

B.S.M.A.S. IN METEOROLOGY

Overview

The Bachelor of Science degree program prepares students for further graduate studies as well as for non-academic professional applications. The program follows standards established by the American Meteorological Society (AMS), emphasizing a math and physics background for understanding the physical processes governing the motion and composition of the atmosphere.

Undergraduate students are encouraged to work with the faculty and are able to earn course credit and senior theses by conducting research under the supervision of leading scientists in their field. Research encompasses atmospheric dynamics, climate science, boundary-layer processes, cloud processes, and remote sensing. Focus areas include hurricanes (modeling, data assimilation and field observations), tropical meteorology, atmosphere-ocean coupling, climate, and climate change. Many faculty are active in fieldwork.

The Bachelor of Science in Meteorology prepares students for admission to graduate programs and for careers in teaching and research as well as for those who will pursue a technical career in this area in government or private industry.

Curriculum Requirements

Code	Title	Credit Hours
Atmospheric Science Requirements		
ATM 103	Survey of Modern Meteorology	3
ATM 243	Weather Forecasting	3
ATM 265	Chemistry in the Air: From Air Pollution to Climate Change	3
ATM 303	Meteorological Instrumentation and Observation	3
ATM 305	Atmospheric Thermodynamics	3
ATM 307	Introduction to the Physics of Climate	3
ATM 405	Atmospheric Dynamics I	3
ATM 406	Atmospheric Dynamics II	3
ATM 407	Weather Analysis	4
ATM 409	Cloud Physics, Radiation, and Remote Sensing	3
MSC 111	Introduction to Marine Science	3
MSC 112	Introduction to Marine Science Lab	1
Mathematics Requirements		
MTH 161 or MTH 171	Calculus I ¹ Calculus I	4
MTH 162 or MTH 172	Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) ¹ Calculus II	4
MTH 210	Introduction to Linear Algebra	3
MTH 211 or MTH 310	Calculus III Multivariable Calculus	3
MTH 311	Introduction to Ordinary Differential Equations	3
Statistics Requirement		
MSC 204 or MTH 224	Environmental Statistics Introduction to Probability and Statistics	3
Computational Science Requirement		
MSC 203 or CSC 120	Foundations of Computational Marine Science Computer Programming I	4
Physics Requirements		
PHY 201	University Physics I for the Sciences	4
PHY 106	Physics Laboratory 1	1
PHY 202	University Physics II for the Sciences	4
PHY 108	Physics Laboratory 2	1
Electives		
Atmospheric Science, Mathematics, or Science Course		3

Additional Electives		24
Recommended courses include:		
ATM 244	Tropical Weather and Forecasting	
ATM 306	Advanced Principles in Broadcasting Meteorology	
MSC 301	Introduction to Physical Oceanography	
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107	First-Year Writing II: STEM	3
or WRS 106	First-Year Writing II	
or ENG 106	Writing About Literature and Culture	
Quantitative Skills:		
MTH 161	Calculus I (fulfilled through the major)	
or MTH 171	Calculus I	
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
Total Credit Hours		120

¹ Calculus I and II must be passed with a grade of "C" or higher.

* 500-level courses are open to undergraduates but typically offered on the Rosenstiel School campus. For Broadcast Meteorology double-majors and minors, the electives may be taken from the School of Communications.

Suggested Plan of Study with Math Minor

This is only a sample. There are numerous ways students can create plans of study for the Meteorology major. Students should feel empowered to use the information listed in the Academic Bulletin and the to take charge of their education, pursue their own academic interests, and create their own, unique plans of study.

Freshman Year		Credit Hours
Fall		
ATM 103	Survey of Modern Meteorology	3
MSC 111	Introduction to Marine Science	3
MSC 112	Introduction to Marine Science Lab	1
WRS 105	First-Year Writing I	3
MTH 161	Calculus I	4
Elective #1		3
		Credit Hours
		17
Spring		
ATM 243	Weather Forecasting	3
ATM 265	Chemistry in the Air: From Air Pollution to Climate Change	3
WRS 107	First-Year Writing II: STEM	3
MTH 162	Calculus II	4
Elective #2		3
		Credit Hours
		16
Sophomore Year		
Fall		
MTH 210	Introduction to Linear Algebra	3
PHY 201	University Physics I for the Sciences	4
PHY 106	Physics Laboratory 1	1
ATM/MTH/Science Course (ATM 244 is recommended)		3
Elective #3		3
		Credit Hours
		14

Spring			
ATM 303	Meteorological Instrumentation and Observation		3
CSC 120 or MSC 203	Computer Programming I or Foundations of Computational Marine Science		4
PHY 202	University Physics II for the Sciences		4
PHY 108	Physics Laboratory 2		1
MSC 204 or MTH 224	Environmental Statistics or Introduction to Probability and Statistics		3
Elective #4			3
			Credit Hours
			18
Junior Year			
Fall			
ATM 305	Atmospheric Thermodynamics		3
MTH 211 or 310	Calculus III or Multivariable Calculus		3
Elective #5			3
Elective #6			3
Elective #7			3
			Credit Hours
			15
Spring			
ATM 307	Introduction to the Physics of Climate		3
ATM 405	Atmospheric Dynamics I		3
MTH 311	Introduction to Ordinary Differential Equations		3
Elective #8			3
Elective #9			3
			Credit Hours
			15
Senior Year			
Fall			
ATM 406	Atmospheric Dynamics II		3
ATM 407	Weather Analysis		4
Elective #10			3
Elective #11			3
			Credit Hours
			13
Spring			
ATM 409	Cloud Physics, Radiation, and Remote Sensing		3
Elective #12			3
Elective #13			3
Elective #14			3
			Credit Hours
			12
			Total Credit Hours
			120

Mission

The mission of the Rosenstiel School of Marine, Atmospheric, and Earth Science is to deepen our collective knowledge of our planet through cutting-edge scientific research on the oceans, atmosphere, geology, biota, and the human dimension, while training the next generation of scientists. We transfer the knowledge gained to our students, the national and international scientific community, and to policymakers and the public.

The educational mission of the BS degree in Meteorology at the University of Miami is to graduate students with the ability and desire to integrate knowledge of meteorology into their future careers.

Goals

Students completing this major will be able to master a broad set of fundamental scientific knowledge in Meteorology, acquire valuable technical skills and learn how to apply this knowledge to real-world problems, in a time of changing climate and increasing stress on Earth's resources and environment. The program will provide the rigor, flexibility, depth and integration to enable students to:

- Pursue a course of study that provides both depth and breadth in Meteorology and related science courses.
- Learn from the diverse and outstanding group of professors and researchers who are experts in their fields and have active research programs.
- Undertake active research experiences, which will allow them to gain a strong understanding of the scientific process and provide them with a set of valuable experimental and computational skills.
- Prepare themselves for graduate school and for successful careers in public and private industries.

Student Learning Outcomes

- Students will be able to apply and use the equations that govern physical atmospheric processes and responses to explain fundamental principles and behaviors of the atmosphere and to solve quantitative problems.
- Students will be able to utilize and interpret observations and model output to evaluate atmospheric processes and phenomena.
- Students will be able to use a computer programming language to investigate weather and climate phenomena and to analyze and visualize data.
- Students will be able to carry out supervised research in the field of atmospheric science.
- Students will demonstrate an ability to effectively communicate scientific information.