Marine Sciences (MAR)

Major and Minor in Marine Sciences

Marine Sciences Research Center

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Marine Sciences is a highly interdisciplinary field requiring an understanding and application of basic science, including biology, physics, and chemistry. In particular, the Marine Sciences major provides students with a solid background in basic biology as well as in the physics and chemistry of the ocean. Upper-division electives permit each student to gain a deeper understanding of particular groups of organisms (microorganisms, algae, marine invertebrates, fish, and marine mammals) and of habitats (salt marshes, rocky intertidal, barrier islands, dunes, estuaries, and the open ocean).

Students are encouraged to participate in research and internships. Opportunities for experiential learning are available through field and laboratory courses taught at or near the Stony Brook campus and from a field station near the ocean in Southampton, New York.

Most students who wish to have a career in research related to the marine environment will need to plan for graduate study. Career possibilities include research, education, or employment in government agencies or non-profit organizations.

The Marine Sciences major is administered by the Marine Sciences Research Center, one of the leading oceanographic institutions in the nation. The Marine Sciences Research Center (MSRC) is the center for marine research, education, and public service in the marine and environmental sciences for the State University of New York system. In addition, the MSRC is Stony Brook University’s center for research, education, and public service in the atmospheric sciences. The MSRC is one of the nation’s leading coastal oceanographic and atmospheric institutions, and the expertise of the MSRC faculty places them at the forefront of addressing and answering questions about regional environmental problems, as well as problems relating to the global ocean and atmosphere. The primary focus of the MSRC faculty is on fundamental research designed to increase understanding of the processes that characterize the coastal ocean and the atmosphere. The MSRC is also committed to applying the results of research to solve problems arising from society’s uses and misuses of the environment. The Center includes institutes in several major areas: the Institute for Terrestrial and Planetary Atmospheres, the Living Marine Resources Institute, the Long Island Groundwater Resource Institute, and the Waste Reduction and Management Institute. The institutes and many research projects add a wealth of varied resources to education and research at Stony Brook.

The MSRC offers undergraduate majors in atmospheric and oceanic sciences, environmental studies, marine sciences, and marine vertebrate biology, and minors in environmental studies and marine sciences. See the separate entries for atmospheric and oceanic sciences (ATM), environmental studies (ENS), and marine vertebrate biology (MVB) in the alphabetical listings of Approved Majors, Minors, and Programs. The MSRC also offers several cooperative programs in both marine and environmental sciences with departments in the College of Arts and Sciences (Chemistry, Geosciences) and the College of Engineering and Applied Sciences (Chemical and Molecular Engineering).

An Environmental Studies Living Learning Center is available, housed in Hendrix College, which is a part of the Science and Society College. The Living Learning Center offers special programs, such as a seminar series showcasing faculty research and selected courses in the major and minor.

Research opportunities in marine sciences, atmospheric sciences, and waste management are available to undergraduates. Information on research opportunities may be found by contacting faculty directly or on the MSRC Web site at http://www.msrc.sunysb.edu.

All students should consult with the director of undergraduate studies to design and approve an acceptable course of study before declaring the major.

Courses Offered in Marine Sciences

See the Course Descriptions listing in this Bulletin for complete information.

MAR 101-E  Long Island Sound: Science and Use
MAR 104-E  Oceanography
MAR 301  Environmental Microbiology
MAR 302  Marine Microbial Ecology
MAR 303  Long Island Marine Habitats
MAR 304-E  Waves, Tides, and Beaches
MAR 305  Experimental Marine Biology
MAR 308  Principles of Instrumental Analysis
MAR 315-H  Conservation Biology and Marine Biodiversity
MAR 318  Engineering Geology and Coastal Processes
MAR 320  Limnology
MAR 333-H  Coastal Oceanography
MAR 334-E  Remote Sensing of the Environment
MAR 336  Marine Pollution
MAR 340-H  Environmental Problems and Solutions
MAR 346  Marine Sedimentology
MAR 349  Introduction to Biological Oceanography
MAR 350  Introduction to Ocean Physics
MAR 351  Introduction to Ocean Chemistry
MAR 352 Introduction to Physical Oceanography
MAR 353 Physical Oceanography Laboratory
MAR 366 Plankton Ecology
MAR 370 Marine Mammals
MAR 371 The Biology and Conservation of Marine Birds and Sea Turtles
MAR 375 Marine Mammal and Sea Turtle Rehabilitation
MAR 380 Ichthyology
MAR 385 Principles of Fishery Biology and Management
MAR 388 Tropical Marine Ecology
MAR 392-H Waste Management Issues
MAR 394-H Environmental Toxicology and Public Health
MAR 395 Topics in Marine Environmental Sciences
MAR 475 Undergraduate Teaching Practicum
MAR 487 Research in Marine Sciences
MAR 488 Internship

Requirements for the Major in Marine Sciences (MAR)
The major in Marine Sciences leads to a Bachelor of Sciences degree. Completion of the major requires between 69 and 72 credits. Of these, no more than one course (4 credits) with a grade lower than C can be credited to the major.

1. Foundation Courses (41-42 credits)
   BIO 150 The Living World
   BIO 201 Organisms to Ecosystems
   BIO 202 Molecular and Cellular Biology
   BIO 203 Cellular and Organ Physiology
   CHE 131/133, 132/134 General Chemistry and Lab (see Note 1)
   CHE 321 Organic Chemistry
   MAT 125, 126 Calculus (see Note 2)
   ENS/PHY 119 Physics for Environmental Studies
   or PHY 121/123 Physics for Life Sciences with lab (see Note 3)
   AMS 102 or AMS 110 Statistics

2. Oceanography Core (13 credits)
   MAR 349 Biological Oceanography
   MAR 352 Introduction to Physical Oceanography
   MAR 353 Physical Oceanography Laboratory
   MAR 350 Introduction to Ocean Chemistry
   MAR 351 Physical Oceanography Laboratory
   MAR 355 Experimental Marine Biology

3. Marine Biology (15-17 credits)
   BIO 353 Marine Ecology
   Four marine biology electives from below:
   BIO 343 Invertebrate Zoology
   BIO 346 Aquatic Arthropods and Vertebrates
   MAR 301 Environmental Microbiology
   or MAR 302 Marine Microbial Ecology
   MAR 303 Long Island Marine Habitats
   MAR 315 Conservation Biology

4. Upper-Division Writing Requirement
   All students in the major must submit two papers from any upper division course in the major to the director of undergraduate programs for evaluation by the end of the junior year.
Notes:
1. CHE 141/143, 142/144 Honors Chemistry and Lab may be substituted for CHE 131/133, 132/134
2. MAT 131, 132 or MAT 141, 142 or MAT 171 may be substituted for MAT 125, 126
3. The first semester of any calculus-based Physics with lab can be substituted, such as PHY 125 or 131/133 or 141 or 142.

Requirements for the Minor in Marine Sciences (MAR)
The minor in Marine Sciences is open to students who either wish to prepare themselves for future graduate education in marine sciences or who are preparing for a career in a marine-related field. The minor, which is interdisciplinary in nature, provides a foundation in marine aspects of biology, chemistry, geology, and physics for the undergraduate. Intended primarily for science majors, the minor assumes completion of basic courses in mathematics, physics, chemistry, biology, or geology. No more than three credits of courses taken under the Pass/No Credit option may be applied toward the minor. Completion of the minor requires 18 credits.

1. MAR 101 or 104
2. At least 15 credits from the following:
   Upper-division MAR courses
   BIO 343
   BIO/GEO 353
   Note: No more than three credits each of MAR 487 and MAR 488 may be applied toward this requirement.