B.S.M.A.S. IN MARINE SCIENCE / METEOROLOGY

Overview

The Marine Science/Meteorology degree is a Bachelor of Science degree (BSMAS) that is designed to give students a strong background in the physical aspects of climate, as well as the interaction of the ocean and the atmosphere. The Meteorology curriculum follows the program guidelines established by the American Meteorological Society.

Undergraduate students are encouraged to work with the faculty and are able to earn course credit by conducting independent 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 double major in Marine Science/Meteorology prepares students for admission to graduate programs and for careers in teaching and research as well as for technical careers in government and private industries concerned with the oceans.

Curriculum Requirements

Code	Title	Credit Hours
Atmospheric Science		
ATM 103	Survey of Modern Meteorology	3
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 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
Marine Science		
MSC 111	Introduction to Marine Science	3
MSC 112	Introduction to Marine Science Lab	1
MSC 215	Chemical Oceanography	3
MBE 230	Introduction to Marine Biology	3
MSC 301	Introduction to Physical Oceanography	3
MSC 302	Introduction to Physical Oceanography Lab	1
MSC 216	Chemical Oceanography Laboratory	1
or MBE 232	Introduction to Marine Biology Laboratory	
Select 9 credit hours of approved Rosenstiel School electives within MBE, MSC, OCE or RSM courses [1]		9
Other Required Courses		
Select one of the following:		5
BIL 150 & BIL 151	General Biology and General Biology Laboratory	
BIL 160 & BIL 161	Evolution and Biodiversity and Evolution and Biodiversity Laboratory	
CHM 121	Principles of Chemistry [2]	4
CHM 113	Chemistry Laboratory I	1
CSC 120	Computer Programming I	4
or MSC 203	Foundations of Computational Marine Science	
Select one of the following:		3-4
GSC 110	The Earth System	
GSC 111	Earth System History	
MSC 424	Origin and Geology of the Galapagos Islands.	
MSC 204	Environmental Statistics	3
MTH 161	Calculus I [3]	4
or MTH 171	Calculus I	

MTH 162	Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) [3]	4
or MTH 172	Calculus II	
MTH 210	Introduction to Linear Algebra	3
MTH 211	Calculus III	3
or MTH 310	Multivariable Calculus	
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 201	University Physics I for the Sciences	4
PHY 202	University Physics II for the Sciences	4
PHY 106	College Physics Laboratory I	1
PHY 108	College Physics Laboratory II	1
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		**123**

[1]   At least 6 of which must be at the 300-level or higher. MSC 204 and MSC 425 do not satisfy the Rosenstiel School elective requirement. ATM courses, GSC courses, and courses from other Schools are allowed only if taken from an approved list (https://undergraduate.rsmas.miami.edu/academics/majors/marine-science-dual-major-programs/).

[2]   Principles of Chemistry must be passed with a grade of "C-" or higher.

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

Suggested Plan of Study

This is only a sample. There are numerous ways students can create plans of study for the Marine Science/Meteorology major. Students should feel empowered to use the information listed in the Academic Bulletin 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
	Credit Hours	**14**
Spring		
ATM 243	Weather Forecasting	3
CHM 113	Chemistry Laboratory I	1
CHM 121	Principles of Chemistry	4
WRS 107	First-Year Writing II: STEM	3
MTH 162	Calculus II	4
	Credit Hours	**15**

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
MSC course (ATM 244 is recommended)		3
MSC 203	Foundations of Computational Marine Science	4
	Credit Hours	**15**
Spring		
ATM 303	Meteorological Instrumentation and Observation	3
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
PHY 202	University Physics II for the Sciences	4
PHY 108	College Physics Laboratory II	1
Elective #1		3
	Credit Hours	**16**
Junior Year		
Fall		
ATM 305	Atmospheric Thermodynamics	3
MSC 204	Environmental Statistics	3
MSC 215	Chemical Oceanography	3
MTH 211 or 310	Calculus III or Multivariable Calculus	3
Elective #2		3
	Credit Hours	**15**
Spring		
ATM 307	Introduction to the Physics of Climate	3
ATM 405	Atmospheric Dynamics I	3
MSC 301	Introduction to Physical Oceanography	3
MSC 302	Introduction to Physical Oceanography Lab	1
MTH 311	Introduction to Ordinary Differential Equations	3
Elective #3		3
	Credit Hours	**16**
Senior Year		
Fall		
ATM 406	Atmospheric Dynamics II	3
ATM 407	Weather Analysis	4
MBE 230	Introduction to Marine Biology	3
MBE 232	Introduction to Marine Biology Laboratory [1]	1
MSC Course		3
Elective #4		3
	Credit Hours	**17**
Spring		
ATM 409	Cloud Physics, Radiation, and Remote Sensing	3
GSC 111	Earth System History	4
MSC Course		3
Elective #5		3
Elective #6		3
	Credit Hours	**16**
	Total Credit Hours	**124**

*   6 elective courses must include:

- 3 Arts and Humanities Cognate courses
- 3 People and Society Cognate courses

[1]   1. Students must take one laboratory from MSC 216 or MBE 232.

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 Marine Science at the University of Miami is to graduate students with the ability and desire to integrate knowledge of marine science into their future careers.

Goals

Students completing this double major will be able to master a broad set of fundamental scientific knowledge in Marine Science and 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:

- Design and pursue their course of study that meets requirements of a double major in Marine Science and Meteorology
- 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 demonstrate an ability to communicate effectively.
- Students will develop analytical and quantitative skills to allow critical data analysis.
- Students will be able to do carry out supervised research in the field of marine science.
- Meteorology students will be able to apply concepts from physics to the atmosphere of a rotating planet, to solve basic problems.
- Students will be able to apply the basic concepts of thermodynamics to the atmosphere.
- Students will learn the structure and chemistry of the troposphere and stratosphere and apply this to air quality and environmental science applications.