

GEOPHYSICS, B.S.

The Bachelor of Science degree in Geophysics concentrates on the branch of geology that deals with the physics of the earth, including oceanography, seismology, volcanology, and geomagnetism.

Learning Outcomes

- Students will demonstrate their knowledge of fundamental concepts and laboratory skills in the geosciences by responding to written and laboratory-practical exam questions in at least one of the following GEOL 302, GEOL 325, GEOL 345, GEOL 355, GEOL 531, GEOL 550, GEOL 554, GEOL 555, GEOL 575 and GEOL 582.
- Students will demonstrate knowledge of geological field skills by showing a competency at the proficiency level on a geologic field exercise. In the Geophysics courses GEOL 548 and GEOL 554, the field exercise will include a class field project using seismic data and solving a particular geologic problem, such as fault identifications or the presence of sinkholes. For students enrolling in GEOL 500, the field exercise will be a mapping exercise, the Sheep Mountain project.
- Students will demonstrate their preparation for careers or graduate studies in the geosciences.

Admissions

Entrance Requirements

New freshmen who meet University admissions standards are eligible for admission to degree programs offered by the college. A student who wishes to enter the College of Arts and Sciences from another college on the Columbia campus must be in good standing and have a cumulative GPA of 2.00 or higher. A student who wishes to enter the College of Arts and Sciences from another UofSC campus must fulfill one of the following requirements:

1. Be in good standing, meet the admission requirements for a baccalaureate degree on the Columbia campus, and have a cumulative GPA of 2.00 or higher.
2. Be in good standing and have completed 30 semester hours with a GPA of 2.00 or higher on a UofSC campus.

Some programs in the College of Arts and Sciences have special admission requirements established by the department or committee that supervises the specific degree program, for example, Cardiovascular Technology, Biological Sciences, Chemistry, Biochemistry and Molecular Biology, Economics, Environmental Science, the Bachelor of Arts in Interdisciplinary Studies, and the Bachelor of Science in Interdisciplinary Studies. These requirements are listed in the sections of this bulletin that describe department and special degree programs.

Degree Requirements (128 hours)

Program of Study

Requirements	Credit Hours
1. Carolina Core	34-46
2. College Requirements	15-18
3. Program Requirements	30-45
4. Major Requirements	34

Founding Documents Requirement

All undergraduate students must take a 3-credit course or its equivalent with a passing grade in the subject areas of History, Political Science, or African American Studies that covers the founding documents

including the United State Constitution, the Declaration of Independence, the Emancipation Proclamation and one or more documents that are foundational to the African American Freedom struggle, and a minimum of five essays from the Federalist papers. This course may count as a requirement in any part of the program of study including the Carolina Core, the major, minor or cognate, or as a general elective. Courses that meet this requirement are listed here (<https://academicbulletins.sc.edu/undergraduate/founding-document-courses/>).

1. Carolina Core Requirements (34-46 hours)

CMW – Effective, Engaged, and Persuasive Communication: Written (6 hours)

must be passed with a grade of C or higher

- any CC-CMW courses (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

ARP – Analytical Reasoning and Problem Solving (8 hours)

must be passed with a grade of C or higher

- MATH 141*
- MATH 142*

SCI – Scientific Literacy (8 hours)

- PHYS 211* & PHYS 211L*
- PHYS 212* & PHYS 212L*

GFL – Global Citizenship and Multicultural Understanding: Foreign Language (0-6 hours)

Demonstration of proficiency in one foreign language equivalent to the minimal passing grade on the exit examination in the 122 course is required. Students can demonstrate this proficiency by successfully completing Phase II of the Proficiency Test or by successfully completing the 122 course, including the exit exam administered as part of that course.

- CC-GFL courses (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

It is strongly recommended that students continuing the study of a foreign language begin college-level study of that language in their first semester and continue in that language until their particular foreign language requirement is completed.

GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)

- any CC-GHS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)

- any CC-GSS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

AIU – Aesthetic and Interpretive Understanding (3 hours)

any CC-AIU course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

CMS – Effective, Engaged, and Persuasive Communication: Spoken Component¹ (0-3 hours)

any overlay or stand-alone CC-CMS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

INF – Information Literacy¹ (0-3 hours)

any overlay or stand-alone CC-INF course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

VSR – Values, Ethics, and Social Responsibility¹ (0-3 hours)

any overlay or stand-alone CC-VSR course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

¹**Carolina Core Stand Alone or Overlay Eligible Requirements** – Overlay-approved courses offer students the option of meeting two Carolina Core components in a single course. A maximum of two overlays is allowed. The total Carolina Core credit hours must add up to a minimum of 31 hours. Some programs may have a higher number of minimum Carolina Core hours due to specified requirements.

2. College Requirements (15-18 hours)**Foreign Language (0-3 hours)**

- only if needed to meet 122-level proficiency

Analytical Reasoning (6 hours)

Course	Title	Credits
STAT 509	Statistics for Engineers (*)	3
or STAT 515	Statistical Methods I	
CSCE 206	Scientific Applications Programming (*)	3
or CSCE 207	UNIX System Administration	
Total Credit Hours		6

History (3 hours)

The College of Arts and Sciences requires one additional GHS course beyond the Carolina Core GHS requirement.

