GEOLOGY

Description

The Department of Earth and Atmospheric Sciences offers the Geology major through the Bachelor of Science degree. The geology major will prepare students for a career in geosciences or in other fields where training in geology is beneficial, such as teaching at the pre-college level, urban planning, law, civil engineering, environmental studies, and museum careers. Geology majors participate in a required summer field camp prior to earning their degree.

Field Study

Many of the geology courses require field trips that typically include camping and primitive conditions. The number of trips and their durations are a function of the requirements of the particular course. Students seeking information or accommodation should contact the course instructor.

Learning Outcomes

Graduates with a major in geology will be able to:

1. Investigate the natural world using scientific reasoning;
2. Approach and interpret geologic processes and systems using temporal reasoning skills;
3. Approach and interpret geologic processes and systems using spatial reasoning skills;
4. Characterize and interpret earth materials using specialized tools of the trade;
5. Conceptualize and explore Earth environments as interconnected systems;
6. Demonstrate strong skills in communication, teamwork, leadership, and ethical reasoning.

Academic and Career Advising

Academic and Career Advising Center

Not sure where to go or who to ask? The Advising Center team in 107 Oldfather Hall can help. The Academic and Career Advising Center is the undergraduate hub for CAS students in all majors. Centrally located and easily accessed, students encounter friendly, knowledgeable people who are eager to help or connect students to partner resources. Students also visit the Advising Center in 107 Oldfather Hall to:

- Choose or change their major, minor, or degree program.
- Check on policies, procedures, and deadlines.
- Get a college approval signature from the Dean's representatives.

CAS Career Coaches are available by appointment (in-person or Zoom) and located in the CAS Academic and Career Advising Center, 107 Oldfather Hall. They help students explore majors and minors, gain experience, and develop a plan for life after graduation.

Assigned Academic Advisors

Academic advisors are critical resources dedicated to students' academic, personal, and professional success. Every CAS student is assigned an academic advisor based on their primary major. Since most CAS students have more than just a single major, it is important to get to know the advisor for any minors or additional majors. Academic advisors work closely with the faculty to provide the best overall support and the discipline specific expertise. They are available for appointments (in-person or Zoom) and through weekly virtual drop-ins. Assigned advisors are listed in MyRED (https://its.unl.edu/myunl/) and their offices may be located in or near the department of the major for which they advise.

Students who have declared a pre-health or pre-law area of interest will also work with advisors in the Exploratory and Pre-Professional Advising Center (Explore Center) in 127 Love South, who are specially trained to guide students preparing to enter a professional school.

For complete and current information on advisors for majors, minors, or pre-professional areas, visit https://cas.unl.edu/major-advisors (https://cas.unl.edu/major-advisors/), or connect with the Arts and Sciences Academic and Career Advising Center, 107 Oldfather Hall, 402-472-4190, casadvising@unl.edu.

Career Coaching

The College believes that **Academics + Experience = Opportunities** and encourages students to complement their academic preparation with real-world experience, including internships, research, education abroad, service, and leadership. Arts and sciences students have access to a powerful network of faculty, staff, and advisors dedicated to providing information and support for their goals of meaningful employment or advanced education. Arts and sciences graduates have unlimited career possibilities and carry with them important career competencies—communication, critical thinking, creativity, context, and collaboration. They have the skills and adaptability that employers universally value. Graduates are prepared to effectively contribute professionally and personally with a solid foundation to excel in an increasingly global, technological, and interdisciplinary world.

Students should contact the career coaches in the Arts and Sciences Academic and Career Advising Center in 107 Oldfather Hall, or their assigned advisor, for more information. The CAS career coaches help students explore career options, identify ways to build experience and prepare to apply for internships, jobs, or graduate school, including help with resumes, applications, and interviewing.

ACE Requirements

Students must complete one course for each of the ACE Student Learning Outcomes below. Certified course choices are published in the degree audit, or visit the ACE (http://ace.unl.edu) website (http://ace.unl.edu) for the most current list of certified courses.

