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

Code	Title	Credit Hours
Geological Sciences		
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
GSC 440	Petrology	4
GSC 480	Structural Geology	4
GSC 482	Field Methods	2
MGS 513	Introductory Geochemistry	3
MGS 514	Geophysics	3
GSC 561	Communicating Geoscience	2
GSC 580	Summer Field Geology	4
Other Required Courses		
CHM 121	Principles of Chemistry [1]	4
CHM 113	Chemistry Laboratory I	1
MTH 161	Calculus I [2]	4
or MTH 171	Calculus I	
MTH 162	Calculus II (fulfills the Rosenstiel BS quantitative skills requirement)	4
or MTH 172	Calculus II	
Select one of the following:		3-4
CSC 120	Computer Programming I	
CSC 220	Computer Programming II	
MSC 204	Environmental Statistics	
MTH 224	Introduction to Probability and Statistics	
MSC 203	Foundations of Computational Marine Science	
MGS 528	Analyze and Visualize Geoscience Data	
Select one of the following options:		10
Options 1:		
PHY 101	College Physics I	
PHY 106	College Physics Laboratory I	
PHY 102	College Physics II	
PHY 108	College Physics Laboratory II	
Option 2:		
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 3:		
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	
Courses in approved minor [3]		9-19
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		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.

3 Approved minors are Anthropology (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/anthropology/anthropology-minor/), Biology (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/biology/biology-minor/), Chemistry (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/chemistry/chemistry-minor/), Climate Science and Policy, (http://bulletin.miami.edu/undergraduate-academic-programs/marine-atmospheric-science/atmospheric-science-meteorology/climate-science-policy-minor/) Computer Science (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/computer-science/computer-science-minor/), Ecosystem Science and Policy (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/ecosystem-science-policy/ecosystem-science-policy-minor/), Geospatial Technology (https://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/geography-regional-studies/minor-in-geospatial-technology/), Mathematics (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/mathematics/mathematics-minor/), Marine Policy (http://bulletin.miami.edu/undergraduate-academic-programs/marine-atmospheric-science/marine-affairs/marine-policy-minor/), Marine Science (http://bulletin.miami.edu/undergraduate-academic-programs/marine-atmospheric-science/marine-science/marine-science-minor/), Meteorology (http://bulletin.miami.edu/undergraduate-academic-programs/marine-atmospheric-science/atmospheric-science-meteorology/meteorology-minor/), and Physics (http://bulletin.miami.edu/undergraduate-academic-programs/arts-sciences/physics/physics-minor/).

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		**Credit Hours**
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]	2
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]	3
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.