

# Meteorology (BS)

The degree of Bachelor of Science in Meteorology is offered in the Department of Marine, Earth and Atmospheric Sciences. A concentration in Marine Science may also be chosen.

Meteorologists study a diverse array of topics, including climate, air pollution, environmental impacts, weather analysis and forecasting, remote sensing, atmospheric physics and interactions between the atmosphere and other components of the earth system. Our undergraduate students pursue careers in air quality, weather forecasting, meteorological research, broadcast meteorology and positions with the armed forces. The proximity of the Environmental Protection Agency center in nearby Research Triangle Park, the NC Department of Air Quality, a strong working relation with the local media, and the presence of the State Climate Office and a NWS forecast office on the NC State campus all provide our students with a broad range of internship and employment possibilities.

## Contact

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

### Maggie Puryear

Associate Director of Undergraduate Programs  
919.513.1093  
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## Plan Requirements

Code	Title	Hours
<b>Orientation</b>		
COS 100	Science of Change <sup>1</sup>	2
<b>English / Communication</b>		
ENG 101	Academic Writing and Research <sup>2</sup>	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	
<b>Math / Statistics</b>		
MEA 217	Introduction to Computing in the Geosciences <sup>2</sup>	3
or MA 116	Introduction to Scientific Programming (Math)	
or PY 251	Introduction to Scientific Computing	
or CSC 113	Introduction to Computing - MATLAB	
MA 141	Calculus I <sup>2</sup>	4
MA 241	Calculus II <sup>2</sup>	4
MA 242	Calculus III	4
MA 341	Applied Differential Equations I	3
ST 311	Introduction to Statistics	3
or ST 370	Probability and Statistics for Engineers	
or ST 371	Introduction to Probability and Distribution Theory	
<b>Chemistry / Physics</b>		
CH 101	Chemistry - A Molecular Science <sup>2</sup>	3
CH 102	General Chemistry Laboratory	1
Chemistry Option (p. 2)		4

PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory <sup>2</sup>	4
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### Meteorology Core

MEA 100	Earth System Science: Exploring the Connections	4
MEA 215	Introduction to Atmospheric Sciences	4
MEA 312	Atmospheric Thermodynamics <sup>2</sup>	4
MEA 315	Mathematics Methods in Atmospheric Sciences <sup>2</sup>	4
MEA 321	Fundamentals of Air Quality and Climate Change <sup>2</sup>	3
MEA 412	Atmospheric Physics <sup>2</sup>	3
MEA 421	Atmospheric Dynamics I <sup>2</sup>	3
MEA 422	Atmospheric Dynamics II <sup>2</sup>	3
MEA 443	Synoptic Weather Analysis and Forecasting	4
MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1

### Major Electives

Geophysical Science Option (p. 2)	3
MEA Restricted Electives (p. 2)	9
Approved Electives <sup>3</sup>	16

Approved Electives constitute a minor field of emphasis consisting of at least 12 credit hours in a single discipline or related disciplines. These include, but are not limited to: biometeorology, chemistry, computer science, environmental quality, geology-geophysics, hydrology, mathematics, physics, physical oceanography, statistics, several areas of engineering, agriculture, forestry, science education, weather communication.

### GEP Courses

GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	6
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	2
GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)	
GEP Foundations of American Democracy ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/</a> ) (verify requirement)	
World Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/</a> ) (verify requirement)	

**Total Hours** 120

- <sup>1</sup> COS 100 is for new freshmen only. Transfer students will need to select a course from the GEP Interdisciplinary Perspectives course list
- <sup>2</sup> A grade of C- or higher is required.
- <sup>3</sup> Approved Electives should be selected in consultation with advisor. In order to qualify for federal civil servant meteorologist positions (i.e. National Weather Service), you must satisfy the GS 1340 requirements. As a result the following courses are strongly recommended: PY208/209, MEA 443, MEA 444, and MEA 511.
- <sup>4</sup> Advanced transfer students are permitted to substitute mathematics, science, or engineering credits for CH 201/202.

