

GEOLOGICAL SCIENCES DEGREE REQUIREMENTS

Geological Sciences Undergraduate Advising Committee: Goodge (Director of Undergraduate Studies), Hansen, Scholle, Stump

GEOLOGY B.A.

A minimum of **28 hrs** in geology, selected from the following:

1. One of GEOL 1301, 1305, 1307, 1308, or 1315 - **3 hrs**
2. Face of the Earth (GEOL 3340), Earth Materials I & II (GEOL 3451, 3452) - **11 hrs**
3. Four geology electives (3000+) - **12 hrs minimum**
4. Geology Field Studies (one of GEOL 3240, 3241, 3242, or 3243) - **2 hrs**

Required support courses - **9 hrs minimum**:

1. CHEM 1301 or 1303 - **3 hrs**
 2. PHYS 1301, 1303 (recommended), 1313, or 1407 - **3 hrs minimum**
 3. MATH 1337 - **3 hrs**
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NOTE:

1. Participation in a recognized geology summer field camp is strongly recommended. (Most geology graduate programs in the U.S. require that a field course be completed.)

GEOLOGY B.S.

A minimum of **36 or 38 hrs** in geology, selected from the following:

1. One of GEOL 1301, 1305, 1307, 1308, or 1315 - **3 hrs**
2. Face of the Earth (GEOL 3340), Earth Materials I & II (GEOL 3451, 3452), Structural Geology (3454) - **15 hrs**
3. Four geology electives (3000+) - **12 hrs minimum**
4. Geology Field Studies (one of GEOL 3240, 3241, 3242, or 3243) - **2 hrs**
5. Integrative Research (4296 & 4298) or Field Geology (4657) - **4 or 6 hrs**

Required support courses - **17 hrs minimum**:

1. CHEM 1303, 1113, 1304, 1114, or 1307, 1113, 1308, 1114 - **8 hrs**
 2. PHYS 1303 (recommended) or 1407 - **3 hrs minimum**
 3. MATH 1337, 1338 - **6 hrs**
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NOTES:

1. Participation in a recognized geology summer field camp is strongly recommended for the B.S. (even for students electing to do Integrative Research). Most geology graduate programs in the U.S. require that a field course be completed.
2. Experience with a modern scientific computing language is **essential**. This experience can be gained in a course such as GEOL 3159 (Computer Methods in the Geological Sciences).

3. The basic requirements for the major are considered **minimal**. Students planning careers in the earth sciences should take additional coursework according to the geoscience emphasis which best fits their goals. See a faculty adviser for suggestions.

GEOPHYSICS B.S.

A minimum of **33 hrs** in the geological sciences, selected from the following:

1. One of GEOL 1301, 1305, 1307, 1308, or 1315 - **3 hrs**
2. Earth Materials I & II (GEOL 3451, 3452) - **8 hrs**
3. Structural Geology (GEOL 3454), Dynamic Earth I (5320), Introduction to Seismology (5392) - **10 hrs**
4. Four geoscience electives (3000+), one of which must be in geophysics - **12 hrs minimum**

Required support courses -- **30 hrs minimum**:

1. CHEM 1303, 1113 or 1307, 1113 (General Chemistry) - **4 hrs**
 2. PHYS 1303, 1105, 1304, 1106 (recommended) or 1407, 1408; - **8 hrs**
 3. MATH 1337, 1338, 2339 (Calculus I, II, III), 2343 (Differential Eqs.), 3337 (Adv. Math for Sci. & Engin. I), 3353 (Linear Algebra) - **18 hrs**
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NOTES:

1. Participation in a recognized geology or geophysics summer field camp is strongly recommended for **all** geophysics majors.
2. Experience with a modern scientific computing language is **essential**. This experience can be gained in a course such as GEOL 3159 (Computer Methods in the Geological Sciences).
3. The basic requirements for the Geophysics major are considered **minimal**. Consult a faculty adviser for recommendations on additional coursework that best fits your goals.

ENVIRONMENTAL GEOLOGY B.S.

A minimum of **33-37 hrs** in geology, selected from the following:

1. One of GEOL 1301, 1305, 1307, 1308, or 1315 - **3 hrs¹**
2. Face of the Earth (GEOL 3340), Earth Materials I & II (GEOL 3451, 3452) - **11 hrs**
3. Environmental Geology and Geochemical Cycles (GEOL 3366), Hydrogeology (GEOL 5384), and Geochemistry (GEOL 5386) - **9 hrs**
4. Two geology electives (GEOL), selected from: Modern & Ancient Climates (3353), Structural Geology (3454), Sedimentology (3472), or Geophysical Prospecting (4390) - **6-8 hrs minimum**
5. Integrative Research (4296 & 4298) or Field Geology (4657) - **4 or 6 hrs**

Required support courses - **26 hrs minimum**:

1. CHEM 1303, 1113, 1304, 1114, or 1307, 1113, 1308, 1114 (General Chemistry) - **8 hrs**
 2. PHYS 1303 (recommended) or 1407 - **3 hrs minimum**
 3. MATH 1337, 1338, 2339 (Calculus I, II, III), 2343 (Differential Equations) - **12 hrs**
 4. SEAS SSH 5311 (Environmental and Hazardous Waste Law) - **3 hrs**
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NOTES:

1. GEOL 1301 (Earth Systems) is the course recommended from this group.
2. Experience with a modern scientific computing language is **essential**. This experience can be gained in a course such as GEOL 3159 (Computer Methods in the Geological Sciences).
3. The basic requirements for the Environmental Geology major are considered **minimal**. Consult a faculty adviser for recommendations on additional coursework that best fits your goals.

