

# MARINE SCIENCE, B.S.

## Contact

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## Mission

The mission of the School of Marine and Environmental Programs at the University of New England is to help our students gain an understanding of the natural world, develop critical thinking skills, and become scientifically literate. Together we lay the foundation for lifelong learning and meaningful, productive contributions to society.

The Marine Sciences encompass a wide variety of disciplines that seek to understand the way the ocean functions, how it is related to earth systems science, and how humans interact with the environment. Students will learn the theoretical underpinnings and applications of disciplines from biology to chemistry, geology, and physics. These disciplines are critical to life as we know it on the planet. Students will be able to apply these disciplines to solving real problems, in ocean sciences and beyond.

## Major Description

The Marine Science program offers a baccalaureate education to students interested in all facets of the marine environment. The classroom curriculum provides a strong background in the marine sciences, including biology, chemistry, physics, and geology of the oceans and their surroundings. The program focuses on hands-on activities, internships, and research experiences in addition to classroom work.

The marine science major is designed to provide students with a strong science foundation upon which to build their marine specialty courses. The program is flexible and students are encouraged to explore many areas of the marine sciences through courses and internships emphasizing "hands-on" experiences. An additional goal of the major is to provide students with an adequate background for entry-level career positions and for graduate study in marine science programs, or any field requiring a strong science background. The University is located on the Saco River where it joins the Atlantic Ocean, providing numerous marine, estuarine, and freshwater habitats to study on or adjacent to campus.

## The Marine Living Learning Community (MLC)

All entering first-year Marine Science, Marine Affairs, and Marine Entrepreneurship majors are invited to participate in a year-long living learning community focused on developing the skills needed to be a successful student, discovery of their majors and associated learning opportunities, and building relationships with peers, faculty, and professional staff.

The MLC integrates classroom learning, student success programming, experiential opportunities, as well as team-building and leadership development programs designed to assist Marine majors in their transitions from high school to college to career.

Learning Community courses and events allows students an opportunity to expand their interests and grow personally, as well as professionally. A dedicated team comprised of faculty, professional staff, and peer leaders

supports the MLC. This community of learning enriches classroom content and allows an opportunity to apply learning in context.

Students who participate in the MLC are expected to:

- Live together in a Residence Hall Community designed by the Office of Housing and Resident/Commuter Life.
- Take two or more designated courses in common over their first year.
- Participate in required experiential learning opportunities and community programs.

For more information, the application, important deadlines, and orientation dates, please visit the Division of Student Affairs webpage (<https://www.une.edu/student-affairs/housing-and-residentialcommuter-life/living-learning-communities-and-theme-housing/>).

## Transfer Credit

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

## Admissions

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

## Financial Information

Tuition and fees for subsequent years may vary. Other expenses include books and housing. For more tuition and fee information, please consult this catalog's Financial Information (<https://catalog.une.edu/undergraduate/financial-information-undergraduate-programs/>) section.

## Lab Fees

Travel courses have separate fees that vary depending on the course.

## Curricular Requirements

### Marine Biology Concentration

Code	Title	Hours
<b>Nor'easter Core Requirements</b>		
	Nor'easter Core Requirements ( <a href="https://catalog.une.edu/undergraduate/core-curriculum/">https://catalog.une.edu/undergraduate/core-curriculum/</a> )	40
<b>Marine Biology Concentration Required Courses</b>		
CHE 110 & 110L or CHE 150 & 150L	General Chemistry I and General Chemistry I Lab University General Chemistry I and University General Chemistry I Lab	4
CHE 111 & 111L or CHE 151 & 151L	General Chemistry II and General Chemistry II Lab University General Chemistry II and University General Chemistry II Lab	4
MAR 105 & 105L	Ecology and Evolution of Marine Organisms and Eco/Evo of Mar Organisms Lab	4
MAR 106 & 106L	Cellular and Molecular Biology of Marine Organisms and Cell/Molec Bio/Marine Orgs Lab	4
MAR 250 & 250L	Marine Biology and Marine Biology Lab	4
MAR 270 & 270L	Oceanography and Oceanography Lab	4

