

# B.S.M.A.S. IN MARINE SCIENCE / GEOLOGICAL SCIENCES

## Overview

The Marine Science/Geological Sciences degree is a Bachelor of Science degree (BSMAS) that is designed to give students a strong background in the study of the origin of the Earth and its oceans, and the ongoing processes of geophysical and geochemical change.

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 at UM focuses on carbonate sedimentology of the Florida reef tract, stable isotope geochemistry and micropaleontology of deep ocean cores to reconstruct paleoclimate, tectonic processes (volcanoes and earthquakes), and the impact of rising sea level on coastal systems.

The Bachelor of Science double major in Marine Science/Geological Sciences 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
<b>Marine Science</b>		
MSC 111	Introduction to Marine Science	3
MSC 112	Introduction to Marine Science Lab	1
MSC 215	Chemical Oceanography	3
Select two of the following laboratories:		2
MSC 216	Chemical Oceanography Laboratory	
MBE 232	Introduction to Marine Biology Laboratory	
MSC 302	Introduction to Physical Oceanography Lab	
MBE 230	Introduction to Marine Biology	3
MSC 301	Introduction to Physical Oceanography	3
Select 9 credit hours of approved Rosenstiel School electives within ATM, GSC, MBE, MSC, OCE or RSM courses <sup>1</sup>		9
<b>Additional Required Courses</b>		
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 <sup>2</sup>	4
CHM 113	Chemistry Laboratory I	1
GSC 110	The Earth System	4
GSC 111	Earth System History	4
GSC 260	Earth Materials	4
GSC 360	Depositional and Diagenetic Systems	4
GSC 380	Paleontology and Stratigraphy	4
MGS 513	Introductory Geochemistry	3
MGS 514	Geophysics	3
GSC 440	Petrology	4
GSC 480	Structural Geology	4
GSC 482	Field Methods	2
GSC 561	Communicating Geoscience	2
GSC 580	Summer Field Geology	4
MTH 161 or MTH 171	Calculus I <sup>3</sup> Calculus I	4
MTH 162 or MTH 172	Calculus II (fulfills the Rosenstiel BSMAS quantitative skills requirement) Calculus II	4
Choose one of the following:		3-4
MSC 203	Foundations of Computational Marine Science	

MSC 204	Environmental Statistics	
MTH 224	Introduction to Probability and Statistics	
CSC 120	Computer Programming I	
MG5 528	Analyze and Visualize Geoscience Data	
Select one of the following options: <sup>4</sup>		10
Option 1:		
PHY 201	University Physics I for the Sciences	
PHY 106	College Physics Laboratory I	
PHY 202	University Physics II for the Sciences	
PHY 108	College Physics Laboratory II	
Option 2:		
PHY 221	University Physics I	
PHY 222	University Physics II	
PHY 223	University Physics III	
PHY 224 or PHY 225	University Physics II Lab University Physics III Lab	
Option 3:		
PHY 101	College Physics I	
PHY 102	College Physics II	
PHY 106	College Physics Laboratory I	
PHY 108	College Physics Laboratory II	
<b>General Education Requirements</b>		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107 or WRS 106 or ENG 106	First-Year Writing II: STEM First-Year Writing II Writing About Literature and Culture	3
Quantitative Skills:		
MTH 161 or MTH 171	Calculus I (fulfilled through the major) Calculus I	
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
<b>Total Credit Hours</b>		<b>121</b>

<sup>1</sup> 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/>).

<sup>2</sup> Principles of Chemistry must be passed with a grade of "C-" or higher.

<sup>3</sup> Calculus I must be passed with a grade of "C-" or higher.

<sup>4</sup> Option 1 is recommended for Physics.

**This is only a sample.** There are numerous ways students can create plans of study for the Marine Science/Geological Sciences 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.

## Suggested Plan of Study

Freshman Year		Credit Hours
<b>Fall</b>		
MSC 111	Introduction to Marine Science	3
MSC 112	Introduction to Marine Science Lab	1
GSC 110	The Earth System	4

MTH 161	Calculus I	4
WRS 105	First-Year Writing I	3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
GSC 111	Earth System History	4
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
MTH 162	Calculus II	4
WRS 107	First-Year Writing II: STEM	3
<b>Credit Hours</b>		<b>16</b>
<b>Sophomore Year</b>		
<b>Fall</b>		
GSC 260	Earth Materials	4
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
MSC Course		3
Elective #1		3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
MSC 215	Chemical Oceanography	3
MSC 216	Chemical Oceanography Laboratory <sup>1</sup>	1
GSC 380	Paleontology and Stratigraphy	4
GSC 440	Petrology	4
Elective #2		3
<b>Credit Hours</b>		<b>15</b>
<b>Junior Year</b>		
<b>Fall</b>		
MBE 230	Introduction to Marine Biology	3
MBE 232	Introduction to Marine Biology Laboratory <sup>1</sup>	1
GSC 360	Depositional and Diagenetic Systems	4
PHY 201	University Physics I for the Sciences	4
PHY 106	College Physics Laboratory I	1
<b>Credit Hours</b>		<b>13</b>
<b>Spring</b>		
MSC 204	Environmental Statistics	3
GSC 482	Field Methods	2
PHY 202	University Physics II for the Sciences	4
PHY 108	College Physics Laboratory II	1
MSC Course		3
Elective #3		3
<b>Credit Hours</b>		<b>16</b>
<b>Summer</b>		
GSC 580	Summer Field Geology	4
<b>Credit Hours</b>		<b>4</b>
<b>Senior Year</b>		
<b>Fall</b>		
MSC 301	Introduction to Physical Oceanography	3
MGS 513	Introductory Geochemistry	3
GSC 561	Communicating Geoscience	2
MSC Course		3
Elective #4		3
<b>Credit Hours</b>		<b>14</b>

<b>Spring</b>		
GSC 480	Structural Geology	4
MGS 514	Geophysics	3
Elective #5		3
Elective #6		3
<b>Credit Hours</b>		<b>13</b>
<b>Total Credit Hours</b>		<b>121</b>

- \* 6 elective courses must include:
- 3 Arts and Humanities Cognate courses
  - 3 People and Society Cognate courses

<sup>1</sup> Students must take two laboratories from MSC 216, MBE 232 or MSC 302.

## 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 Geology, acquire valuable technical skills and learn how to apply this knowledge to real-world problems, in a time of 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 Geology.
- 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.