- If the Carolina Core GHS requirement is fulfilled by a **U.S. history** course, the College of Arts and Sciences history requirement must be fulfilled by a **non-U.S. history** course.
- If the Carolina Core GHS requirement is fulfilled by a **non-U.S. history** course, the College of Arts and Sciences history requirement must be fulfilled by a **U.S. history** course.

Please select the College of Arts and Sciences history requirement from the approved list of U.S. and non-U.S. history courses (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/history-requirement/>).

Social Science and Fine Arts or Humanities (6 hours)

- **Social Science (3 hours)**
 - The College of Arts and Science requires one 3- hour Social Science Course (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-social-science/>)
- **Fine Arts/Humanities (3 Hours)**
 - A Bachelor of Science from the College of Arts and Sciences requires one 3-hour Fine Arts/Humanities Course (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-fine-arts-humanities/>)

3. Program Requirements (30-45 hours)**Supporting Courses (12 hours)**

Course	Title	Credits
Select one of the following:		
GEOL 101	Introduction to the Earth (*)	4
GEOL 103	Environment of the Earth (*)	
GEOL 201	Observing the Earth (*)	
CHEM 111 & 111L	General Chemistry I and General Chemistry I Lab (*)	4
CHEM 112 & 112L	General Chemistry II and General Chemistry II Lab (*)	4
Total Credit Hours		12

Cognate or Minor (13-18 hours)

Students must complete a cognate or a minor as part of this program.

In lieu of a cognate or minor, an additional major may be added to a student's program of study. **Additional majors must include all major courses as well as any prescribed courses noted (*) in the bulletin.**

Prescribed courses noted in the bulletin may be shared with Carolina Core, College requirements, and Program requirements in the primary program.

Cognate (13-14 hours)

must be passed with a grade of C or higher

Course	Title	Credits
MATH 241	Vector Calculus	3
MATH 242	Elementary Differential Equations	3
MATH 344 & 344L	Applied Linear Algebra and Applied Linear Algebra Lab	4
Select one of the following:		
MATH 520	Ordinary Differential Equations	3-4
MATH 521	Boundary Value Problems and Partial Differential Equations	
MATH 522	Wavelets	
MATH 525	Mathematical Game Theory	
MATH 526	Numerical Linear Algebra	
MATH 527	Numerical Analysis	
MATH 550	Vector Analysis	
MATH 552	Applied Complex Variables	
Total Credit Hours		13-14

Minor (18 hours) optional

In place of the cognate a student in the College of Arts and Sciences may choose a minor consisting of at least 18 credit hours of prescribed courses.

The minor is intended to develop a coherent basic preparation in a second area of study. It differs from the cognate inasmuch as the courses must follow a structured sequence.

Courses applied toward general education requirements cannot be counted toward the minor. No course may satisfy both major and minor requirements. All minor courses must be passed with a grade of C or higher. At least half of the courses in the minor must be completed in residence at the University.

A list of minor programs of study can be found at Programs A-Z (<https://academicbulletins.sc.edu/undergraduate/programs-az/>).

Electives (4-20 hours)

120 (or 128) degree applicable credits are required to complete any degree at UofSC. After the cognate, minor or second major is complete, any additional credits needed to reach 120 (or 128) total credits can be fulfilled by electives. No courses of a remedial, developmental, skill-acquiring, or vocational nature may apply as credit toward degrees in the College of Arts and Sciences. The College of Arts and Sciences allows the use of the Pass-Fail option on elective courses. Further clarification on inapplicable courses can be obtained from the College of Arts and Sciences.

Note: No electives will be needed to reach hours to graduate if completing the Degree with Distinction.

4. Major Requirements (34 hours)

a minimum grade of C is required in all major courses

Major Courses (34 hours)

Course	Title	Credits
GEOL 302	Rocks and Minerals	4
Select one of the following:		4
GEOL 315	Surface and Near Surface Processes	
GEOL 325	Stratigraphy and Sedimentary Basins	
GEOL 345	Igneous and Metamorphic Processes	
GEOL 355	Structural Geology and Tectonics	4
GEOL 531	Plate Tectonics	3
GEOL 548	Environmental Geophysics ¹	4
GEOL 554	Applied Seismology	3
GEOL 555	Elementary Seismology	3
GEOL 556	Seismic Reflection Interpretation	3
GEOL 575	Numerical Modeling for Earth Science Applications	3
GEOL 546	Marine Geophysics	3
or GEOL 582	Marine Hydrodynamics	
Total Credit Hours		34

¹ An approved field course may substitute as the Capstone Experience.

Degree with Distinction in Geophysics

Available to students majoring in Geophysics who wish to participate in significant research activities in their major field under the supervision of a faculty mentor. Students who successfully fulfill all of these requirements will be awarded their degree with "Distinction in Geophysics" upon graduation. South Carolina Honors College students taking this route would graduate with both Honors in SCHC and "Distinction in Geophysics".

Requirements:

- A minimum GPA of 3.5 in the major and 3.3 overall.
- A written sponsorship agreement from the faculty mentor on file in the department.
- Public presentation of the Senior Thesis research accompanied by a written document approved by the faculty mentor and a second reader that follows the guidelines of the School of the Earth, Ocean and Environment.
- 2 courses (6 hours) in addition to the general major requirements, including:
 - GEOL 498 or GEOL 499
 - GEOL 699

Major Map

A major map is a layout of required courses in a given program of study, including critical courses and suggested course sequences to ensure a clear path to graduation.

Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.

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