Marine Sciences (BS): Biological Oceanography Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (https://apps.oirp.ncsu.edu/pgas/)!

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:

Maggie Puryear
Associate Director of Undergraduate Programs
mwpollar@ncsu.edu
919.513.1093

Plan Requirements

Code	Title	Hours	Counts towards
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	Plant Life	4	
or PB 250	Plant Biology		
Concentration Electives [1, 2]		15	
AEC/PB 360	Ecology	4	
MEA 449	Principles of Biological Oceanography	3	
or MEA 549	Principles of Biological Oceanography		
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	Calculus for Life and Management Sciences A [1]	3
or MA 141	Calculus I	
MA 231	Calculus for Life and Management Sciences B [1]	3
or MA 241	Calculus II	
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 US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-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	Counts towards
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 US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		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 and pursue careers in industry, at government agencies and in academia.

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.

Geology graduates address society's needs for dealing effectively with earth processes, such as water resources and the stability of land forms. They work for engineering firms, permit-issuing agencies, and industries that rely on geological resources. Historical geologists are familiar with the evolution of earth through time and provide a perspective on potential long-term reactions of the earth systems to change. Those who concentrate in Environmental Geology are trained to assess and monitor geological resources such as ground water. Marine geologists are experts in the complex issues facing industry, municipalities, and residents in the dynamic and ecologically vulnerable coastal zone.

Meteorology graduates enjoy careers in weather forecasting, air quality assessment, development of weather products and services, broadcast communications, and advanced research. Marine meteorologists study ocean-generated weather systems. Their research is yielding practical benefits such as refined prediction of storm surge, which has streamlined evacuation efforts during severe storms along the Carolina coast. Meteorology graduates with an air quality emphasis work for environmental firms, regulatory agencies, and in applied research. Study of air quality and how air pollution is transported and dispersed is a rapidly expanding field in the atmospheric sciences.

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.