

Marine Sciences (BS): Biological Oceanography Concentration

The degree of Bachelor of Science in Marine Science may be obtained by selecting one of five concentrations: Biological Oceanography, Chemistry, Geology, Meteorology, or Physics.

The degree of Bachelor of Science in Natural Resources is available with a concentration in Marine and Coastal Resources.

Marine scientists explore all aspects of the seas and coastal regions, seeking to understand how the oceans, their biological communities, the solid earth and the atmosphere interact. As professionals with interdisciplinary training, marine scientists are needed to advise business, industry and governments on the potential impact of human activities and the wise use of marine resources. Marine scientists work for consulting firms; regulatory agencies; the mass media; business and industry; federal, state and local governments; academic laboratories; research and education organizations; and nonprofit environmental watchdog groups.

Contact

For more information about our marine science programs, visit our website (<https://meas.sciences.ncsu.edu/undergraduate/programs/marine-science/>) or contact:

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Plan Requirements

Code	Title	Hours
Core Courses/Marine Science ¹		
MEA 100	Earth System Science: Exploring the Connections	4
MEA 200	Introduction to Oceanography	3
MEA 210	Oceanography Lab	1
MEA 250	Introduction to Coastal Environments	3
MEA 251	Introduction to Coastal Environments Laboratory	1
MEA 459	Field Investigation of Coastal Processes	5
MEA 460	Principles of Physical Oceanography	3
MEA 462	Observational Methods and Data Analysis in Marine Physics	3
MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1
Biological Oceanography Concentration ¹		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity ¹	4
BIO 183	Introductory Biology: Cellular and Molecular Biology ¹	4
Select one of the following Organic Chemistry course sets:		4

CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
PB 200 or PB 250	Plant Life Plant Biology	4
Concentration Electives ^{1, 2}		15
AEC/PB 360	Ecology	4
MEA 449 or MEA 549	Principles of Biological Oceanography Principles of Biological Oceanography	3
ZO 350	Animal Phylogeny and Diversity	4
Basic Math & Sciences ¹		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory ¹	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory ¹	4
Select one of the following Physics I courses: ¹		4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	
PY 211	College Physics I	
Select one of the following Physics II courses:		4
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	
PY 212	College Physics II	
MA 131 or MA 141	Calculus for Life and Management Sciences A ¹ Calculus I	3
MA 231 or MA 241	Calculus for Life and Management Sciences B ¹ Calculus II	3
Statistics Elective (p.)		3
Select one of the following Computer Science electives:		3
GIS 280	Introduction to GIS	
MEA 217	Introduction to Computing in the Geosciences	
CSC 111	Introduction to Computing: Python	
CSC 112	Introduction to Computing-FORTRAN	
CSC 113	Introduction to Computing - MATLAB	
College Requirements		
COS 100	Science of Change ³	2
ENG 101	Academic Writing and Research ¹	4
Select one of the following Advanced Writing courses:		3
ENG 331	Communication for Engineering and Technology	
ENG 332	Communication for Business and Management	
ENG 333	Communication for Science and Research	
GEP Courses		
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3

GEP Global Knowledge (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/>) (verify requirement)

GEP Foundations of American Democracy (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/>) (verify requirement)

World Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/>) (verify requirement)

Total Hours **120**

¹ Grade of C- or higher required in BIO 181, 183; CH 101, 201; ENG 101; MA 131/141, 231/241; PY 211/205. No more than one D will be accepted in MEA core courses and concentration courses. No more than one D will be accepted in other basic math or science courses.

² Students should consult their academic advisors to determine which courses fill this requirement.

³ COS 100 is for new freshmen only. Transfer students will need to select a course from the GEP Interdisciplinary Perspectives course list.