ACE Student Learning Outcomes
ACE 1: Write texts, in various forms, with an identified purpose, that respond to specific audience needs, integrate research or existing knowledge, and use applicable documentation and appropriate conventions of format and structure.
ACE 2: Demonstrate competence in communication skills.
ACE 3: Use mathematical, computational, statistical, logical, or other formal reasoning to solve problems, draw inferences, justify conclusions, and determine reasonableness.
ACE 4: Use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable.

ACE 5: Use knowledge, historical perspectives, analysis, interpretation, critical evaluation, and the standards of evidence appropriate to the humanities to address problems and issues.

ACE 6: Use knowledge, theories, and research perspectives such as statistical methods or observational accounts appropriate to the social sciences to understand and evaluate social systems or human behaviors.

ACE 7: Use knowledge, theories, or methods appropriate to the arts to understand their context and significance.

ACE 8: Use knowledge, theories, and analysis to explain ethical principles and their importance in society.

ACE 9: Exhibit global awareness or knowledge of human diversity through analysis of an issue.

ACE 10: Generate a creative or scholarly product that requires broad knowledge, appropriate technical proficiency, information collection, synthesis, interpretation, presentation, and reflection.

College Degree Requirements

College Distribution Requirements

The College of Arts and Sciences distribution requirements are designed to ensure a range of courses across disciplines within the College. Students develop the ability to learn in a variety of ways and apply their knowledge from a variety of perspectives. All requirements are in addition to University ACE requirements, and no course can be used to fulfill both an ACE outcome and a College Distribution Requirement.

- A student may not use a single course to satisfy more than one College Distribution Requirement, with the exception of CDR Diversity. Courses used to meet CDR Diversity may also meet CDR Writing, CDR Humanities, or CDR Social Science.
- Internship (395 or 495), independent study or readings (396 or 496), research (398 or 498), and thesis (399, 399H, 499, or 499H) will not satisfy distribution requirements.
- Other courses with a 9 in the middle number (ex. PSYC 292) will not satisfy distribution requirements unless approved by an advisor.
- Cross-listed courses from interdisciplinary programs will be applied in the same area as courses from the lead department.

CDR: Written Communication

Select from courses approved for ACE outcome 1.

CDR: Natural, Physical, and Mathematical Sciences [1]

Select a course from ASTR, BIOS, CHEM, GEOL, LIFE, METR, MATH, PHYS, or ANTH 242, GEOG 155, GEOG 281, POLS 250, or PSYC 273.

CDR: Laboratory [2]

Laboratory courses may be embedded in a 4-5 credit course used in CDR Natural, Physical, and Mathematical Science (example GEOG 155), or stand alone (example LIFE 120L).

CDR: Humanities [3]

Select a course from ARAB, CHIN, CLAS, CZEC, ENGL, FILM, FREN, GERM, GREK, HIST, JAPN, LATN, PHIL, RELG, RUSS, or SPAN.

CDR: Social Science [4]

Select a course from ANTH, COMM, GEOG, NSST, POLS, PSYC, or SOCI.

