Geology in the UNL Department of Geosciences

http://www.geosciences.unl.edu/

The Department of Geosciences offers both the **bachelor of science (B.S.)** and the **bachelor of arts (B.A.)** degrees in Geology. Details of degree requirements are provided on p. 2-5.

The B.S. program is designed for those who expect to continue in graduate work and become professional geoscientists.

The B.A. program is designed for those students who want strong preparation for allied fields such as teaching at the pre-college level, urban planning, law, civil engineering, environmental studies, and museum work. The B.A. program is strong in fundamental geology but does not provide the ancillary requirements for admission for most graduate study in geology.

Highlights of the Geology Undergraduate Program include:

- A summer course in Wyoming (senior year for BS students, not required for BA students), which provides hands-on experience with geology skills in a classic setting world famous for its dinosaur fossils.
- The Schramm course in economic and exploration geology includes field trips to classic geological locations. Recent destinations include California, the Bahamas, Australia, the Gulf Coast, and Canada. Because these trips are funded by geology alumni, students do not have to pay for transportation or lodging.
- Undergraduate research is a major facet of the program, with many students completing a senior research thesis while working in the laboratories of active researchers.
- Low faculty-to-student ratio and small majors classes provide for individual attention and education.
- Strong alumni-supported scholarship program for top students. More information and application materials are provided on p. 6-7.
- Opportunities to participate in "Dinosaurs and Disasters," an annual event at the University of Nebraska State Museum. This event has attracted record crowds to the museum (http://www.unl.edu/museum/press/dinosdisasters06.html).
- Excellent employment outlook. All of our recent graduates have landed jobs in geology or have gone on to pursue a higher degree in the geosciences. See pages 8-9 for information on careers in geology.

Contacts:

- Undergraduate Advisor: Dr. Tracy Frank (tfrank2@unl.edu), 223 Bessey Hall, tel: 472-9799
- UNL Geology Club, Jacob Carnes, President.
- UNL Student Chapter of the American Association of Petroleum Geologists (http://www.geosciences.unl.edu/AAPG/AAPG%20Main.htm) Brandi Harkins, President (bharkins@gmail.com).

Outline of program of study (BS in Geology)

First Year

GEOL 101 or 101H (preferred) Physical Geology (fall/spring)
GEOL 103H Historical Geology (spring)

Second Year

GEOL 210 Minerals, Rocks, and Ores (fall)
GEOL 211 Sedimentology and Stratigraphy (spring)

The following should be completed by the end of the second year: MATH106, MATH107, and CHEM 113 (or equivalent)

THIRD YEAR

GEOL 310 Depositional Environments
GEOL 340 Structural Geology
GEOL elective(s)
GEOL 460 Field Camp (summer)

*** The following should be completed by the end of the third year: physics requirement***

FOURTH YEAR

GEOL 412 Geochemistry
GEOL electives

Degree Requirements Bachelor of Science in Geology

I. GENERAL EDUCATION REQUIREMENTS

Area	Comments	Cr	☑
A. Communications		6	
C. Human Behavior, Culture, & Social Organization	Courses must be from 2 departments	6	
E. Historical Studies	Courses must be from sub-area 1	3	
F. Humanities		3	
G. Arts		3	
H. Ethnicity and Gender		3	
I. Foreign language		16	
Additional in C, E, F, & G		6	
Library 110		1	

II. ANCILLARY SCIENCE

Course	Cr	☑
Math 106 Analytic Geometry and Calculus I	5	
Math 107 Analytic Geometry and Calculus II	5	
Chemistry 109 or 113 (preferred)	4	
Physics 141 or 211/221 (preferred)	5	
Physics 142 or 212/222 (preferred	5	
Choice of following (total 6 cr) ASTR204 BIOL101/101L, 104H, 109, 112, 201, 204, 301 CHEM110 or 114, 116 or 221, (251 and 253) or (261 and 263), 471 MATH208, 221, 380 STAT180 PHYS311, 343	6	

III. GEOLOGY CORE

Course	Cr	☑
GEOL101 or 101H (preferred) Physical Geology	4	
GEOL103H Historical Geology	4	
GEOL210 Minerals, Rocks, and Ores	4	
GEOL211 Sedimentology and Stratigraphy	3	
GEOL310 Depositional Environments	3	
GEOL340 Structure	3	
GEOL410 Geochemistry	3	
GEOL460 Summer Field Course	6	
Electives at the 200 level or higher, including at least one course at the 400 level	12	

IV. INTEGRATIVE STUDIES (IS) REQUIREMENT

Description	☑
The above must include 10 courses that fulfill the IS requirements (see course list in Undergraduate Bulletin). Among the 10 IS courses, at least one must be from each level (100, 200, 300, and 400) and no more than 3 may be taken in any one discipline.	

