

# DUAL MAJOR IN MARINE SCIENCE AND PHYSICS

This is an interdisciplinary major offered by the Rosenstiel School of Marine and Atmospheric Science (RSMAS) in conjunction with the Physics Department.

## 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
MSC 216	Chemical Oceanography Laboratory	1
MBE 230	Introduction to Marine Biology	3
MSC 301	Introduction to Physical Oceanography	3
MSC 302	Introduction to Physical Oceanography Lab	1
or MBE 232	Introduction to Marine Biology Laboratory	
Select 12 credit hours of approved RSMAS electives within MBE, MSC, OCE or RSM courses <sup>1</sup>		12
<b>Other Required Courses</b>		
BIL 150 & BIL 151	General Biology and General Biology Laboratory	5
CHM 121	Principles of Chemistry <sup>2</sup>	4
CHM 113	Chemistry Laboratory I	1
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.	
MTH 161	Calculus I <sup>3</sup>	4
or MTH 171	Calculus I	
MTH 162	Calculus II <sup>3</sup>	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
MSC 204	Environmental Statistics	3
or MTH 224	Introduction to Probability and Statistics	
Select one of following:		3-4
MSC 203	Foundations of Computational Marine Science	
RSM 521	Object-Oriented Programming and Agent-Based Modelling	
CSC 120	Computer Programming I	
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 224	University Physics II Lab	1
PHY 225	University Physics III Lab	1
PHY 321	Thermodynamics and Kinetic Theory	3
PHY 340	Classical Mechanics I	3
PHY 350	Intermediate Electricity and Magnetism	3
PHY 351	Intermediate Electricity and Magnetism II	3
PHY 360	Introduction to Modern Physics	3
PHY 362	Modern Physics Honors Seminar	1
PHY 540	Classical Mechanics II	3

PHY 560	Quantum Mechanics and Modern Physics I	3
<b>General Education Requirements</b>		
ENG 105	English Composition I	3
ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate Courses		9
People and Society Cognate Courses		9
<b>Total Credit Hours</b>		<b>120-122</b>

<sup>1</sup> At least 6 of which must be at the 300-level or higher. MSC 204, MSC 425 and RSM 567 do not satisfy the RSMAS elective requirement. ATM, 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 and II must be passed with a grade of "C-" or higher.

## 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
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
ENG 105	English Composition I	3
MTH 161	Calculus I	4
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
PHY 221	University Physics I	3
GSC 111	Earth System History	4
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
<b>Credit Hours</b>		<b>14</b>
<b>Sophomore Year</b>		
<b>Fall</b>		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
MTH 210	Introduction to Linear Algebra	3
MTH 211	Calculus III	3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
MSC 301	Introduction to Physical Oceanography	3
MSC 302	Introduction to Physical Oceanography Lab <sup>1</sup>	1
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
MTH 311	Introduction to Ordinary Differential Equations	3
Arts and Humanities or People and Society Cognate Course		3
Arts and Humanities or People and Society Cognate Course		3
<b>Credit Hours</b>		<b>17</b>
<b>Junior Year</b>		
<b>Fall</b>		
MSC 203	Foundations of Computational Marine Science	4
MBE 230	Introduction to Marine Biology	3

PHY 350	Intermediate Electricity and Magnetism	3
PHY 360	Introduction to Modern Physics	3
Arts and Humanities or People and Society Cognate Course		3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
MSC 215	Chemical Oceanography	3
MSC 216	Chemical Oceanography Laboratory	1
PHY 321	Thermodynamics and Kinetic Theory	3
PHY 340	Classical Mechanics I	3
MSC 204	Environmental Statistics	3
Arts and Humanities or People and Society Cognate Course		3
<b>Credit Hours</b>		<b>16</b>
<b>Senior Year</b>		
<b>Fall</b>		
MSC Course		3
MSC Course		3
PHY 362	Modern Physics Honors Seminar	1
PHY 540	Classical Mechanics II	3
PHY 560	Quantum Mechanics and Modern Physics I	3
Arts and Humanities or People and Society Cognate Course		3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
MSC Course		3
MSC Course		3
PHY 351	Intermediate Electricity and Magnetism II	3
Arts and Humanities or People and Society Cognate Course		3
<b>Credit Hours</b>		<b>12</b>
<b>Total Credit Hours</b>		<b>122</b>

<sup>1</sup> Students must take one laboratory from MBE 232 or MSC 302.

## Mission

The mission of the Rosenstiel School of Marine and Atmospheric 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 Physics, 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 Physics.
- 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.