

GEOLOGICAL SCIENCES MAJOR, B.A.–EARTH SCIENCE CONCENTRATION

The study of earth's dynamic systems is a field that has seen major advances over the last few decades. Geologists investigate diverse systems that play a large role in controlling the environment at the earth's surface. The B.A. degree is designed to prepare students for professional employment in the earth and environmental sciences and is an ideal degree program for students who wish to pursue a double major.

Student Learning Outcomes






Upon completion of the geological sciences program (B.A.), students should be able to:



- Demonstrate broad knowledge of core geological concepts
- Produce written synthesis of professional journal articles dealing with topics covered in advanced courses
- Make a clear and effective oral presentation
- Apply knowledge and skills from coursework in a significant field experience in an area of geological sciences


In addition to the program requirements, students must

- earn a minimum final cumulative GPA of 2.000
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- take at least half of their major core requirements (courses and credit hours) at UNC–Chapel Hill
- earn a minimum cumulative GPA of 2.000 in the major core requirements. Some programs may require higher standards for major or specific courses.

For more information, please consult the degree requirements section of the catalog (<https://catalog.unc.edu/undergraduate/degree-requirements/>).




Code	Title	Hours
Core Requirements		
EMES 200	 The Solid Earth	3
EMES 201	 Earth's Surface: Processes, Landforms, and History	3
A minimum of 11 credits from the following EMES courses:		11
EMES 221	Geology of North America	
EMES 301	Earth Materials: Minerals	
EMES 302	Structural Geology	
EMES 303	Sedimentology and Stratigraphy	
EMES 304	Petrology and Plate Tectonics	
EMES 306	 Earth Systems History	
EMES 324 & 324L	 Water in Our World: Introduction to Hydrologic Science and Environmental Problems and  Water in Our World Laboratory	
Capstone requirement:		6
EMES 485 & EMES 486	Summer Field Course in Geology and Summer Field Course in Geology	

EMES 691H & EMES 692H  Honors in Earth, Marine, and Environmental Sciences and  Honors in Earth, Marine, and Environmental Sciences

EMES 395  Undergraduate Research in Earth, Marine, and Environmental Sciences ¹

Science-oriented Experiential Education (EE) courses (6 credits total). ²

Additional Requirements

CHEM 101 & 101L	 General Descriptive Chemistry I and  Quantitative Chemistry Laboratory I ^{H, F}	4
MATH 130	 Precalculus Mathematics ^F	3
At least three geology and/or allied science electives not otherwise required for the major (see below chart)		9
Total Hours		39







^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.





^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ 6 credits of independent research

² Must be pre-approved by the director of undergraduate studies.

Geology and/or Allied Science Electives Not Otherwise Required for the Major

Code	Title	Hours
ANTH 143	Human Evolution and Adaptation	3
ANTH 220	 Principles of Archaeology	3
ANTH 315	 Human Genetics and Evolution	3
ANTH 412	Paleoanthropology	3
ANTH 414	 Laboratory Methods: Human Osteology	3
ASTR ---	any Astronomy course	
BIOC ---	any Biochemistry course except BIOC 107 and BIOC 108	
BIOL 101 & 101L	 Principles of Biology and  Introductory Biology Laboratory ^{H, F}	4
BIOL ---	any Biology course above BIOL 113	
CHEM ---	any Chemistry course above CHEM 101	
COMP ---	any Computer Science course except COMP 50, COMP 70, and COMP 380	
ECON 101	 Introduction to Economics ^{H, F}	4
EMES ---	any Earth, Marine, and Environmental Sciences course numbered above EMES 103	
ENEC 489	Ecological Processes in Environmental Systems	4
ENEC 490	Special Topics in Environmental Science and Studies ^H	1-12

ENVR ---	any Environmental Health Sciences course except ENVR 600	
GEOG 370	 Introduction to Geographic Information	3
GEOG 410	 Modeling of Environmental Systems	3
GEOG 412	Synoptic Meteorology	3
GEOG 414	 Climate Change	3
GEOG 416	 Applied Climatology: The Impacts of Climate and Weather on Environmental and Social Systems	3
GEOG 440	Earth Surface Processes	3
GEOG 441	Introduction to Watershed Systems	3
GEOG 444	Landscape Biogeography	3
GEOG ---	any Geography course above GEOG 477	
GEOL ---	any Geological Sciences course	
MASC ---	any Marine Sciences course above MASC 101	
MATH ---	any Mathematics course above MATH 130	
PHYS ---	any Physics course except PHYS 101, PHYS 132, and PHYS 313	
STOR ---	any Statistics and Operations Research course STOR 155 or above	

- H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
- F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

Students also must satisfy all General Education requirements.

Course descriptions for:

- Astronomy (ASTR) and Physics (PHYS) (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>)
- Biochemistry (BIOC) (<https://catalog.unc.edu/undergraduate/departments/biochemistry-biophysics/#coursestext>)
- Biology (BIOL) (<https://catalog.unc.edu/undergraduate/departments/biology/#coursestext>)
- Chemistry (CHEM) (<https://catalog.unc.edu/undergraduate/departments/chemistry/#coursestext>)
- Computer Science (COMP) (<https://catalog.unc.edu/undergraduate/departments/computer-science/#coursestext>)
- Environmental Health Sciences (ENVR) (<https://catalog.unc.edu/undergraduate/departments/environmental-sciences-engineering/#coursestext>)
- Geography (GEOG) (<https://catalog.unc.edu/undergraduate/departments/geography/#coursestext>)
- Geological Sciences (GEOL) (<https://catalog.unc.edu/undergraduate/departments/earth-marine-environment/#coursestext>)
- Marine Sciences (MASC) (<https://catalog.unc.edu/undergraduate/departments/earth-marine-environment/#coursestext>)
- Mathematics (MATH) (<https://catalog.unc.edu/undergraduate/departments/mathematics/#coursestext>)