MAR 325	Marine Science Speaker Series	1
MAT 150	Statistics for Life Sciences	3
MAT 190	Calculus I	4
PHY 110	General Physics I w/Lab	4
or PHY 210	University Physics I	
PHY 111	General Physics II w/Lab	4
or PHY 211	University Physics II	
One MAR 400-level course <sup>1</sup>		3
One Cellular and Molecular Area Course		3-4
One Organismal Area Course		3-4
One Physiological Area Course		3-4
One Process Area Course		3-4
Eight Credits of Marine Science Electives		8
Open Elective Courses (Students complete open elective credits as necessary to meet the University's 120-credit minimum for graduation. The total number of elective credits required will depend on the student's completed program, core, and other degree requirements.)		17
<b>Total Hours</b>		<b>120-124</b>

<sup>1</sup> MAR 400-level may be fulfilled by BIO 422 Coral Biology – Marine Biology Topics: Coral Reefs with lab. MAR 410 Marine Science Research and MAR 495 Adv Marine Science Internship cannot be used for this requirement.

## Oceanography Concentration

Code	Title	Hours
<b>Nor'easter Core Requirements</b>		
Nor'easter Core Requirements ( <a href="https://catalog.une.edu/undergraduate/core-curriculum/">https://catalog.une.edu/undergraduate/core-curriculum/</a> )		40
<b>Oceanography Concentration Required Courses</b>		
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
or CHE 150 & 150L	University General Chemistry I and University General Chemistry I Lab	
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
or CHE 151 & 151L	University General Chemistry II and University General Chemistry II Lab	
CHE 201 & 201L	Organic Chemistry I and Organic Chemistry I Lab	4
Select one of the following:		4
CHE 202 & 202L	Organic Chemistry II and Organic Chemistry II Lab	
CHE 310 & 310L	Fundamentals of Biochemistry and Biochemistry Lab	
MAR 105 & 105L	Ecology and Evolution of Marine Organisms and Eco/Evo of Mar Organisms Lab	4
MAR 106 & 106L	Cellular and Molecular Biology of Marine Organisms and Cell/Molec Bio/Marine Orgs Lab	4
MAR 250 & 250L	Marine Biology and Marine Biology Lab	4
MAR 270 & 270L	Oceanography and Oceanography Lab	4

MAR 325	Marine Science Speaker Series	1
MAR 366	Adv Oceanography I:Bio/Geo	3
MAR 368	Advanced Oceanography II: Chemical and Physical Oceanography	3
MAT 150	Statistics for Life Sciences	3
MAT 190	Calculus I	4
MAT 195	Calculus II	4
MAT 225	Computer Programming with MAT LAB	3
or DSC 225	Programming I	
PHY 110	General Physics I w/Lab	4
or PHY 210	University Physics I	
PHY 111	General Physics II w/Lab	4
or PHY 211	University Physics II	
One 400-level MAR course <sup>1</sup>		3
Open Elective Courses (Students complete open elective credits as necessary to meet the University's 120-credit minimum for graduation. The total number of elective credits required will depend on the student's completed program, core, and other degree requirements.)		16
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> MAR 400-level may be fulfilled by BIO 422 Coral Biology – Marine Biology Topics: Coral Reefs with lab. MAR 410 Marine Science Research and MAR 495 Adv Marine Science Internship cannot be used for this requirement.

## Topic Area Courses

Code	Title	Hours
<b>Topic Area Courses</b>		
<b>Organismal Biology Area Courses:</b>		
BIO 234 & 234L	Environmental Microbiology and Environmental Microbiology Lab	4
BIO 330 & 330L	and (Comparative Vertebrate Anatomy w/Lab)	4
MAR 222 & 222L	Finfish/Shellfish Culture Tech and Finfish/Shellfish Culture Tech Lab	4
MAR 223 & 223L	Health, Nutrition, Feeding Cultured Organisms and Health, Nutrition, Feeding Cultured Organisms Lab	4
MAR 312 & 312L	Plankton Ecology and Plankton Lab	4
MAR 320 & 320L	Invertebrate Zoology and Invertebrate Zoology Lab	4
MAR 331 & 331L	Biology of Fishes and Biology of Fishes Lab	4
MAR 355 & 355L	Biology of Marine Mammals and Biology of Marine Mammals Lab	4
MAR 375 & 375L	and (Biology of Sharks, Skates, and Rays w/Lab)	4
MAR 422 & 422L	Coral Biology and Coral Biology Lab	4
MAR 452 & 452L	Nat Hist & Ev of Galapagos Faun and Nat His&Evo Galapagos Faun Lab	4
<b>Process Area Courses:</b>		

