B.S. IN GEOLOGICAL SCIENCES

Overview

This major program prepares students for the study of the Earth and its ocean, and the ongoing processes of geophysical and geochemical change. Research at UM focuses on carbonate sedimentology and coral reefs, geochemistry, paleoclimate, tectonic processes (volcanoes and earthquakes), and the impact of rising sea level on coastal systems. This major is designed for students preparing for graduate study and professional careers.

Curriculum Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSC 110</td>
<td>The Earth System</td>
<td>4</td>
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<tr>
<td>GSC 111</td>
<td>Earth System History</td>
<td>4</td>
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<tr>
<td>GSC 260</td>
<td>Earth Materials</td>
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<tr>
<td>GSC 360</td>
<td>Depositional and Diagenetic Systems</td>
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<td>GSC 380</td>
<td>Paleontology and Stratigraphy</td>
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<tr>
<td>GSC 440</td>
<td>Petrology</td>
<td>4</td>
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<tr>
<td>GSC 480</td>
<td>Structural Geology</td>
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<tr>
<td>GSC 482</td>
<td>Field Methods</td>
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<tr>
<td>MGS 513</td>
<td>Introductory Geochemistry</td>
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<tr>
<td>MGS 514</td>
<td>Geophysics</td>
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<td>GSC 561</td>
<td>Communicating Geoscience</td>
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<td>GSC 580</td>
<td>Summer Field Geology</td>
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<tr>
<td>CHM 121</td>
<td>Principles of Chemistry ¹</td>
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<td>CHM 113</td>
<td>Chemistry Laboratory I</td>
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<tr>
<td>MTH 161</td>
<td>Calculus I ²</td>
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<tr>
<td>or MTH 171</td>
<td>Calculus I</td>
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<tr>
<td>MTH 162</td>
<td>Calculus II (fulfills the Rosenstiel BS quantitative skills requirement)</td>
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<td>or MTH 172</td>
<td>Calculus II</td>
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<tr>
<td>CSC 120</td>
<td>Computer Programming I</td>
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<tr>
<td>CSC 220</td>
<td>Computer Programming II</td>
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<tr>
<td>MSC 204</td>
<td>Environmental Statistics</td>
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<tr>
<td>MTH 224</td>
<td>Introduction to Probability and Statistics</td>
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<tr>
<td>MSC 203</td>
<td>Foundations of Computational Marine Science</td>
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<tr>
<td>MGS 528</td>
<td>Analyze and Visualize Geoscience Data</td>
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<td>Options 1:</td>
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<tr>
<td>PHY 101</td>
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<td>PHY 106</td>
<td>College Physics Laboratory I</td>
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<td>PHY 102</td>
<td>College Physics II</td>
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<td>Option 2:</td>
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<td>University Physics I for the Sciences</td>
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<tr>
<td>PHY 106</td>
<td>College Physics Laboratory I</td>
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<td>PHY 202</td>
<td>University Physics II for the Sciences</td>
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<td>PHY 108</td>
<td>College Physics Laboratory II</td>
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<td>Option 3:</td>
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<td>University Physics I</td>
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<td>PHY 222</td>
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<tr>
<td>PHY 223</td>
<td>University Physics III</td>
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</table>
B.S. in Geological Sciences

PHY 224 University Physics II Lab
or PHY 225 University Physics III Lab

Courses in approved minor

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)

Electives

Additional Electives 12-22

Total Credit Hours 123

1 Principles of Chemistry must be passed with a grade of "C-" or higher.
2 Calculus I must be passed with a grade of "C-" or higher.

This is only a sample. There are numerous ways students can create plans of study for the B.S. in 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

Fall
GSC 110 The Earth System 4
WRS 105 First-Year Writing I 3
MTH 161 Calculus I 4
HUM Course #1 3

Credit Hours 14

Spring
GSC 111 Earth System History 4
WRS 107 First-Year Writing II: STEM 3
MTH 162 Calculus II 4
Minor Course #1 3

Credit Hours 14
## Sophomore Year

### Fall
- **GSC 260** Earth Materials 4
- **CHM 121** Principles of Chemistry 4
- **CHM 113** Chemistry Laboratory I 1
- Minor Course #2 3
- PS Course #1 3

### Credit Hours
15

### Spring
- **GSC 440** Petrology 4
- **MSC 204** Environmental Statistics 3
- HUM Course #2 3
- Elective #1 4

### Credit Hours
14

## Junior Year

### Fall
- **GSC 360** Depositional and Diagenetic Systems 4
- **PHY 201** University Physics I for the Sciences 4
- **PHY 106** College Physics Laboratory I 1
- Minor Course #3 3
- HUM Course #3 3

### Credit Hours
15

### Spring
- **GSC 231** Field Studies in Earth Systems 1
- **GSC 380** Paleontology and Stratigraphy 4
- **GSC 482** Field Methods 2
- **PHY 202** University Physics II for the Sciences 4
- **PHY 108** College Physics Laboratory II 1
- PS Course #2 3

### Credit Hours
16

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

### Credit Hours
4

## Senior Year

### Fall
- **MGS 514** Geophysics 3
- **GSC 561** Communicating Geoscience 2
- Minor Course #4 3
- PS Course #3 3
- Elective #2 4

### Credit Hours
15

### Spring
- **GSC 480** Structural Geology 4
- **GSC 411** Research in Geological Sciences 1
- **MGS 513** Introductory Geochemistry 3
- Minor #5 3
- Elective #3 3

### Credit Hours
16

### Total Credit Hours
123

1 Recommended elective to take for the Geological Sciences B.S. major.
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 Geological Sciences at the University of Miami is to graduate students with the ability and desire to integrate knowledge of geological science into their future careers.

Goals

In a time of increasing stress on Earth’s resources, land, oceans and environment, we strive to train our students in both the fundamentals of the Geological Sciences and natural systems and also the global environmental stresses facing Earth and society. In addition to the basic classroom and hands-on education in the various aspects of the Geological Sciences, we focus on preparing our undergraduate students in three critical areas: extensive field training and research to give students competence in dealing with the complexities of the real world; training in written and oral communication to give them competence in sharing their accumulating knowledge with their peers and also with the public; and an understanding of how increased human population and resource use is affecting Earth’s climate, environment and future character.

Student Learning Outcomes

- Students will demonstrate a strong knowledge base in the basics of geological sciences materials, history and processes (as provided in our GSC 110, 111, and 260 courses).
- Students will demonstrate a competent knowledge base in the following advanced sub-disciplines of geological sciences: sedimentology, stratigraphy, structural geology, paleontology/paleoecology, geochemistry, geophysics, and petrology.
- Students will demonstrate research competence in supervised research projects through course, employment, and/or a Senior Thesis.
- Students will demonstrate a competence in application of their geological sciences knowledge to field research applications, including mapping, sequence analysis, paleo-environmental reconstruction, structural/tectonic history, and process reconstruction.
- Students will demonstrate the ability to communicate their scientific knowledge and findings orally and in writing both at the professional scientific level and in lay terms.