapagos, focusing on sharks, penguins, sea turtles and other at-risk species and habitats. Part of UGalapagos semester.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 424. Origin and Geology of the Galapagos Islands.. 3 Credit Hours.  
This course will explore the origin and geology of volcanic oceanic islands, using the Galapagos Islands as a natural laboratory. Though all share a common origin in plate tectonic theory, each island presents a host of environments that originate in the processes of volcanic action, erosion and hydrology. Individual islands therefore develop distinctive ecosystems within which organisms interact and evolve. The emphasis of this course will be to lay out the underlying geological processes that have led to the formation of the islands and to their present state, and then to explore the ways the physical environment has influenced adaptation and biodiversity. Part of UGalapagos semester.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 425. Galapagos Community-Based Research and Service. 2 Credit Hours.  
Prerequisite: MSC 426.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 427. Field Experience In The Galapagos Island. 3 Credit Hours.  
This 3 cr, 20-day Summer I field course in the southern Galapagos Islands, with a research paper, is a companion course to the lecture course MSC426. MSC427 provides students with the first-person knowledge and opportunity for research in the topics covered in the previous lecture course, encompassing the flora, fauna, geology, and society of the Galapagos Islands.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 432. Comparative Ecology of Terrestrial and Marine Systems. 3 Credit Hours.  
Components: LEC.  
Grading: GRD.  
Typically Offered: Spring.  

MSC 460. Spatial Applications in Marine Science. 3 Credit Hours.  
The concepts and marine applications of Geographic Information Systems. Every class period will entail short class lectures and hands on computer based GIS exercise on marine science related issues. Students will learn how to use ArcGIS 9.2 and create simple GIS models primarily using vector data.  
Components: LAB.  
Grading: GRD.  
Typically Offered: Fall & Spring.
MSC 462. Marine Biomedicine. 3 Credit Hours.
The course will cover diverse bioactive molecules that are derived from marine sources ranging from sponges to sharks. The isolation and characterization of these compounds as well as their potential application in clinical medicine and human health will be reviewed. The class will also cover marine-derived factors used in biotechnology and marine animal models used in biomedical research with an emphasis on marine immunology. 
Prerequisite: BIL 255 and CHM 112.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 463. Marine Conservation Genetics. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MSC 464. Marine Comparative Immunology Lab. 1 Credit Hour.
The laboratory course will cover immunology techniques used in the assessment of immune function and immune reactivity in diverse marine taxa from sponges to fish to mammals
Prerequisite: MSC 465. Or Corequisite: MSC 465.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 465. Marine Comparative Immunology. 3 Credit Hours.
The course will cover immune function in diverse marine taxa from sponges to fish and the evolution of innate and adaptive immune mechanisms from a comparative point of view, with an emphasis on shark and fish immunology. Adaptations related to living in a microbe-rich marine environment will be highlighted. Potential applications of research findings will be addressed with respect to conservation and aquaculture. The role of invertebrate and vertebrate models in the study of the evolution of the immune system and applications for human health and medicine will be discussed. 
Prerequisite: BIL 255.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MSC 466. Environmental Physiology: Oxygen, Water And Ionoregulatory Stress. 3 Credit Hours.
This is an intensive laboratory course that combines and elaborates on concepts learned in BIL 360. Topics will include homeostasis, interactions with the external environment, and life with limited oxygen and water. Lectures will be highly discussion-based; students will be expected to read primary research articles as suggested by the professor before lecture to foster participation in those discussions and form hypotheses about accompanying laboratory. Each lab will be written up as a formal laboratory report (i.e., Introduction, Materials and Methods, Results and Discussion).
Components: LAB.
Grading: GRD.
Typically Offered: Fall.

MSC 491. Special Studies in Marine Science. 1-3 Credit Hours.
Interdisciplinary capstone course in Marine Science. Content of course will vary by semester. Content in any semester will be expressed in parentheses following “Special Studies” in the class schedule.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.