Statistics Electives

Code	Title	Hours
ST 311	Introduction to Statistics	3
ST 312	Introduction to Statistics II	3
ST/BUS 350	Economics and Business Statistics	3
ST 370	Probability and Statistics for Engineers	3
ST 371	Introduction to Probability and Distribution Theory	3
ST 372	Introduction to Statistical Inference and Regression	3

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity ¹	4
COS 100	Science of Change ³	2
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
MA 131 or MA 141	Calculus for Life and Management Sciences A (CP) ¹ or Calculus I	3-4
MEA 100	Earth System Science: Exploring the Connections ¹	4
Hours		14

Spring Semester

BIO 183	Introductory Biology: Cellular and Molecular Biology ¹	4
ENG 101	Academic Writing and Research ¹	4
MEA 200 & MEA 210	Introduction to Oceanography and Oceanography Lab (CP) ²	4
MA 231 or MA 241	Calculus for Life and Management Sciences B ¹ or Calculus II	3-4
Hours		15

Second Year

Fall Semester

PB 200 or PB 250	Plant Life ² or Plant Biology	4
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory (CP) ¹	4
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
Select one of the following:		4
PY 205 & PY 206 or PY 211	Physics for Engineers and Scientists I or College Physics I	

Hours **15**

Spring Semester

ZO 350	Animal Phylogeny and Diversity ¹	4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory ¹	4
MEA 250 & MEA 251	Introduction to Coastal Environments and Introduction to Coastal Environments Laboratory ¹	4
PY 208 & PY 209 or PY 212	Physics for Engineers and Scientists II ¹ or College Physics II	4

Hours **16**

Third Year

Fall Semester

Concentration Elective ^{1, 2}		3
CH 220 or CH 221	Introductory Organic Chemistry ¹ or Organic Chemistry I	3
CH 222	Organic Chemistry I Lab ¹	1
MEA 449/549	Principles of Biological Oceanography ¹	3
MEA 460/540	Principles of Physical Oceanography ¹	3

Hours **13**

Spring Semester

Concentration Elective ^{1, 2}		3
MEA 462	Observational Methods and Data Analysis in Marine Physics ¹	3
MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1
Statistical Science Option (p.) ³		3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1

Hours **14**

Summer

MEA 459	Field Investigation of Coastal Processes ²	5
	Hours	5

Fourth Year

Fall Semester

Advanced Writing Elective (p. 1)		3
Concentration Elective ^{1, 2}		3
PB 360	Ecology ¹	4

GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	3
Hours	13
Spring Semester	
Concentration Elective ^{1, 2}	3
Concentration Elective ^{1, 2}	3
Computer Science Option Elective (p. 1) ¹	3
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)	3
Hours	15
Total Hours	120

¹ A grade of C- or higher is required.

² No more than one D will be accepted in MEA core courses and concentration courses.

³ No more than one D will be accepted in other basic math or science courses.

Career Opportunities

MEAS undergraduate degree programs provide talented students with the foundation of scientific knowledge required for careers in government, industry, or academia. Many students pursue graduate degrees after completion of an undergraduate degree in Marine Science.

Marine Sciences graduates go on to become oceanographers, to manage our coastal resources, model air-sea interaction, and explore global climate change. They conduct basic and applied research, serving as environmental consultants for industry and governmental agencies, policy and management experts for governmental agencies, and environmental science educators. Graduates with a Natural Resources degree are versed in the fundamental processes and interdisciplinary nature of the coastal zone. As scientists, managers, administrators, and regulators, they make decisions regarding use and conservation of coastal and marine resources.

MEAS graduates play a key service role for the State of North Carolina, assisting in everything from forecasting severe storms and analyzing the impact of atmospheric pollutants on agriculture and our estuaries, to determining the effects of toxic waste disposal on quality of surface and ground water.

Career Titles

- Chief Scientist
- Coastal Geologist
- Conservation Scientist
- Contact Diver
- Environmental Consultant
- Environmental Protection Specialist
- Environmental Research Scientist
- Environmental Scientist
- GIS and Geological Oceanography Specialist
- Marine Eco-toxicologist
- Marine Geophysicist
- Natural Science Manager

- Ocean Mapper
- Oceanographer
- Sensory Biophysicist
- Undersea Specialist
- Wildlife Biologist
- Zoologist

Learn More About Careers

NCCareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

Marine Careers (<https://www.marinecareers.net/>)

Careers in Oceanography, Marine Science, & Marine Biology (<https://ocean.peterbrueggeman.com/career.html>)

Association for the Sciences of Limnology and Oceanography (<https://www.aslo.org/>)