MAR 335 & 335L	Animal Behavior and Behavioral Ecology and Animal Behav/Behav Ecology Lab	4
MAR 350 & 350L	Marine Ecology and Marine Ecology Lab	4
MAR 432 & 432L	Fisheries Biology and Fisheries Biology Lab	4
Physiology Area Courses:		
BIO 322	Comparative Animal Physiology	3
BIO 421 & 421L	and (Physiological Ecology of Fishes w/Lab)	4
or MAR 421 & 421L	Marine Science Topics and Marine Science Topics Lab	
MAR 305 & 305L	Aquatic Health Management and Aquatic Health Management Lab	4
MAR 380	Exp. Animal Physiology	4
Cell and Molecular Area Course:		
MAR 220 & 220L	Cellular & Molecular Approaches in Marine Sciences and Cell/Mole Approaches in MS Lab	4

## Electives

Code	Title	Hours
<b>Marine Electives</b>		
Any course with a CHE prefix (200-level or above)		3-5
Any course with a GIS prefix		3-4
Any course with a MAF prefix		3
Any course with a MAR prefix (200-level or above)		3-4

Please note: While some courses can fulfill both core and program requirements, the credits earned do not count twice towards the minimum total required credits for the degree.

Students wishing to pursue teacher certification in Life Science can complete a double major with Marine Science and Middle and Secondary Education or a major in Middle and Secondary Education and a concentration in Marine Science. For more information, see the Middle and Secondary Education catalog page. (<https://catalog.une.edu/programs/middle-secondary-education-certification-bs/>)

Students in this major can participate in the pre-health graduate school preparation tracks. (<https://catalog.une.edu/programs/science-prerequisites-health-professions/>)

## Academic and Technical Standards

### Graduation Requirements

A minimum grade of C- must be achieved in all science and mathematics courses used toward graduation in any of the programs in the School of Marine and Environmental Programs. A 2.00 cumulative average in sciences is a requirement for graduation in any of the programs in the School of Marine and Environmental Programs.

### Program completion Time

Students have a maximum of seven years to complete the graduation requirements.

## Learning Outcomes

Students who successfully complete the program will be able to:

- Demonstrate a strong content-knowledge foundation in their field of study by (all of the below):
  - describing biotic and abiotic characteristics of the Gulf of Maine
  - explaining how our region compares and connects to ocean systems around the world
  - explaining how and why the ocean and its inhabitants change/ have changed over varying time scales
- Contribute to and/or lead efforts to protect the ocean and coastal environment by:
  - discussing potential mitigation, adaptation, and/or conservation strategies to address climate change and other contemporary human-induced challenges
- Demonstrate practical skills in their field of study by (first two below required + at least one additional):
  - collecting meaningful data using field or laboratory gear/ instruments
  - analyzing data through spreadsheet manipulation, figure generation, and statistical analysis
  - earning formal credentials such as a UNE badge, boat captain license, drone pilot license, SCUBA certification, animal care/life support system certification, zoo/aquarium interpretive guide certification, data science certification, GIS certification, etc.
  - successfully completing an internship course
  - successfully completing research credits with a faculty member
- Demonstrate critical thinking in their specific field of study by (at least one of the below):
  - evaluating the literature published by professionals
  - making recommendations to policy makers
  - creating and innovating in their field (e.g., designing an experiment and interpreting its results in the context of other work, developing a new piece of data collecting equipment, developing materials to teach information or methodology to others, etc.)
- Communicate their scientific knowledge effectively by (all of the below):
  - creating clear written materials that are appropriately formatted for the audience (e.g., peers, professionals, decision-makers, stakeholders, the public, etc.)
  - creating and delivering clear oral presentations and/or recordings that are appropriately formatted for the audience (e.g., peers, professionals, decision-makers, stakeholders, the public, etc.)