## MEA Restricted Electives

Code	Title	Hours
MEA 415	Climate Dynamics	3
MEA 425	Introduction to Atmospheric Chemistry	3
MEA 444	Mesoscale Analysis and Forecasting	4
MEA 455	Micrometeorology	3
MEA 458	Introduction to Tropical Meteorology	3
MEA 463	Fluid Physics	3
MEA 467	Marine Meteorology	3
MEA/CE 479	Air Quality	3
MEA 488	Meteorology for Media	3
MEA 493	Special Topics in MEAS	1-6
MEA 498	Internship in MEAS	1-6
MEA 510	Air Pollution Meteorology	3
MEA 511	Introduction to Meteorological Remote Sensing	3
MEA 514	Advanced Physical Meteorology	3
MEA 515	Climate Dynamics	3
MEA 517	Fundamentals of Climate Change Science	3
MEA 518	Adaptation to Climate Change	3
MEA 519	Barriers to Climate Change Literacy	3
MEA 525	Introduction to Atmospheric Chemistry	3
MEA/CE 579	Principles of Air Quality Engineering	3
MEA 580	Air Quality Modeling and Forecasting	4
MEA 581	Fluid Mechanics in Natural Environments	3
MEA/GIS 582	Geospatial Modeling	3
MEA 593	Special Topics in Atmospheric Science	1-6

## Chemistry Option

Code	Title	Hours
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	4
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	4

## Geophysical Science Elective

Code	Title	Hours
MEA 101	Geology I: Physical	3
MEA 200	Introduction to Oceanography	3
PY 123	Stellar and Galactic Astronomy	3
PY 124	Solar System Astronomy	3
SSC 200	Soil Science	3

## Semester Sequence

This is a sample.

### First Year

Fall Semester	Hours
CH 101      Chemistry - A Molecular Science (CP) <sup>2</sup>	3
CH 102      General Chemistry Laboratory	1
MA 141      Calculus I <sup>2</sup>	4

MEA 100      Earth System Science: Exploring the Connections	4
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
COS 100      Science of Change <sup>1</sup>	2
<b>Hours</b>	<b>15</b>

### Spring Semester

Chemistry Option (p. 2)	4
ENG 101      Academic Writing and Research <sup>2</sup>	4
MA 241      Calculus II <sup>2</sup>	4
MEA 215      Introduction to Atmospheric Sciences	4
<b>Hours</b>	<b>16</b>

### Second Year

#### Fall Semester

MA 242      Calculus III	4
MEA 217      Introduction to Computing in the Geosciences <sup>2</sup>	3
MEA 321      Fundamentals of Air Quality and Climate Change <sup>2</sup>	3
PY 205      Physics for Engineers and Scientists I (CP) <sup>2</sup>	3
PY 206      Physics for Engineers and Scientists I Laboratory	1
<b>Hours</b>	<b>14</b>

#### Spring Semester

MA 341      Applied Differential Equations I	3
MEA 312      Atmospheric Thermodynamics <sup>2</sup>	4
MEA 315      Mathematics Methods in Atmospheric Sciences <sup>2</sup>	4
Approved Electives <sup>3</sup>	4
<b>Hours</b>	<b>15</b>

### Third Year

#### Fall Semester

Approved Elective	3
MEA 421      Atmospheric Dynamics I <sup>2</sup>	3
Geophysical Science Option (p. 2)	3
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
Statistics Option (p. 1)	3
<b>Hours</b>	<b>15</b>

#### Spring Semester

Advanced Writing Elective (p. 1)	3
Approved Elective <sup>3</sup>	3
MEA 412      Atmospheric Physics <sup>2</sup>	3
MEA 422      Atmospheric Dynamics II <sup>1</sup>	3
MEA 495      Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1
GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )	3
<b>Hours</b>	<b>16</b>

### Fourth Year

#### Fall Semester

Approved Elective <sup>3</sup>	3
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MEA Restricted Electives (p. 2)	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
MEA 443 Synoptic Weather Analysis and Forecasting	4
<b>Hours</b>	<b>14</b>
<b>Spring Semester</b>	
Approved Elective	3
MEA Restricted Electives (p. 2)	3
MEA Restricted Electives (p. 2)	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
<b>Hours</b>	<b>15</b>
<b>Total Hours</b>	<b>120</b>

<sup>1</sup> COS 100 is for new freshmen only. Transfer students will need to select a course from the GEP Interdisciplinary Perspectives course list

<sup>2</sup> A grade of C- or higher is required.

<sup>3</sup> Approved Electives should be selected in consultation with advisor. In order to qualify for federal civil servant meteorologist positions (i.e. National Weather Service), you must satisfy the GS 1340 requirements. As a result the following courses are strongly recommended: PY208/209, MEA 443, MEA 444, and MEA 511.

## 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 Meteorology.

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.

## Career Titles

- Air Traffic Controller
- Airfield Operations Specialist
- Astronomer
- Atmospheric and Space Scientist

- Atmospheric, Earth, Marine, and Space Sciences Teachers
- Environmental Science and Protection Technician
- Geophysicist
- Meteorologist
- Oceanographer
- Outdoor Education Teacher
- Park Naturalist
- Pilot
- Postsecondary Teacher
- Technical & Scientific Publications Editor
- Weather Forecaster

## 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.

American Meteorological Society (<http://www.ametsoc.org/>)

National Weather Association (<https://nwas.org/>)