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.

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 (http://catalog.unc.edu/undergraduate/degree-requirements/).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 200</td>
<td>The Solid Earth</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 201</td>
<td>Earth’s Surface: Processes, Landforms, and History</td>
<td>3</td>
</tr>
<tr>
<td>A minimum of 11 credits from the following GEOL courses:</td>
<td>11</td>
<td></td>
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<tr>
<td>GEOL 202</td>
<td>Earth Systems History</td>
<td></td>
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<tr>
<td>GEOL 221</td>
<td>Geology of North America</td>
<td></td>
</tr>
<tr>
<td>GEOL 301</td>
<td>Earth Materials: Minerals</td>
<td></td>
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<tr>
<td>GEOL 302</td>
<td>Structural Geology</td>
<td></td>
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<tr>
<td>GEOL 303</td>
<td>Sedimentology and Stratigraphy</td>
<td></td>
</tr>
<tr>
<td>GEOL 304</td>
<td>Petrology and Plate Tectonics</td>
<td></td>
</tr>
<tr>
<td>GEOL 315</td>
<td>Energy Resources</td>
<td></td>
</tr>
<tr>
<td>GEOL 324 &amp; 324L</td>
<td>Water in Our World: Introduction to Hydrologic Science and Environmental Problems and Water in Our World Laboratory</td>
<td></td>
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<tr>
<td>Capstone requirement:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>GEOL 485 &amp; 486</td>
<td>Summer Field Course in Geology and Summer Field Course in Geology</td>
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</tbody>
</table>

Additional Requirements

- CHEM 101 & 101L: General Descriptive Chemistry I and Quantitative Chemistry Laboratory I^F
- MATH 130: Precalculus Mathematics^F
- At least three geology and/or allied science electives not otherwise required for the major (see below chart)

Total Hours: 39

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

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

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>ANTH 143</td>
<td>Human Evolution and Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 220</td>
<td>Principles of Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 315</td>
<td>Human Genetics and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 412</td>
<td>Paleontology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 414</td>
<td>Laboratory Methods: Human Osteology</td>
<td>3</td>
</tr>
<tr>
<td>ASTR —</td>
<td>any Astronomy course</td>
<td></td>
</tr>
<tr>
<td>BIOC —</td>
<td>any Biochemistry course except BIOC 107 and BIOC 108</td>
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</tr>
<tr>
<td>BIOL 101 &amp; 101L</td>
<td>Principles of Biology and Introductory Biology Laboratory</td>
<td>4</td>
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<tr>
<td>BIOL —</td>
<td>any Biology course above BIOL 113</td>
<td></td>
</tr>
<tr>
<td>CHEM —</td>
<td>any Chemistry course above CHEM 101</td>
<td></td>
</tr>
<tr>
<td>COMP —</td>
<td>any Computer Science course except COMP 50, COMP 70, and COMP 380</td>
<td></td>
</tr>
<tr>
<td>ECON 101</td>
<td>Introduction to Economics^H,F</td>
<td>4</td>
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<tr>
<td>ECON 454</td>
<td>Economics of Population</td>
<td>3</td>
</tr>
<tr>
<td>ENEC 489</td>
<td>Ecological Processes in Environmental Systems</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 490</td>
<td>Special Topics in Environmental Science and Studies^H</td>
<td>1-12</td>
</tr>
<tr>
<td>ENVR —</td>
<td>any Environmental Health Sciences course except ENVR 600</td>
<td></td>
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<tr>
<td>GEOG 370</td>
<td>Introduction to Geographic Information</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 410</td>
<td>Modeling of Geographic Information</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 412</td>
<td>Synoptic Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 414</td>
<td>Climate Change</td>
<td>3</td>
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</tbody>
</table>
Special Opportunities in Geological 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 GEOL 691H (fall semester) and GEOL 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 geology courses emphasize experiential learning through field and laboratory work. Most degree tracks include a field geology course (GEOL 485 and GEOL 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.

Course descriptions for:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>GEOG 416</td>
<td>Applied Climatology: The Impacts of Climate and Weather on Environmental and Social Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 440</td>
<td>Earth Surface Processes</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 441</td>
<td>Introduction to Watershed Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 444</td>
<td>Landscape Biogeography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG --</td>
<td>any Geography course above GEOG 477</td>
<td></td>
</tr>
<tr>
<td>GEOL --</td>
<td>any Geological Sciences course</td>
<td></td>
</tr>
<tr>
<td>MASC --</td>
<td>any Marine Sciences course above MASC 101</td>
<td></td>
</tr>
<tr>
<td>MATH --</td>
<td>any Mathematics course above MATH 130</td>
<td></td>
</tr>
<tr>
<td>PHYS --</td>
<td>any Physics course except PHYS 101, PHYS 132, and PHYS 313</td>
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<tr>
<td>STOR --</td>
<td>any Statistics and Operations Research course</td>
<td></td>
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</table>

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<tr>
<th>Code</th>
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<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>EDUC 689</td>
<td>Foundations of Special Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 532</td>
<td>Human Development and Learning</td>
<td>3</td>
</tr>
<tr>
<td>or EDUC 501</td>
<td>Adolescent and Adulthood Development: A Cross-Cultural</td>
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<tr>
<td>EDUC 615</td>
<td>Schools and Community Collaboration</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 593</td>
<td>Internship/Student Teaching</td>
<td>12</td>
</tr>
<tr>
<td>EDUC 601</td>
<td>Education Workshops</td>
<td>1</td>
</tr>
</tbody>
</table>

Teaching methods course
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 (GEOL 395) or in conjunction with the geology honors program.

**Department Programs**

**Majors**
- Geological Sciences Major, B.A.–Earth Science (p. 1)

**Minors**
- Geological Sciences Minor (http://catalog.unc.edu/undergraduate/programs-study/geological-sciences-minor/)
- Marine Sciences Minor (http://catalog.unc.edu/undergraduate/programs-study/marine-sciences-minor/)

**Graduate Programs**
- M.S. in Geological Sciences (http://catalog.unc.edu/graduate/schools-departments/geological-sciences/)
- M.S. in Marine Sciences (http://catalog.unc.edu/graduate/schools-departments/marine-sciences/)
- Ph.D. in Geological Sciences (http://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

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