CDR: Human Diversity in U.S. Communities

Select from the following approved courses also listed in your degree audit: ANTH 130, ANTH 412, ANTH 447, ANTH 473, ARAB/RELG 313, COMM 311, COMM 315, COMM/ETHN 335, COMM 364, COMM/ETHN 365, COMM 465, ENGL/WMNS 212, ENGL/ETHN 245N, ENGL/WMNS 312, ENGL/ETHN 345D, ENGL/ETHN/WMNS 345N, ENGL/ETHN 346, ENGL 376, ENGL 380, ENGL/ETHN 445, ETHN 100, ETHN 201, ETHN 202, ETHN 204, ETHN 484, FILM/ETHN 344, GEOG 271, GEOG 403, GLST/ANTH/MODL 214, GLST 350, HIST/ETHN/WMNS 115, HIST/ETHN 234, HIST/ETHN 246, HIST 251, HIST/ETHN 340, HIST 351/ETHN 341, HIST/ETHN/WMNS 356, HIST/ETHN 357, HIST/WMNS 402, HRHA 350, MODL 260, PHIL 105, PHIL 106, PHIL/WMNS 218, PHIL 323, PHIL 325, POLS/ETHN 333, POLS/WMNS 338, POLS 340, POLS 347, POLS 433, PSYC/ETHN 310, PSYC 330, PSYC/WMNS 421, PSYC/ETHN 425, RELG/HIST 134, RELG/ETHN/HIST 226, RELG/HIST 227, SOCI 101, SOCI 180, SOCI/WMNS 200, SOCI/ETHN 217, SPAN 206, SPAN 486, WMNS 101, WMNS 201, WMNS 202, WMNS 210

CDR: Language

BA Students [5]

Fulfilled by the completion of the 4th level of a single language (either in H.S. or in college). Language study at UNL is available in: ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, SPAN, or SLPA.

BS Students [6]

Fulfilled by the completion of the 2nd level of a single language (either in H.S. or in college). Language study at UNL is available in: ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, SPAN, or SLPA.

1 *Excluded courses:* BIOC 101, BIOS 100, BIOS 180, CHEM 101, MBIO 101, PHYS 201, MATH 100A, MATH 101, MATH 101P, MATH 102, MATH 103, *and MATH subject area credit at the 100 level or below.*

2 ANTH 242L, ASTR 224, BIOS 101L, BIOS 110L, BIOS 111, BIOS 116, BIOS 213L, BIOS 214, CHEM 105L, CHEM 106L, CHEM 109L, CHEM 110L, CHEM 113L, GEOG 155, GEOL 101, GEOL 103, LIFE 120L, LIFE 121L, METR 100, PHYS 141, PHYS 142, PHYS 153, PHYS 221, *or* PHYS 222.

3 *ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, and SPAN courses must be numbered 300 or above. ENGL courses must be* ENGL 170, ENGL 180, *or ENGL 200 level and above. Excluded courses:* CLAS 116, ENGL 254, ENGL 300, ENGL 354, SPAN 300A, SPAN 303, *and* SPAN 304.

4 *Excluded courses:* ANTH 242/ANTH 242L, GEOG 155, GIST 111, GIST 311, POLS 101, POLS 250, PSYC 100, PSYC 273.

5 ARAB 202, CHIN 202, CZEC 202, FREN 202 *or* FREN 210, GERM 202, GREK 301 *and* GREK 302, JAPN 201 *and* JAPN 202, LATN 301 *and* LATN 302, SPAN 202 *or* SPAN 210 *or* SPAN 300A *or* SLPA 202.

6 ARAB 102, CHIN 102, CZEC 102, FREN 102, GERM 102, GREK 102 *or* GREK 151, JAPN 102, LATN 102, SPAN 102 *or* SPAN 110 *or* SPAN 300A, *or* SLPA 102.

Language Requirement

The University of Nebraska–Lincoln and the College of Arts and Sciences place great value on academic exposure and proficiency in a second language. The University of Nebraska–Lincoln entrance requirement is successful completion of two levels of the same world language, and the College of Arts and Sciences degree requirement (CDR: Language) is proficiency through 4 levels for BA students, or 2 levels for BS students.

Levels are defined as years in High School, or semesters in college as documented on an official transcript.

Students who believe they are proficient in a language, but who do not have academic records of that proficiency, should consult with their academic advisor to explore alternative assessments which may include a proficiency examination by a UNL faculty member for languages taught at UNL, or through an approved private service for languages not taught at UNL (expenses for this service would be the student's responsibility.)

Experiential Learning Requirement

All undergraduates in the College of Arts and Sciences must complete an Experiential Learning (EL) designated course. This may include 0-credit courses designed to document co-curricular activities recognized as Experiential Learning. Students should consult their assigned Academic Advisor and Career Coach for assistance identifying experiential learning opportunities relevant to their academic program, interests and goals.

