

MARINE SCIENCE (MARS)

MARS 110 - Introduction to Oceanography

An introduction to marine sciences with emphasis on physiography of the ocean basins, waves, tides, near-shore processes, the physical and chemical nature of seawater, circulation, characteristics of marine plant and animal communities, history of oceanography, and law of the sea.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 190 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

MARS 195 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

MARS 198 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

MARS 200 - Art Workshop-Painting of the Coastal Area

This workshop is to be an intensive involvement with the esthetic qualities of the seashore and its environs. Paintings using various media (watercolor, oils, acrylics) according to personal preference will be created. Slides and other reproductions of relevant paintings by artists of historical importance will be examined and discussed.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 201 - Art Workshop-Pewter and Marine Jewelry

This workshop will explore pewter and objects found in the near-shore environment as materials for making jewelry and body ornaments. Participants will learn techniques of casting, fabricating, soldering, tinning and bezel setting for the purpose of creating unique pieces.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 204 - Writing about the Sea

A survey of literature from several genre, both fiction and nonfiction, which focuses on maritime themes and topics.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 211 - Field Methods in Oceanography

A course to familiarize students with the dynamic marine environment and field work on board small research vessels, to instruct in the use and application of standard oceanographic instruments and sampling devices and to promote and encourage independent research through the initial stages of scientific projects.

Prerequisites: MARS 110^D or EGEO 131^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 212 - Navigation

This course covers navigation, i.e. the art and science of safely bringing a boat from one position to another in a body of water. Topics covered are piloting, navigation within sight of land, electronic navigation, radio bearings by radio direction finder, LORAN, OMEGA, radar, celestial navigation, circles of equal altitude, navigational triangle, celestial lines of position, celestial fix, Greenwich Mean Time, Greenwich Hour Angle.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 215 - Marine Wildlife Photography

This class includes an in-depth study of the science of photography and how this relates to the field work of marine biology. The student will develop skills in micro- and macrophotography and an understanding of the science of optics, filter and camera techniques, and darkroom procedures and techniques. The class will learn various chemical processes for color and black/white photography. Specific articles on marine science photography will be used to develop an understanding both within the marine science laboratory and in the field.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 221 - Marine Invertebrates

A study of the invertebrate phyla with emphasis on development, reproduction, structure, function and classification of selected marine organisms. Laboratory field experience will be given in collection, preservation and classification of the phyla.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 241 - Marine Biology

A study of plant and animal life in the marine environment. Emphasis will be on physical and chemical environmental factors affecting the biota in the inter-tidal, open water, and benthic habitats. Common biota characteristic of each habitat will be investigated in terms of their natural history, morphology, and ecological relationships.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 250 - Wetland Ecology

The ecology and management of wetland wildlife with emphasis on the management of wetlands as ecological systems.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 260 - Marine Ecology

A study of the ecology of marine organisms, the relationship of plants and animals to physical, chemical and bio-logical factors and their zonation and communities.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 270 - Coastal Vegetation

In-depth examination of vegetation falling under the marine influence. Identification of same and determination of factors limiting and controlling their distribution.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 280 - Field Biology

An introduction to basic principles of ecology and natural history of selected plants and animals in terrestrial, freshwater, and marine environments. Course is suitable for non-science majors.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 285 - Recreation Management/Development in the Coastal Zone

This course focuses on the recreation component of coastal zone management. The nature, extent, location, and value of coastal recreation behavior will be probed and related to the overall coastal management framework.

Credits: 3

Term(s) Typically Offered: Offered as Needed

MARS 290 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

MARS 295 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed

MARS 298 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

MARS 300 - Behavior of Marine Organisms

Concepts of ethology; discussion and observation of the influences of external and internal factors on the regulation and control of behavior of organisms living in the marine coastal environment.

Prerequisites: BIOL 113^C or BIOL 114^C

^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 310 - The Mammals of Coastal Ecosystems

Distribution, behavior, physiology, adaptations, and ecological relationships of mammals with special emphasis on the mammals of the Delmarva Peninsula. In addition to the lectures and seminars, the laboratory and field work will deal with the productivity, population dynamics, species diversity, ecoenergetics, and behavior of local mammals.

Prerequisites: BIOL 113^C or BIOL 114^C

^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 320 - Marine Microbiology

A survey of methods and concepts of marine microbiology. Attention will be given to technical aspects of sample collection, microbial ecology of the marine environment, enrichment culturing, methods of enumeration and identification with emphasis on marine bacteria.

