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

Atmospheric Science Atm 103 Survey of Modern Meteorology 3 ATM 103 Weather Forecasting 3 ATM 243 Weather Forecasting 3 ATM 303 Meteorological Instrumentation and Observation 3 ATM 303 Atmospheric Thermodynamics 3 ATM 307 Introduction to the Physics of Climate 3 ATM 405 Atmospheric Dynamics I 3 ATM 407 Weather Analysis 4 ATM 409 Cloud Physics, Radiation, and Remote Sensing 3 Other Required Courses 5 CSC 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science 3 MSC 111 Introduction to Marine Science Lab 1 MSC 112 Introduction to Marine Science Lab 1 MSC 113 Calculus II 4 or MTH 171 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills 4 or MTH 210 Introduction to Linear Algebra 3 MTH 221 Calculus II (fulfill sthe Rosenstiel BSMAS quantitative skills 3 <th>Code</th> <th>Title</th> <th>Credit Hours</th>	Code	Title	Credit Hours
ATM 243	Atmospheric Science		
ATM 265 Atmospheric Chemistry 3 ATM 303 Meteorological Instrumentation and Observation 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 Other Required Courses Computer Programming I 4 SCS 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science 3 MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 164 Calculus I 4 or MTH 171 Calculus I 4 MTH 162 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) 1 4 or MTH 172 Calculus II 3 MTH 210 Introduction to Linear Algebra 3 MTH 221 Introduction to Cridana Pulperia 3 or MSC 204	ATM 103	Survey of Modern Meteorology	3
ATM 303 Meteorological Instrumentation and Observation 3 ATM 305 Atmospheric Thermodynamics 3 ATM 307 Introduction to the Physics of Climate 3 ATM 406 Atmospheric Dynamics I 3 ATM 407 Weather Analysis 4 ATM 409 Cloud Physics, Radiation, and Remote Sensing 3 Other Required Courses CSC 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science 3 MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 161 Calculus I 4 or MTH 171 Calculus I 4 MTH 162 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) 1 4 or MTH 172 Calculus II 3 MTH 211 Calculus III 3 MTH 221 Calculus III 3 MTH 232 Introduction to Linear Algebra 3 MTH 243 Introduction to Calculus II 3 or MSC 204 Environmental Statistics 4	ATM 243	Weather Forecasting	3
ATM 303 Meteorological Instrumentation and Observation 3 ATM 305 Atmospheric Thermodynamics 3 ATM 307 Introduction to the Physics of Climate 3 ATM 406 Atmospheric Dynamics II 3 ATM 407 Weather Analysis 4 ATM 409 Cloud Physics, Radiation, and Remote Sensing 3 Other Required Courses CSC 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science 3 MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 161 Calculus I 4 or MTH 171 Calculus I 4 MTH 162 Calculus I 4 or MTH 172 Calculus II 4 MTH 162 Calculus II 3 MTH 210 Introduction to Linear Algebra 3 MTH 211 Calculus III 3 or MTH 310 Multivariable Calculus MTH 224 Introduction to Probability and Statistics 3 or MSC 204 Environm	ATM 265	Atmospheric Chemistry	3
ATM 307 Introduction to the Physics of Climate 3 ATM 405 Atmospheric Dynamics I 3 ATM 406 Atmospheric Dynamics II 3 ATM 409 Cloud Physics, Radiation, and Remote Sensing 3 Other Required Courses SCS 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 161 Calculus I 4 or MTH 171 Calculus I 4 MTH 162 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement). 4 or MTH 172 Calculus II 3 MTH 210 Introduction to Linear Algebra 3 MTH 221 Calculus III 3 MTH 224 Introduction to Probability and Statistics 3 MTH 231 Introduction to Ordinary Differential Equations 3 APY 201 University Physics I for the Sciences 4 PHY 106 Colle	ATM 303	Meteorological Instrumentation and Observation	3
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ATM 406 Atmospheric Dynamics II 3 ATM 407 Weather Analysis 4 ATM 409 Cloud Physics, Radiation, and Remote Sensing 3 Other Required Courses CSC 120 Computer Programming I 4 or MSC 203 Foundations of Computational Marine Science MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 161 Calculus I 4 or MTH 171 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) 1 4 or MTH 210 Introduction to Linear Algebra 3 MTH 211 Calculus II 3 MTH 224 Introduction to Probability and Statistics 3 MTH 224 Introduction to Probability and Statistics 3 MTH 311 Introduction to Ordinary Differential Equations 3 MTH 224 Inviewing Physics I for the Sciences 4 PHY 202 University Physics I for the Sciences 4 PHY 204 University Physics	ATM 307	Introduction to the Physics of Climate	3
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MSC 111 Introduction to Marine Science 3 MSC 112 Introduction to Marine Science Lab 1 MTH 161 Calculus I 4 or MTH 171 Calculus II 4 MTH 162 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) 1 4 or MTH 172 Calculus II (Fulfills the Rosenstiel BSMAS quantitative skills requirement) 1 3 MTH 210 Introduction to Linear Algebra 3 MTH 211 Calculus III 3 or MTH 310 Multivariable Calculus 3 MTH 224 Introduction to Probability and Statistics 3 MTH 311 Introduction to Ordinary Differential Equations 3 PHY 201 University Physics I for the Sciences 4 PHY 202 University Physics Laboratory I 1 PHY 108 College Physics Laboratory II 1 Electives 4 Additional Electives 24 Recommended courses include: 24	CSC 120	Computer Programming I	4
