Marine Sciences (BS): Meteorology 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.

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
Email: mwpollar@ncsu.edu
Phone: 919-513-1093

Plan Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
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<tbody>
<tr>
<td>MEA 100</td>
<td>Earth System Science: Exploring the Connections</td>
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<tr>
<td>MEA 200</td>
<td>Introduction to Oceanography</td>
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<tr>
<td>MEA 210</td>
<td>Oceanography Lab</td>
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<td>MEA 250</td>
<td>Introduction to Coastal Environments</td>
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<td>MEA 459</td>
<td>Field Investigation of Coastal Processes</td>
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<td>MEA 460</td>
<td>Principles of Physical Oceanography</td>
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Meteorology Concentration

<table>
<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
<th>Counts towards</th>
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<tbody>
<tr>
<td>MEA 215</td>
<td>Introduction to Atmospheric Sciences</td>
<td>4</td>
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<tr>
<td>MEA 321</td>
<td>Fundamentals of Air Quality and Climate Change</td>
<td>3</td>
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<td>MEA 312</td>
<td>Atmospheric Thermodynamics</td>
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<td>MEA 421</td>
<td>Atmospheric Dynamics I</td>
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<td>MEA 463</td>
<td>Fluid Physics</td>
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<td>MEA 464</td>
<td>Ocean Circulation Systems</td>
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<tr>
<td>MEA 467</td>
<td>Marine Meteorology</td>
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Meteorology Concentration Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
<th>Counts towards</th>
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<tbody>
<tr>
<td>CH 101</td>
<td>Chemistry - A Molecular Science</td>
<td>3</td>
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<tr>
<td>CH 102</td>
<td>General Chemistry Laboratory</td>
<td>1</td>
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<tr>
<td>CH 201</td>
<td>Chemistry - A Quantitative Science</td>
<td>3</td>
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<tr>
<td>CH 202</td>
<td>Quantitative Chemistry Laboratory</td>
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<tr>
<td>PY 205</td>
<td>Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PY 208</td>
<td>Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory</td>
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<tr>
<td>MA 141</td>
<td>Calculus I</td>
<td>4</td>
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<tr>
<td>MA 241</td>
<td>Calculus II</td>
<td>4</td>
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<tr>
<td>MA 242</td>
<td>Calculus III</td>
<td>4</td>
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</table>
MA 341  Applied Differential Equations I  3

ST 370  Probability and Statistics for Engineers  3

Select one of the following Computer Science electives:  3

CSC 112  Introduction to Computing - FORTRAN
CSC 113  Introduction to Computing - MATLAB
CSC 116  Introduction to Computing - Java

College Requirements

COS 100  Science of Change  2
ENG 101  Academic Writing and Research  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 Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-additional-breadth/) (Humanities/Social Sciences/Visual and Performing Arts)  3

GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)

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/gep-foreign-language-proficiency/) (verify requirement)

Total Hours  120

1 A grade of C- or higher is required.
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.

Semester Sequence

This is a sample.

First Year

Fall Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 101</td>
<td>Chemistry - A Molecular Science (CP) 1</td>
<td>3</td>
</tr>
<tr>
<td>CH 102</td>
<td>General Chemistry Laboratory 3</td>
<td>1</td>
</tr>
<tr>
<td>MA 141</td>
<td>Calculus I (CP) 1</td>
<td>4</td>
</tr>
<tr>
<td>MEA 100</td>
<td>Earth System Science: Exploring the Connections 2</td>
<td>4</td>
</tr>
<tr>
<td>COS 100</td>
<td>Science of Change</td>
<td>2</td>
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<td><strong>Hours</strong></td>
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<td><strong>14</strong></td>
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<tr>
<td>Spring Semester</td>
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<tr>
<td>CH 201</td>
<td>Chemistry - A Quantitative Science 1</td>
<td>3</td>
</tr>
<tr>
<td>CH 202</td>
<td>Quantitative Chemistry Laboratory 3</td>
<td>1</td>
</tr>
<tr>
<td>ENG 101</td>
<td>Academic Writing and Research 1</td>
<td>4</td>
</tr>
<tr>
<td>MA 241</td>
<td>Calculus II (CP) 1</td>
<td>4</td>
</tr>
<tr>
<td>MEA 215</td>
<td>Introduction to Atmospheric Sciences 2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
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<td><strong>16</strong></td>
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Second Year

Fall Semester

Computer Science Option Elective (p. 1)  3

MA 242  Calculus III 3  4

MEA 200  Introduction to Oceanography (CP) 2  3

MEA 210  Oceanography Lab 2  1

PY 205  Physics for Engineers and Scientists I (CP) 1  3

PY 206  Physics for Engineers and Scientists I Laboratory 3  1

**Hours**  15

Spring Semester

MA 341  Applied Differential Equations I 3  3

MEA 250  Introduction to Coastal Environments 2  3

MEA 312  Atmospheric Thermodynamics 2  4
Marine Sciences (BS): Meteorology Concentration

Years

First Year

Fall Semester

ST 370 Probability and Statistics for Engineers 3 3
ME 463 Fluid Physics 2 3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/ 3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/ (Humanities/Social Sciences/Visual and Performing Arts) 3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/ 3

Spring Semester

PY 208 Physics for Engineers and Scientists II 3 3
ME 421 Atmospheric Dynamics I 1 3
ME 460 Principles of Physical Oceanography 2 3
ST 370 Probability and Statistics for Engineers 3 3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) 3

Total Hours 120

Second Year

Fall Semester

ME 321 Fundamentals of Air Quality and Climate Change 2 3
ME 421 Atmospheric Dynamics I 3
ME 460 Principles of Physical Oceanography 2 3
ST 370 Probability and Statistics for Engineers 3 3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) 3

Summer

ME 459 Field Investigation of Coastal Processes 2 5

Third Year

Fall Semester

ME 321 Fundamentals of Air Quality and Climate Change 2 3
ME 421 Atmospheric Dynamics I 3
ME 460 Principles of Physical Oceanography 2 3
ST 370 Probability and Statistics for Engineers 3 3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) 3

Spring Semester

Advanced Writing Elective (p. 1) 3
Approved Elective (p. 1) 2 3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/) 1
ME 462 Observational Methods and Data Analysis in Marine Physics 2 3
ME 467 Marine Meteorology 2 3
ME 495 Junior Seminar in the Marine, Earth, and Atmospheric Sciences 1

Summer

ME 459 Field Investigation of Coastal Processes 2 5

Fourth Year

Fall Semester

Approved Elective (p. 1) 2 4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) 3
ME 463 Fluid Physics 2 3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) 3

Spring Semester

Approved Elective (p. 1) 2 4
ME 464 Ocean Circulation Systems 2 3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/ (Humanities/Social Sciences/Visual and Performing Arts) 3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) 3

Total Hours 120

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.