

MARINE BIOLOGY 2008-09



UNIVERSITY OF CALIFORNIA, SANTA CRUZ

THE MARINE BIOLOGY MAJOR

The marine biology major is designed to introduce students to marine ecosystems, including the great diversity of marine organisms and their coastal and oceanic environments. The emphasis is on basic principles that help us to understand the processes that shape life in marine environments. The marine biology major is a demanding program that offers a B.S. degree and requires several more courses than the general biology B.A. major.

STUDY AND RESEARCH OPPORTUNITIES

- ◆ Undergraduate Degree Available: Bachelor of Science (B.S.)
- ◆ The hallmark of this major: the large number of lab and field courses that provide students with opportunities to study and conduct research in a diversity of marine ecosystems: beaches, rocky intertidal, estuaries, kelp forests, coral reefs, and nearshore open ocean
- ◆ Over 15 courses focused on marine topics
- ◆ Ten field and laboratory marine courses that require students to conduct directed and independent research projects
- ◆ An array of opportunities to work with marine-oriented federal agencies (e.g., NOAA National Marine Fisheries Service, United States Geological Service (USGS), U.S. Fish and Wildlife Service, National Marine Sanctuary Program, Elkhorn Slough National Estuarine Research Reserve), and state agencies (e.g., California Department of Fish and Game, California Coastal Commission, Water Quality Control Boards), research institutions (e.g., Monterey Bay Aquarium Research Institute), and non-profit organizations in the Monterey Bay area for directed faculty- and/or department-sponsored independent study in marine biology

HIGH SCHOOL PREPARATION

In addition to the courses required for UC admission, high school students who intend to major in marine biology should take high school courses in biology, chemistry, advanced mathematics (precalculus), and physics.

TRANSFER PREPARATION

The faculty encourage applications from transfer students in the biological sciences. Students and their college advisers are strongly recommended to examine the degree requirements for the student's intended major: www.biology.ucsc.edu/program. Students should satisfy as many introductory requirements as possible prior to transfer. Courses offered at the student's institution should be compared to the UC Santa Cruz transfer agreements (found at www.assist.org) and/or course descriptions to ensure that they will qualify for transfer. It is very important for transfer students to complete science prerequisite courses before transfer, especially calculus, general chemistry with labs, and an introductory biology sequence. Students should also take physics, if possible. Prospective transfer students should visit the biology undergraduate advising web site for further information (see the *For More Information* section). In addition, please see the *Course Substitution/Transfer Credit* section.

Introductory requirements for the marine biology major are:

- Biology 20A, *Cell and Molecular Biology*, 20B, *Development and Physiology*, and 20C, *Ecology and Evolution*
- Chemistry 1A, 1B/M, and 1C/N, *General Chemistry with Laboratory* (three quarters)
- Applied Mathematics and Statistics 7/L, *Biostatistics with Laboratory*
- Mathematics 11A-B, *Calculus with Applications* (two quarters) or Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics* (two quarters)
- Physics 7A/L and 7B/M, *Elementary Physics* (two quarters)

RECOGNITION

Faculty in the Department of Ecology and Evolutionary Biology are internationally recognized for their research on the genetics and evolution of marine organisms (Drs. Giacomo Bernardi, Lynda Goff, and Grant Pogson), the physiological ecology of marine species (Drs. Daniel Costa and Terrie Williams), and behavioral, population, and ecosystem ecology (Drs. Mark Carr, Don Croll, James Estes, Don Potts, Pete Raimondi). All of these faculty are involved in the application of their research to marine management and conservation.

CAREERS

Students with bachelor's degrees in marine biology find employment opportunities in a variety of fields. In conjunction with a teaching credential or graduate degree in teaching, students often use their marine biology background to teach science at the K–12 level.

Technical positions with local, state, and federal governmental agencies are most commonly pursued. Coastal cities and counties maintain biology staffs for monitoring and evaluating water quality and environmental impacts of marine discharges. Examples of employment opportunities with California's state agencies include the State Water Resources Control Board and Regional Water Quality Control Boards; Environmental Protection Agency; Departments of Conservation, Fish and Game, Parks and Recreation, and Water Resources; and the California Coastal Commission (these and other applicable state agencies are listed at resources.ca.gov). Examples of federal agencies include National Marine Fisheries Service, U.S. Fish and Wildlife, United States Geological Service's Biological Resources Division, Environmental Protection Agency, National Marine Sanctuaries, National Ocean Service, National Park Service, and others. The number of local, regional, national, and international non-governmental organizations (NGOs), especially those oriented toward marine conservation, continues to grow rapidly. These organizations hire students as interns and permanent technical staff.

Elsewhere in the private sector, students find employment with mariculture, environmental consulting, aquariums, and biotechnology firms. Academic research institutions also hire students for technical research positions. All of the above provide students opportunities to explore career trajectories as they consider continuing their education in graduate programs. The strong reputation of the marine biology program at UC Santa Cruz underpins the strong record of successful placement of its graduates in employment and graduate programs.

COURSE SUBSTITUTION/TRANSFER CREDIT

At least half of the upper-division courses (Biol/Bioe 100–190) required for each biological sciences major must be taken through the biological sciences program at UC Santa Cruz, not as transfer credits from another department or institution. Transfer students are advised to contact the Biological Sciences Undergraduate Advising Office before enrolling in numerous upper-division courses at other institutions.

EDUCATION ABROAD PROGRAM (EAP)

The UC Education Abroad Program (EAP) offers qualified students unique opportunities to broaden their educational horizons. Many programs are in English-speaking countries or use English for advanced courses. Many programs offer small classes and extensive laboratory and/or field research experience.

There are excellent programs for biological science students in Costa Rica, Australia, and New Zealand, among others. The Costa Rica Tropical Biology Program is of note to students interested in tropical biology and ecology. Held spring and fall quarters at the Monteverde Research Station, this program gives students experience with hands-on field research, offers a homestay program, and carries credit for upper-division biology courses. The University of Queensland (Australia) offers an intensive, full-semester Marine Science Program, which includes a stay at a research station on the Great Barrier Reef, near sheltered mangrove and seagrass habitats.

Students interested in study abroad need to get an early start on their basic science requirements, including general and organic chemistry, math, and introductory biology. Visit the EAP office as soon as possible to begin planning, and seek advice about your academic plan from the biological sciences undergraduate adviser and/or faculty adviser.

ACADEMIC ADVISING

Academic advising is available at the Biological Sciences Undergraduate Advising Office. The advising office publishes the Biological Sciences Undergraduate Web Site, www.biology.ucsc.edu, which contains detailed information about the degree programs, sample schedules, transferring credit, placement exams, faculty research, and opportunities in the Biological Sciences majors.

FOR MORE INFORMATION

For further information about the marine biology major and upper-division course requirements, see:

reg.ucsc.edu/catalog/html/programs_courses/biolPS.html#EEB

The biological sciences web site can be found at:

www.biology.ucsc.edu

If you have other questions, contact:

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