MINOR IN GEOLOGY

A minimum of **17-18 hrs** in geology, selected from the following:

1. One of GEOL 1301 (Earth Systems), 1305 (Oceanography), 1307 (Solar System), 1308 (Evolution and Life History), or 1315 (Intro. to Environmental Sciences) - **3 hrs**
2. Four advanced-level (3000+) geology electives - **12 hrs minimum**
3. Geology Field Studies (one of GEOL 3240, 3241, 3242, or 3243) or a geology elective of 3300 or higher level (if not used in 2) - **2-3 hrs**

MINOR IN ENVIRONMENTAL EARTH SCIENCE

A minimum of **18 hrs**, selected from the following*:

1. One of GEOL 1301 (Earth Systems), 1305 (Oceanography), 1307 (Solar Systems), or 1308 (Evolution and Life History) - **3 hrs**
2. One of GEOL 1315 (Introduction to Environmental Science), 3340¹ (Face of the Earth), 3353² (Modern and Ancient Climates), 3363 (Environmental Geology Seminar), or 3366² (Environmental Geology and Geochemical Cycles) - **3 hrs**
3. Four courses to be selected from the following list: - **12 hrs**
 GEOL 3330, 3340, 3353, 3363, 3366 (if not used in 2)
 BIOL 1305 (Our Natural Environment)**
 BIOL 3307³ (Ecology)
 BIOL 3342³ (The Plant Kingdom)
 BIOL 3343³ (Field Botany)**
 ME 1304 (Control of Environmental Pollution)
 SSH 5311 (Environmental and Hazardous Waste Law)
 CF 2317 (Geological/Social Perspectives on Global Environmental Problems)
 CAPS 3396 (Science and Politics in the Nuclear Age)

NOTES:

* At least **9** of the 18 semester hours must be 3000-level or above.

** Course taught **only** at S.M.U. in Taos

COURSE PREREQUISITES:

¹One 1300-level GEOL course or consent of instructor

²High school chemistry and algebra

³BIOL 1401 and 1402, or consent of instructor.

OVERALL CURRICULUM

1. Transfer credit. New criteria for pre-approval of transfer credit for introductory geoscience courses to be completed at other universities are as follows:

- a. Institution must be 4-year college or university.
- b. Department must be listed as a geoscience department in the AGI directory (or in the case of a non-U.S. institution, in a program of recognized standing).
- c. Course must explicitly cover topical material that is similar to that described for an equivalent SMU course, and it must include a lab component.
- d. Course must include a minimum of 60 contact hours, at least 20 of which must be in a scheduled lab [This is in parallel with approved courses at other institutions, which commonly include 8 hrs/wk lecture and 4 hrs/wk lab over 5 weeks. Science courses offered during SMU summer sessions range from 75-95 contact hrs]. Students must document that these requirements will be met prior to approval.

2. Minimum grade standards.

5. The Department requires that students make a grade of at least B- in an introductory-level course in order to major in our department programs. Students making lower than a B- but who are still interested in a Geology major may either retake the course in order to raise their grade, or pass a different 1300-level course with a B- minimum.

- b. Following General University policy, the Department requires that majors earn at least a C- in any course in order for it to count toward major requirements. Students making lower than a C- in a required course or an elective course counting toward total required hours in the major must retake the course in order to raise their grade.

3. Waivers for satisfaction of degree requirements. Students are expected to fulfill all degree requirements in order to advance in the major or meet graduation requirements. Petitions to waive these requirements will not be approved except in unusual circumstances to be approved by the Undergraduate Advising Committee. Students are encouraged to complete the core sequence of courses during their Sophomore and Junior years. Standing requirements include:

- a. students must satisfactorily pass a 1300-level course (B- or better) in order to major;
- b. students must satisfactorily pass required courses in the core sequence (C- or better in GEOL 3340, 3451, 3452); and
- c. students must meet all other requirements for hours in the major and supporting science and math courses.

4. Course changes.

- a. The following courses that have not been taught in a number of years will be dropped from the catalog:
 - i. GEOL 5261 Mineral Chemistry
 - ii. GEOL 5394 Geophysical Problem Solving
- b. A proposal to add courses *GEOL 5170, 5270, and 5370: Independent Study in Geoscience* will be submitted to the Undergraduate Council for approval. These courses will allow students to take an independent study or reading course for material not covered in current course offerings. See attached course proposal.

5. Course pre-requisites. New course pre-requisites are listed below. Pre-requisites must be completed prior to or taken concurrently with the courses listed on the right:

<u>Pre-requisite</u>	<u>Courses</u>
GEOL 1301 (or 13xx)	Field Studies (3240, 3241) Resources & the Environment (3330) Face of the Earth (3340) Modern & Ancient Climates (3353) Process Geomorphology (3360) Environmental Geology Seminar (3363) Env. Geology/Geochemical Cycles (3366) Paleobiology (3369) Petroleum Geology (3374) Earth Materials I (3451)
GEOL 3340	Earth Materials II (3452)
GEOL 3369	Paleoecology (5368)
GEOL 3451	Earth Materials II (3452) Sedimentation (3472)
GEOL 3452	Structural Geology (3454) Global Change (5370) Stratigraphy (5380) Geochemistry (5386) Igneous & Metamorphic Petrology (5481)
CHEM 1303 (co-req)	Earth Materials I (3451) Hydrogeology (5384)

MATH 1338	Geophysical Prospecting (4390) Hydrogeology (5384)
MATH 2343	Digital Data Processing (5389) Intro. to Seismology (5392)