Prerequisite: BIOL 330^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 330 - Tropical Invertebrates

An introduction to tropical invertebrates. A variety of collection and observation methods will be used to sample near-shore and reef areas. Emphasis will be on systematics and ecology using the communities approach. One week at Wallops will be intensive review of general systematics and ecology of marine invertebrates. The last two weeks in Florida will involve sampling and identifying species and describing ecological communities.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 331 - Chemical Oceanography

Treatment of a wide range of oceanic chemical phenomena, including salinity and age of the oceans, sources and residence times of chemical constituents in seawater, geochemical cycles of mineral resources and trace elements. Sampling and laboratory analysis techniques.

Prerequisites: MARS 110^D or EGEO 131^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 342 - Marine Botany

A study of marine and marine fringe plants of the Middle Atlantic Coast, their taxonomy, ecology, distribution, life histories, physiology, and economic status. Techniques of collecting, preserving, identifying and herbarium cataloging will be stressed. Exercises in plant ecology and marine microbiology will be included.

Prerequisites: BIOL 113^C or BIOL 114^C
^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 343 - Marine Ichthyology

A study of the fishes. Specimens collected along the eastern seaboard by the students will be used to illustrate the anatomy, physiology and systematics of this major vertebrate group. Field collections will also give students the opportunity to observe the relationships of these animals to their biotic and physical environment.

Prerequisites: BIOL 113^C or BIOL 114^C
^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 344 - Anatomy of Marine Chordates

A course designed to familiarize the students with the qualitative aspects of the speciation process; to lay ground work for understanding the basic and specialized structure of marine chordates; to trace the most obvious or important trends (and their functional significance) in the evolution of this basic structure in various vertebrate lines. The laboratories will be devoted primarily to dissection of representative marine vertebrates, particularly those collected live on field trips.

Prerequisites: BIOL 113^C or BIOL 114^C
^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 345 - Ornithology

Introduces the student to avian fauna of the seacoast and at the same time enables comparison with inland species. In addition to the field work providing visual and vocal identification, lecture material will include information on the distribution, behavior, physiology, and anatomy of birds.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 350 - Physiology of Marine Invertebrates

Mechanisms and regulation of organ function in marine invertebrates with emphasis on homeostasis. Invertebrate examples of fundamental principles and of unique physiological mechanisms.

Prerequisites: BIOL 113^C or BIOL 114^C
^C Requires minimum grade of C.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 362 - Marine Geology

Structure and sedimentology of the ocean basins and shores; methods of exploration, general feature of the ocean basins, and theory of ocean basin evolution.

Prerequisites: MARS 110^D or EGE0 131^D
^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 364 - Physical Oceanography

A study of the physical properties of the oceans to include: mass and energy budgets; theory of distribution of variables; cause, nature, measurement, analysis and prediction of tides, currents and waves; basic instrumentation in field work.

Prerequisites: MARS 110^D or EGE0 131^D
^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

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MARS 390 - Experimental

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Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 394 - Comparative Physiology of Marine Organisms

This course will provide an introduction to the physiology of marine organisms utilizing a comparative approach. The lecture will introduce the topics of respiration, circulation, metabolism, osmoregulation, thermoregulation, locomotion and sensory systems by drawing comparisons between the mechanisms and strategies utilized by a wide range of marine organisms. Laboratory and field work will focus on the physiological responses of marine plants and animals to common environmental stresses such as salt load, temperature variation, depletion of dissolved oxygen, and tidal flux. This will be accomplished through measurements and observations in the field, as well as through experimental manipulations in a laboratory setting.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 395 - Workshop

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Credits: 1-6

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 398 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Prerequisites: BIOL 113^C or BIOL 114^C

^C Requires minimum grade of C.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 420 - Marine Micropaleontology

Designed for students majoring in either biological or geological sciences, the course will deal with modern, living representatives of micro-organisms important in the fossil record. Particular emphasis will be on the taxonomy, morphology, evolution and ecological affinities of the Foraminifera (Sarcodina), but other groups, including the Radiolaria, Diatoms and Ostracoda, will also be considered. Laboratory and field aspects will include sample collecting, preparation and analysis.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 431 - Ecology of Marine Plankton

Study of the phytoplankton and zooplankton in marine and brackish environments. Qualitative and quantitative comparisons will be made between the planktonic populations of various types of habitats in relation to primary and secondary productivity.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 432 - Marine Evolutionary