- Statistics and Operations Research (STOR) (<https://catalog.unc.edu/undergraduate/departments/statistics-operations-research/#coursestext>)

Special Opportunities in Earth, Marine, and Environmental Sciences Honors in Geological Sciences

The honors program is open to undergraduates with an overall grade point average of 3.3 or better as of the beginning of the fall semester of the senior year. To participate in this program, the student chooses a research topic in consultation with his or her chosen faculty sponsor and conducts the research during the last two semesters in residence. The research project should represent the equivalent time expenditure of six hours of course credit and is taken as EMES 691H (fall semester) and EMES 692H (spring semester).

Upon recommendation of the faculty, students may be awarded the degree with honors or highest honors. Highest honors is reserved for students who have distinguished themselves in both coursework and independent research. In order to obtain this distinction the student must maintain a grade point average of 3.60 or higher and complete a research project that is worthy of peer-reviewed publication.

Departmental Involvement



The department encourages the active participation of undergraduates in department research, teaching, and social life. In addition to opportunities for experiential education and teaching internships described below, the department has an active Geology Honor Fraternity and Geology Club and regularly sponsors field excursions, career information sessions, and social events. Dates, times, and locations for all events are posted on the website and in the main lobby on the first floor of Mitchell Hall.

Experiential Education


Many department courses emphasize experiential learning through field and laboratory work. Most degree tracks include a field geology course (EMES 485 and EMES 486 or a similar course in another department) that fulfills the experiential education General Education requirement (in the Making Connections curriculum). Additionally, all students are encouraged to contact faculty members about conducting independent research, either as an honors thesis or a senior thesis project.

UNC-BEST

The UNC Baccalaureate Education in Science and Teaching (UNC-BEST) Program is a collaboration between the School of Education and the College of Arts and Sciences and is designed to allow undergraduate science majors interested in teaching high school science the opportunity to earn their science degree and obtain licensure as a North Carolina high school science teacher in four years.

Code	Title	Hours
Educational Foundations		
EDUC 532	 Human Development and Learning	3
EDUC 615	Schools and Community Collaboration	3
EDUC 689	Foundations of Special Education	3
Student Teaching		
EDUC 593	 Internship/Student Teaching	12
Seminar		
EDUC 601	Education Workshops	1

Pedagogy Course

EMES 412	 Principles and Methods of Teaching Earth Science	4
----------	--	---

Total Hours 26

For more details on admission requirements, application deadlines, and submitting an online application, visit the School of Education website (<http://soe.unc.edu/academics/uncbest/>).

Study Abroad

Although the department has no formalized study abroad program, many students participate in a study abroad program, and some receive credit for geology coursework completed abroad. Students interested in a study abroad program should contact the director of undergraduate studies. Students must receive approval from the director of undergraduate studies prior to taking courses abroad for geology credit.

Undergraduate Awards

The Op White Prize in Geology, established in 1966, consists of a cash prize and an engraved bronze plaque displayed in the geology office. The award is given annually to the outstanding senior in geology.

Field Camp Scholarships

Several scholarships for geology field camp are awarded each year from the Grover Murray and Anadarko funds.

Undergraduate Research

The department encourages qualified undergraduate students to conduct independent research on an interesting geologic topic under the direction of a geological sciences faculty member. This research can be conducted as a one- to four-credit hour project (EMES 395) or in conjunction with the geology honors program.

Department Programs**Majors**

- Geological Sciences Major, B.A.–Earth Science (p. 1)
- Earth and Marine Sciences Major, B.S. (<https://catalog.unc.edu/undergraduate/programs-study/earth-marine-sciences-major-bs/>)

Minors

- Environmental Microbiology Minor (<https://catalog.unc.edu/undergraduate/programs-study/environmental-microbiology-minor/>)
- Geological Sciences Minor (<https://catalog.unc.edu/undergraduate/programs-study/geological-sciences-minor/>)
- Hydrology Minor (<https://catalog.unc.edu/undergraduate/programs-study/hydrology-minor/>)
- Marine Sciences Minor (<https://catalog.unc.edu/undergraduate/programs-study/marine-sciences-minor/>)

Graduate Programs

- M.S. in Geological Sciences (<https://catalog.unc.edu/graduate/schools-departments/geological-sciences/>)
- M.S. in Marine Sciences (<https://catalog.unc.edu/graduate/schools-departments/marine-sciences/>)
- Ph.D. in Geological Sciences (<https://catalog.unc.edu/graduate/schools-departments/geological-sciences/>)

- Ph.D. in Marine Sciences (<https://catalog.unc.edu/graduate/schools-departments/marine-sciences/>) (<https://catalog.unc.edu/graduate/schools-departments/geological-sciences/>)

Contact Information**Department of Earth, Marine, and Environmental Sciences**

Visit Program Website (<https://emes.unc.edu/>)

Murray and Mitchell Halls

Chair

Eric Kirby

ekirby@unc.edu

Director of Undergraduate Studies

Kevin Stewart

KGSTEWAR@email.unc.edu

Undergraduate Student Services Manager

Heratia Brelland

heratiab@unc.edu