V. OTHER REQUIREMENTS

Description	☑
The above courses must include 30 credits above the 299 level.	

Total 125 cr. (130 with language entrance deficiency)

Degree Requirements Bachelor of Arts in Geology

I. GENERAL EDUCATION REQUIREMENTS

Area	Comments	Cr	☑
A. Communications		6	
B. Mathematics and Statistics		3	
C. Human Behavior, Culture, & Social Organization	Courses must be from at least 2 departments	9	
E. Historical Studies	3 credits must be from sub-area 1	6	
F. Humanities		3	
G. Arts		3	
H. Ethnicity and Gender		3	
I. Foreign language		16	
Additional in F or G		6	
Library 110		1	

II. ANCILLARY SCIENCE

Course	Cr	☑
MATH 102 or 103	5	
CHEM 109 or 113	4	

III. GEOLOGY CORE

Course	Cr	☑
GEOL101 or 101H (preferred) Physical Geology	4	
GEOL103H Historical Geology (Spring only)	4	
GEOL210 Minerals, Rocks, and Ores	4	
GEOL211 Sedimentology and Stratigraphy	3	
GEOL310 Depositional Environments	3	
GEOL340 Structural Geology	3	
Electives, of which only 4 cr may be taken at the 100 level.	9	

IV. INTEGRATIVE STUDIES

Description	☑
The above must include 10 courses that fulfill the IS requirements (see course list in Undergraduate Bulletin). Among the 10 IS courses, at least one must be from each level and no more than 3 may be taken in any one discipline.	

V. OTHER REQUIREMENTS

Description	☑
The above courses must include 30 credits above the 299 level..	

Total 125 cr. (130 with language entrance deficiency)

ELECTIVE COURSES FOR THE GEOLOGY DEGREE

(*note that this list is subject to change*)

For the BS in Geology, students must complete 12 credits of electives at the 200 level or higher, including at least one course at the 400 level.

A. All electives that count toward the degree

Any GEOL courses at the 200, 300, or 400 level

METR200, METR351

B. Recommended courses for Professional Geologist emphasis

Over 30 US and Canadian states and provinces, including Nebraska, require geologists whose work affects public health and safety to obtain a professional license. Students wishing to pursue professional licensure should take the required core courses as well as GEOL 488 Groundwater Geology. Recommended electives include GEOL450 Surficial Processes and Landscape Evolution; GEOL470 Field Techniques in Hydrogeology, GEOL472 Water in Geosciences, and GEOL485 Fossil Fuel Geology and Exploration.

C. Recommended courses for emphasis in Sedimentary Geology

Students pursuing this emphasis should choose four electives from the following: GEOL414 Clay mineralogy, GEOL420 Siliciclastic Sedimentology, GEOL421 Carbonate Petrology, GEOL450 Surficial Processes and Landscape Evolution, GEOL485 Fossil Fuel Geology and Exploration, GEOL495 Schramm Course in Economic and Exploration Geology, GEOL498 Stratigraphic Architecture

D. Recommended courses for emphasis Paleontology & Earth Systems Science:

Students pursuing this emphasis should choose four electives from the following: GEOL417 Organic geochemistry, GEOL422 Marine Geology and Paleoceanography, GEOL423 Quaternary Ecology and Climate, GEOL424 Biogeochemical Cycles, GEOL430 Quantitative Methods in Paleontology, GEOL431 Micropaleontology, GEOL435 Vertebrate Paleontology

E. Recommended courses for emphasis in Hydrological Sciences & Environmental Geosciences

Students pursuing this emphasis should choose four electives from the following: GEOL417 Organic Geochemistry, GEOL418/L Chemistry of Natural Waters, GEOL450 Surficial Processes and Landscape Evolution, GEOL465 Soil Geomorphhology and Paleopedology, GEOL470 Field Techniques in Hydrogeology, GEOL472 Water in Geosciences, GEOL488 Groundwater Geology

ALUMNI SCHOLARSHIPS IN GEOLOGY

The generosity of our alumni has provided a number of undergraduate scholarships for the study of geology at the University of Nebraska-Lincoln. We are seeking motivated, bright students with strong academic records. Outstanding candidates who are pre-admitted as geology majors will be considered for partial tuition scholarships. Information about the Geology Program and the Department of Geosciences is available on the web at http://www.geosciences.unl.edu/.

To apply, complete the application form on the next page and send it to the undergraduate advisor (contact information below). For consideration by our scholarships panel, we need ACT and/or SAT (or equivalent test) results and a high school transcript. A letter of recommendation from a teacher who knows you well is also required. Please feel free to duplicate the application form.

The deadline for applications each year is flexible, with applications arriving before March 15 being considered immediately. Award decisions will be made soon after an application is received.