The study of the ecological mechanisms underlying evolutionary processes. This course is broad in scope and requires that students synthesize both evolutionary and ecological concepts and theory into an understanding of how organisms adapt to their environment. Marine, estuarine, and maritime organisms will be used as model systems and processes, which affect marine populations, will be emphasized.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 441 - Biology of Molluscs

The Mollusca is the second largest group of animals and perhaps the most diverse in terms of morphological, ecological and behavioral variations. This course offers an evolutionary, functional, and ecologic approach to studying this important group of organisms.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 451 - Coastal Environmental Oceanography

This course examines the interaction of biological, chemical, physical, geological and ecological ocean processes as applied to coastal environments. Emphasis is placed on environmental management issues of the coastal zone. Topics include water quality analysis, barrier island geology and ecology, estuarine pollution, beach defense and biological implications in areas of coastal up welling and coastal fronts. Specific cases in coastal pollution will be examined from coastal environments around the U.S., including Kepone in the James River, VA, DDT on the Palos Verde Shelf, CA., Eutrophication on the North Carolina Coast, The Exxon-Valdex Oil spill and Pfsteria in the coastal waters of N.C. and VA. Cross listed as MARS551.

Prerequisites: MARS 110^D or EGEO 131^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 457 - Marine Geophysics

A study of the basic geophysical theories about the transmission of shock waves, and gravity and magnetic fields to the understanding and exploration of the continental shelves and marine basins. The student is introduced to the use and limitations of the portable seismic refraction seismograph, gravity meter, and magnetometer.

Prerequisites: MARS 110^D or EGEO 131^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 458 - Exploration Methods in Marine Geology

A study of geophysical and geologic instruments and techniques used to penetrate the water layer obscuring the ocean bottom topography and geology and the results of some of that effort. Emphasis is on laboratory and field assignments using basic geophysical and geological instruments. The students are introduced to the use, limitations and results of these instruments.

Prerequisite: EGEO 101^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 459 - Coastal Geomorphology

A study of coastal environments with an emphasis on understanding the inter-relationship among land forms, processes and materials. The student will participate in field studies conducted along high and low wave energy environments.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 464 - Biological Oceanography

Interdisciplinary study of the interactions between biological communities and the ocean environment as seen by distributions of coastal plankton, fish, and benthic invertebrates. Projects will involve boat trips to sample populations and to quantitatively document environmental variables with state of the art equipment, laboratory and field experiments to determine rate processes, and visits to nearby field and government laboratories. Examples of project topics include transport of plankton at barrier island passes, effect of submarine banks on fish populations, ground truth data for satellite imagery, and other current topics in biological oceanography.

Prerequisites: MARS 110^D or EGEO 131^D

^D Requires minimum grade of D.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 490 - Independent Study

Independent research under the guidance of a faculty member. Prerequisite: Permission of the instructor, departmental chairperson, and dean of the college where the study will be conducted. (repeatable up to 6 credits) Independent Study courses give students the opportunity to pursue research and/or studies that are not part of the university's traditional course offerings. Students work one on one or in small groups with faculty guidance and are typically required to submit a final paper or project as determined by the supervising professor.

Credits: 1-3

Term(s) Typically Offered: Offered as Needed

MARS 491 - Coral Reef Ecology

A study of coral reef structure, formation, types, and the relationships of reef organisms to their environment. Emphasis is given to species diversity, identification, symbioses, and effects of temperature, salinity, light, nutrient concentration, predation, and competition on the abundance and the distribution of coral reef organisms.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 492 - Marine Mammals

A study of the distribution, population ecology, behavior, physiology and adaptations of marine mammals. Student projects will entail collecting physiological and behavioral data at field sites and at facilities studying marine mammals.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 493 - Behavioral Ecology

Designed to present animal behavior within an ecological and evolutionary context. Presents mathematical and theoretical framework of behavioral ecology. An in-depth exploration of the ways in which the behavior of animals is influenced by the environment, especially with regard to resource distribution.

Credits: 3

Term(s) Typically Offered: Offered as Needed

Students with a semester level of Freshman 1, Freshman 2 or Sophomore 1 may **not** enroll.

MARS 494 - Marine Aquaculture

This course will include the theory and practice of raising organisms for food and for the aquarium trade. Techniques for raising economically important organisms from the egg stage to marketable size and their food supplies will be studied.

Credits: 3

Term(s) Typically Offered: Offered as Needed

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MARS 495 - Workshop

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Credits: 1-6

Term(s) Typically Offered: Offered as Needed

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MARS 498 - Selected Topics

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Credits: 1-3

Term(s) Typically Offered: Offered as Needed

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