The bachelor of science degree requires students to complete 60 hours in mathematical, physical, and natural sciences from disciplines within the College of Arts and Sciences or required in its majors: ACTS, ASTR, BIOC, BIOS, CHEM, CSCE, GEOL, LIFE, MBIO, METR, MATH, PHYS, STAT or ANTH 242 , ANTH 242L, ANTH 341, ANTH 385, ANTH 386, ANTH 389, ANTH 416, ANTH 422, ANTH 430, ANTH 442, ANTH 443, ANTH 444, ANTH 448, ANTH 473, ANTH 484, ANTH 487D, ENVR 201, GEOG 155, GEOG 217, GEOG 281, GEOG 308, GEOG 317, GEOG 408, GEOG 417, GEOG 418, GEOG 419, GEOG 421, GEOG 422, GEOG 425, GEOG 427, GEOG 432, GEOG 444, GEOG 461, GEOG 467, PHIL 211, POLS 250, PSYC 273, PSYC 368, PSYC 370, PSYC 450, PSYC 451, PSYC 456, PSYC 458,PSYC 460, PSYC 461, PSYC 463, PSYC 464, or PSYC 465.

Excluded courses include: BIOC 101, BIOS 100, BIOS 180, CHEM 101, MATH 100A, MATH 101, MATH 101P, MATH 102, MATH 103, MBIO 101, PHYS 201 as well as any course numbered 395, 495, 399, 399H, 499, or 499H. MATH subject area credit at the 100 level or below is also excluded.

Up to 12 hours of scientific and technical courses offered by other colleges may be accepted toward this requirement with approval of the College of Arts and Sciences. See your assigned academic advisor to start the approval process.

Minimum Hours Required for Graduation

A minimum of 120 semester hours of credit is required for graduation from the College of Arts and Sciences. A cumulative grade point average of at least 2.0 is required.

Grade Rules

Restrictions on C- and D Grades

The College will accept no more than 15 semester hours of C- and D grades from other domestic institutions except for UNO and UNK. All courses taken at UNO and UNK impact the UNL transcript. No transfer of C- and D grades can be applied toward requirements in a major or a minor. No University of Nebraska–Lincoln C- and D grades can be applied toward requirements in a major or a minor. International coursework (including education abroad) with a final grade equivalent to a C- or lower will not be validated by the College of Arts and Sciences departments to be degree applicable.

Pass/No Pass Privilege

University policy for the Pass/No Pass (P/N) privilege:

- Neither the P nor the N grade factor into your GPA.
- 'P' is interpreted to mean a grade of C or above. A grade of C- or lower results in a "N'.
- A change to or from a Pass/No Pass may be made until mid-term (1/2 of the course - see the academic calendar for specific dates per term).
- The Pass/No Pass or grade registration cannot conflict with the policy of the professor, department, college, or University policy governing the grading options.
- Changing to or from the Pass/No Pass grading option requires using MyRED, or processing a Schedule Adjustment Form.
- For undergraduates, the University maximum of 24 'Pass' credit hours and/or college and department limits will apply. These limits do not include courses offered on a 'Pass/No Pass' basis only. Consult your advisor or the Undergraduate Catalog (https://catalog.unl.edu/undergraduate/) for restrictions on the number of 'Pass' hours you can apply toward your degree.
- The 'Pass/No Pass' grading option cannot be used for the removal of 'C-', 'D+', 'D', 'D-', or 'F' grade factors.
  NOTE: See Course Repeats *(*https://registrar.unl.edu/academic-standards/course-repeats/*)*

College of Arts and Sciences policy on the Pass/No Pass (P/N) privilege:

- Pass hours can count toward fulfillment of University ACE requirements and college distribution requirements up to the 24-hour maximum.
- Most arts and sciences majors and minors do not permit any courses graded Pass/No Pass to apply, or limit them to no more than 6 hours. Students should refer to the major section of the catalog for clarification.
- Departments may specify that certain courses of theirs can be taken on a P/N-only or on a graded-only basis.