Send completed applications to:
Dr. Tracy D. Frank (tfrank2@unl.edu)
Chief Undergraduate Advisor, Geology Program
University of Nebraska-Lincoln
Department of Geosciences
214 Bessey Hall
Lincoln, NE 68588-0340

Scholarship Application Form

Full name: _____

Phone number:_____

Address: _____

City, State, country, Zip code: _____

_____

_____

High school: _____

Recommending science teacher (attach letter): _____

Grades: Average for high school career: _____

Rank in class: _____ Number in class: _____

Standardized test score(s): _____

_____

Honors and activities: _____

_____

_____

On a separate piece of paper, the applicant should write a short essay (approximately 250 words) describing reasons for wanting to study geology.

Return this form and the essay to:

Dr. Tracy D. Frank
Department of Geosciences
214 Bessey Hall
University of Nebraska
Lincoln, NE 68588-0340, USA
Tel. 402-472-9799/ Fax 402-472-4917
Email: tfrank2@unl.edu

CAREERS IN GEOLOGY

What is geology and what do geologists do?

Geology is the scientific study of planet Earth, emphasizing its physical makeup, its history, and how it works. Study extends across the entire Earth surface, from the Earth's core to the edge of the Atmosphere, and back through time.

Geologists investigate the materials, processes, and products of the Earth to increase understanding of the planet and its history, to supply things we need, to protect the environment, and to mitigate natural hazards.

Geologists specialize in one of the following fields.

- **Economic geology** – study of earth materials of economic interest, including metals, minerals, building stone, petroleum, coal, and water.
- **Environmental geology** – study of problems associated with pollution, waste disposal, and urban development.
- **Geochemistry** – study of the nature and distribution of elements in Earth materials.
- **Geochronology** – using decay rates of radioactive elements to determine the age of rocks
- **Geodynamics** – study of plate tectonics
- **Geomorphology** – study of the nature, origin, and development of landforms
- **Geophysics** – study of the Earth using physical methods, including seismicity and electromagnetism.
- **Hydrogeology** – study of the abundance, distribution, and quality of ground water.
- **Marine geology** – study of the ocean basins and continental shelves.
- **Mineralogy & Petrology** – study of the formation, composition, and genesis of minerals and rocks.
- **Paleoclimatology & paleoceanography** – study of past changes in Earth's climate and oceans
- **Paleontology** – study of fossils to understand past life forms and their evolution, and to reconstruct past environments
- **Sedimentology** – study of the formation, composition, and deposition of sediments and sedimentary rocks.
- **Stratigraphy** – study of the time and space relationships of layered rocks and their mineral and fossil contents
- **Structural geology** – study of deformation, fracturing, and folding of the Earth's crust.
- **Volcanology** – study of volcanoes and volcanic phenomena.

Money Magazine has ranked **Geologist** as second overall out of the 100 perceived best occupations, and in the top 10 for job satisfaction.

Who employs geologists?

Federal and state government

- US Geological Survey, Department of Energy, Forest Service, NASA, NOAA, US Army Corps of Engineers, state geological surveys

Industry

- Oil companies, environmental firms, mining companies, consulting firms

Educational and research institutions

- K-12 schools, universities, and museums

According to the National Science Foundation, about 125,000 geoscientists work in the US. Most are employed by industries related to oil and gas, mining and minerals, and water resources.

What is the outlook for employment as a geologist?

Several topical issues present challenges—and employment opportunities—for geologists:

- Decreasing energy, mineral, and water resources
- Increasing concerns about protecting the environment
- Global warming and its effect on sea level and climate
- Predicting and mitigating natural hazards such as earthquakes, tsunamis, volcanic eruptions, and landslides

What is the typical salary range for a geologist?

The following information comes from the Bureau of Labor Statistics. Find more information clicking here**.**

- In May 2004, the median annual earnings of geoscientists were $68,730. The middle 50% earned between $49,260 and $98,380.
- Beginning salary offers in July 2005 for graduates with bachelor's degrees in geology averaged $39,365.
- In 2005, the Federal Government's average salary was $83,178 for geologists and $94,836 for geophysicists.
- The petroleum & mining industries are vulnerable to recessions and to changes in oil and gas prices, and may release workers when exploration slows down. Consequently, they offer *higher salaries*, but less job security, than other industries. Click here for details.

Where can I find more information about careers in geology?

- AGI's (American Geological Institute's) Guide to Geoscience Careers and Employers: http://guide.agiweb.org/employer/index.html
- Careers in the Geosciences: http://www.earthscienceworld.org/careers/brochure.html
- Geosciences Career Frequently Asked Questions: http://www.earthscienceworld.org/careers/faqs/index.html
- Employment Statisctics for the Geosciences in the United States: http://www.earthscienceworld.org/careers/stats/employ.html