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or MTH 171 Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) \(^1\) or MTH 172 Calculus II MTH 210 Introduction to Linear Algebra 3 MTH 211 Calculus III 3 or MTH 310 Multivariable Calculus MTH 224 Introduction to Probability and Statistics or MSC 204 Environmental Statistics MTH 311 Introduction to Ordinary Differential Equations 3 PHY 201 University Physics I for the Sciences 4 PHY 106 College Physics Laboratory I PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course Additional Electives Recommended courses include:	MSC 112	Introduction to Marine Science Lab	1
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MTH 211 Calculus III Multivariable Calculus MTH 224 Introduction to Probability and Statistics 3 or MSC 204 Environmental Statistics MTH 311 Introduction to Ordinary Differential Equations MTH 311 University Physics I for the Sciences MTH 301 University Physics I for the Sciences PHY 106 College Physics Laboratory I 1 PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course Additional Electives Recommended courses include:	or MTH 172	Calculus II	
or MTH 310 Multivariable Calculus MTH 224 Introduction to Probability and Statistics 3 or MSC 204 Environmental Statistics MTH 311 Introduction to Ordinary Differential Equations 3 PHY 201 University Physics I for the Sciences 4 PHY 106 College Physics Laboratory I 1 PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	MTH 210	Introduction to Linear Algebra	3
MTH 224 Introduction to Probability and Statistics or MSC 204 Environmental Statistics MTH 311 Introduction to Ordinary Differential Equations 3 PHY 201 University Physics I for the Sciences 4 PHY 106 College Physics Laboratory I PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course Additional Electives Recommended courses include:	MTH 211	Calculus III	3
or MSC 204 Environmental Statistics MTH 311 Introduction to Ordinary Differential Equations 3 PHY 201 University Physics I for the Sciences 4 PHY 106 College Physics Laboratory I 1 PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	or MTH 310	Multivariable Calculus	
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PHY 201 University Physics I for the Sciences 4 PHY 106 College Physics Laboratory I 1 PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	or MSC 204	Environmental Statistics	
PHY 106 College Physics Laboratory I 1 PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	MTH 311	Introduction to Ordinary Differential Equations	3
PHY 202 University Physics II for the Sciences 4 PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	PHY 201	University Physics I for the Sciences	4
PHY 108 College Physics Laboratory II 1 Electives Atmospheric Science, Mathematics, or Science Course 3 Additional Electives 24 Recommended courses include:	PHY 106	College Physics Laboratory I	1
Electives Atmospheric Science, Mathematics, or Science Course Additional Electives Recommended courses include:	PHY 202	University Physics II for the Sciences	4
Atmospheric Science, Mathematics, or Science Course Additional Electives Recommended courses include:	PHY 108	College Physics Laboratory II	1
Additional Electives 24 Recommended courses include:	Electives		
Recommended courses include:	Atmospheric Science, Mathematics, or Science Course		
	Additional Electives		24
ATM 244 Tropical Weather and Forecasting	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	1	20

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

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		
Fall		Credit Hours
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	Atmospheric Chemistry	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	College Physics Laboratory I	1
ATM/MTH/Science Course (ATM 2	44 is recommended)	3
Elective #3		3
	Credit Hours	14
Spring		
ATM 303	Meteorological Instrumentation and Observation	3

^{* 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.

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	College Physics Laboratory II	1
MSC 204 or MTH 224	Environmental Statistics	3
W30 204 01 W111 224	or Introduction to Probability and Statistics	J
Elective #4	,	3
	Credit Hours	18
Junior Year		
Fall		
ATM 305	Atmospheric Thermodynamics	3
MTH 211 or 310	Calculus III	3
	or Multivariable Calculus	
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	
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 cuttingedge 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.

4 B.S.M.A.S. in Meteorology

- 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.