Grading Appeals

A student who feels that he/she has been unfairly graded must ordinarily take the following sequential steps in a timely manner, usually by initiating the appeal in the semester following the awarding of the grade:

1. Talk with the instructor concerned. Most problems are resolved at this point.
2. Talk to the instructor's department chairperson.
3. Take the case to the Grading Appeal Committee of the department concerned. The Committee should be contacted through the department chairperson.
4. Take the case to the College Grading Appeals Committee by contacting the Dean's Office, 1223 Oldfather Hall.

Course Level Requirements

Courses Numbered at the 300 or 400 Level

Thirty (30) of the 120 semester hours of credit must be in courses numbered at the 300 or 400 level. Of those 30 hours, 15 hours (1/2) must be completed in residence at the University of Nebraska–Lincoln.

Residency Requirement

The term "Residency" refers to courses taken at UNL. Students must complete at least 30 of the 120 total hours for their degree at the University of Nebraska–Lincoln. Students must complete at least 18

hours of their major coursework, and 15 of the 30 hours required at the 300 or 400 level, at UNL.

Catalog to Use

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Arts and Sciences. Students must complete all degree requirements from a single catalog year. Beginning in 1990-1991, the catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Transfer Students: Students who have transferred from a community college may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. Students must complete all degree requirements from a single catalog year and within the time frame allowable for that catalog year.

Major Requirements

Core Requirements

Required Courses

GEOL 101	Dynamic Earth	4
GEOL 103	Earth Through Time	4
GEOL 200	Mineralogy	2
GEOL 201	Igneous and Metamorphic Petrology	2
GEOL 300	Sedimentology and Stratigraphy	3
GEOL 400	Structural Geology	3
GEOL 410	Geochemistry	3
GEOL 441	Geophysics	3
GEOL 451	Invertebrate Paleobiology	3
GEOL 455	Computational Methods for Modeling Earth Systems	3
GEOL 460	Summer Field Course	6
Credit Hours Subtotal:		36
Total Credit Hours		**36**

Specific Major Requirements

Additional Geology Courses [1]

Select 12 hours of additional GEOL courses at the 200 level or above, with at least one course at the 400 level.	12
Credit Hours Subtotal:	12
Total Credit Hours	**12**

[1] METR 100 *or* METR 370 *are also allowed to be used.*

Ancillary Requirements

Mathematics

MATH 106	Calculus I	5
MATH 107	Calculus II	3-4
or STAT 218	Introduction to Statistics	
Credit Hours Subtotal:		8-9

Chemistry

Select one set:		*4*
CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	
or CHEM 113A & CHEM 113L	Fundamental Chemistry I and Fundamental Chemistry I Laboratory	
Credit Hours Subtotal:		4

Physics

Select one set:		*5*
PHYS 141	Physics for Life Sciences I	
or PHYS 211 & PHYS 221	General Physics I and General Physics Laboratory I	
Credit Hours Subtotal:		5

Additional Science Courses

Select at least 6 additional hours from the following:		*6*
ASTR 204	Introduction to Astronomy and Astrophysics	
BIOS 101 & 101L	General Biology and General Biology Laboratory	
BIOS 201	General Genetics	
CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	
or CHEM 114	Fundamental Chemistry II	
CHEM 221A & CHEM 221L	Elementary Quantitative Analysis and Elementary Quantitative Analysis Laboratory	
CHEM 251 & CHEM 253	Organic Chemistry I and Organic Chemistry I Laboratory	
or CHEM 261 & CHEM 263	Mechanistic Organic Chemistry I and Mechanistic Organic Chemistry I Laboratory	
LIFE 120 & 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	
LIFE 121 & 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	
MATH 107	Calculus II	
MATH 208	Calculus III	
MATH 221	Differential Equations	
PHYS 142	Physics for Life Sciences II	
or PHYS 212 & PHYS 222	General Physics II and General Physics Laboratory II	
PHYS 343	Physics of Lasers and Modern Optics	
STAT 218	Introduction to Statistics	
STAT 380	Statistics and Applications	

Credit Hours Subtotal:	6
Total Credit Hours	**23-24**

ADDITIONAL MAJOR REQUIREMENTS

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the major and minor, including ancillary courses.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the major or the minor.

