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

Marine Science/Geological Sciences

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC 111</td>
<td>Introduction to Marine Science</td>
<td>3</td>
</tr>
<tr>
<td>MSC 112</td>
<td>Introduction to Marine Science Lab</td>
<td>1</td>
</tr>
<tr>
<td>MSC 215</td>
<td>Chemical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>MSC 216</td>
<td>Chemical Oceanography Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>MBE 230</td>
<td>Introduction to Marine Biology</td>
<td>3</td>
</tr>
<tr>
<td>MSC 301</td>
<td>Introduction to Physical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>MBE 232</td>
<td>Introduction to Marine Biology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>or MSC 302</td>
<td>Introduction to Physical Oceanography Lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select 9 credit hours of approved Rosenstiel</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>School electives within ATM, GSC, MBE, MSC, OCE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or RSM courses</td>
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</tbody>
</table>

Additional Required Courses

Select one of the following:

- 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
- CHM 113 Chemistry Laboratory I
- WRS 105 First-Year Writing I
- WRS 107 First-Year Writing II: STEM
- or WRS 106 First-Year Writing II
- or ENG 106 Writing About Literature and Culture
- GSC 110 The Earth System
- GSC 111 Earth System History
- GSC 260 Earth Materials
- GSC 360 Depositional and Diagenetic Systems
- GSC 380 Paleontology and Stratigraphy
- GSC 410/MGS 513 Environmental Geochemistry
- GSC 420/MGS 514 Geophysics
- GSC 440 Petrology
- GSC 480 Structural Geology
- GSC 482 Field Methods
- GSC 561 Communicating Geoscience
- GSC 580 Summer Field Geology
- MTH 161 Calculus I
- or MTH 171 Calculus I
- MTH 162 Calculus II
Choose one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSC 203</td>
<td>Foundations of Computational Marine Science</td>
<td>3-4</td>
</tr>
<tr>
<td>MSC 204</td>
<td>Environmental Statistics</td>
<td></td>
</tr>
<tr>
<td>MTH 224</td>
<td>Introduction to Probability and Statistics</td>
<td></td>
</tr>
<tr>
<td>CSC 120</td>
<td>Computer Programming I</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following options: 5

**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 University Physics II Lab
  or PHY 225 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

**Electives**
- Arts and Humanities Cognate Courses 9
- People and Society Cognate Courses 9

**Total Credit Hours** 121

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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 must be passed with a grade of "C-" or higher.
4. Calculus II fulfills the Quantitative Skills Requirement.
5. Option 1 is recommended for Physics.

### Suggested Plan of Study

#### Freshman Year

**Fall**

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<tr>
<td>MSC 112</td>
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<td>1</td>
</tr>
<tr>
<td>GSC 110</td>
<td>The Earth System</td>
<td>4</td>
</tr>
<tr>
<td>MTH 161</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>WRS 105</td>
<td>First-Year Writing I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>GSC 111</td>
<td>Earth System History</td>
<td>4</td>
</tr>
<tr>
<td>CHM 121</td>
<td>Principles of Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHM 113</td>
<td>Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>MTH 162</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>WRS 107</td>
<td>First-Year Writing II: STEM</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours** 15

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**Credit Hours** 16
### Sophomore Year

#### Fall
- **GSC 260** Earth Materials 4
- **BIL 150** General Biology 4
- **BIL 151** General Biology Laboratory 1
- MSC Course 3
- Elective #1 3

#### Credit Hours
- **15**

#### Spring
- **MSC 215** Chemical Oceanography 3
- **MSC 216** Chemical Oceanography Laboratory 1
- **GSC 380** Paleontology and Stratigraphy 4
- **GSC 440** Petrology 4
- Elective #2 3

#### Credit Hours
- **15**

### Junior Year

#### Fall
- **MBE 230** Introduction to Marine Biology 3
- **MBE 232** Introduction to Marine Biology Laboratory 1
- **GSC 360** Depositional and Diagenetic Systems 4
- **PHY 201** University Physics I for the Sciences 4
- **PHY 106** College Physics Laboratory I 1

#### Credit Hours
- **13**

#### Spring
- **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

#### Credit Hours
- **16**

#### Summer
- **GSC 580** Summer Field Geology 4

#### Credit Hours
- **4**

### Senior Year

#### Fall
- **MSC 301** Introduction to Physical Oceanography 3
- **MGS 513** Introductory Geochemistry 3
- **GSC 561** Communicating Geoscience 2
- MSC Course 3
- Elective #4 3

#### Credit Hours
- **14**

#### Spring
- **GSC 480** Structural Geology 4
- **MGS 514** Geophysics 3
- Elective #5 3
- Elective #6 3

#### Credit Hours
- **13**

#### Total Credit Hours
- **121**

* 6 elective courses must include:
B.S.M.A.S. in Marine Science / Geological Sciences

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

1 Students must take one laboratory from 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.