Requirements for Minor Offered by Department

Twenty-two (22) hours of geology courses with no more than 8 hours at the 100 level.

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the major and minor.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the major or the minor.

GEOL 100 Introduction to Geology
Prerequisites: Credit toward the degree may be earned in only one of GEOL 100 or GEOL 101 or GEOL 101H
Notes: Does not fulfill the prerequisite requirement for any course in geology.
Description: Background in physical geology for non-majors. Topics include rocks and minerals, surficial processes, plate tectonics, and applied geology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

GEOL 101 Dynamic Earth
Prerequisites: Credit toward the degree may be earned in only one of GEOL 100 or GEOL 101 or GEOL 101H
Notes: Lab includes field trips.
Description: Minerals, rocks, and ores; the surface features and internal character of the earth and the forces that are constantly changing it. Examination of minerals and rocks and investigation of geological processes and their products.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: GEOG 308, GEOL 308, NRES 308; GEOL 103; GEOL 200; GEOL 260; GEOL 372; METR 270; PLAS 455, AGRO 855, NRES 455, NRES 855, SOIL 455
ACE: ACE 4 Science
Course and Laboratory Fee: $25

GEOL 103 Earth Through Time
Prerequisites: GEOL 101
Description: An examination of the evolution of life on earth through time in the context of changing continents, oceans, and climate. Lab work includes the study of earth processes affecting the sedimentary rock record and provides an overview of common fossils.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Offered: SPRING
ACE: ACE 4 Science
Course and Laboratory Fee: $30

GEOL 105 Fossils and the History of Life
Description: Introduction to the history of life based on the fossil record, evolutionary patterns, and processes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
ACE: ACE 4 Science

GEOL 106 Environmental Geology
Description: Survey of geologic materials and processes with emphasis on those that influence modern societies' adjustment to our environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: GEOL 372
ACE: ACE 4 Science

GEOL 109 Oceanography
Description: Introduction to physical oceanography, the geologic aspects of biologic oceanography, and human impact on the oceans.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

GEOL 110 Deadly Planet
Description: Major geological natural hazards that affect human society and the geological processes that are responsible for them, such as earthquakes, tsunamis, volcanoes, landslides, floods, and meteorite impacts.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

GEOL 120 Geology of National Parks and Monuments
Description: Physical and historical geology of selected United States parklands. Geological and geophysical processes that produced the unique features of the parks. Interpretation of fossils, archaeology and geologic history. Environmental park policy issues involving geosciences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
ACE: ACE 4 Science

GEOL 125 Frontiers in Antarctic Geosciences
Description: Scientific exploration of the modern environment and geological and climate history of the Antarctic continent and Southern Ocean.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity ACE 4 Science

GEOL 200 Mineralogy
Prerequisites: GEOL 101; MATH 102, 103, or a qualifying MPE score for MATH 106; CHEM 109A and CHEM 109L or parallel
Description: Crystallography and mineral optics, mineral classes, crystal chemistry, and mineral identification methods. Includes microscope techniques and field methods.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Offered: FALL/SPR
Prerequisite for: GEOL 201
Course and Laboratory Fee: $60

GEOL 201 Igneous and Metamorphic Petrology
Prerequisites: GEOL 200
Description: Introduction to the petrology of common igneous and metamorphic rocks and their identification, occurrence, and formation. Includes microscope techniques, analytical methods, and phase diagrams.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Prerequisite for: GEOL 300; GEOL 400; GEOL 410
Course and Laboratory Fee: $50

GEOL 260 Geology of the Western USA
Prerequisites: GEOL 101
Description: Learn to identify rock types and sedimentary and structural features in the field in the Western United States. Build crucial field skills including the ability to tell a geologic story from a landscape or outcrop.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: SPRING
Experiential Learning: Fieldwork

GEOL 291 Special Topics in Geology
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

GEOL 296 Independent Study in Geology
Prerequisites: Permission.
Description: Independent study under direction of a faculty member.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 300 Sedimentology and Stratigraphy
Prerequisites: GEOL 201
Description: Sedimentary rocks and processes, their descriptive parameters, occurrence, origin, and significance in earth history. Stratified rocks in time and space, and methods of correlating geologic units from different localities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: GEOL 301; GEOL 400
Course and Laboratory Fee: $25

GEOL 301 Depositional Environments
Prerequisites: GEOL 300
Description: Sedimentological facies analysis and recognition of clastic, carbonate, and evaporite depositional systems in the rock record.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Course and Laboratory Fee: $25

GEOL 308 Biogeography
Crosslisted with: GEOG 308, NRES 308
Prerequisites: GEOG 155 or BIOS 101 and 101L or GEOL 101.
Notes: Biogeography is a highly interdisciplinary science, relying heavily on ecology, geological science, and climatology. It is global in scope and offers the latest knowledge in understanding organism distributions, and the factors that determine those distributions.
Description: Introduction to the basic concepts of biogeography, the study of distributions of plants and animals, both past and present.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 361 Soils, Environment and Water Quality
Crosslisted with: PLAS 361, NRES 361, SOIL 361
Prerequisites: PLAS/SOIL 153; MATH 102 or 103; two semesters chemistry (CHEM 105A and 105L, CHEM 106A and 106L, CHEM 109A and 109L, CHEM 110A and 110L) and WATS/GEOG/NRES 281
Description: Chemical and physical processes that influence the fate and transport of contaminants (inorganic, organic, microbial) in soil-water environments. Extent, fate, mitigation and impact of various sources of pollution. Remedial technologies used for environmental restoration of contaminated environments.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: PLAS 458, AGRO 858, NRES 458, NRES 858, SOIL 458

GEOL 372 Water & Earth Connections
Prerequisites: GEOL 101, or GEOL 106, or METR 100, and MATH 106, or instructor permission
Description: Quantitative understanding of water-related processes in the earth sciences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 400 Structural Geology
Prerequisites: GEOL 201; GEOL 300 or parallel; PHYS 141 or 211.
Description: Folding and faulting of rocks, types of texture and rock structure, cleavage, joints, dikes, and unconformaties; structural interpretation of geologic maps; plate tectonics, mountain belts, and regional structures.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: GEOL 460
ACE: ACE 10 Integrated Product
Course and Laboratory Fee: $75

GEOL 410 Geochemistry
Prerequisites: MATH 106; GEOL 201.
Description: Age of the Earth. Origin of the elements, solar system, oceans, atmosphere, and global geochemical cycles. Radioactive isotope geochemistry, stable isotope geochemistry, and equilibrium relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 412 Volcanology and Igneous Petrology
Crosslisted with: GEOL 812
Prerequisites: GEOL 201; and either CHEM 109A and 109L or CHEM 113A and 113L
Description: The study of igneous systems, including an investigation of volcanic processes, mineral equilibria, petrography, and the geochemistry of magmas and minerals.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $35

GEOL 415 Geochemical Thermodynamics
Crosslisted with: GEOL 815
Prerequisites: MATH 107, GEOL 201
Description: Exploration of the fundamentals of geochemistry from thermodynamics, including the laws of thermodynamics, multicomponent analysis, extrapolation to temperatures and pressures of interest, nonideal solution behavior, phase diagrams, volatile fugacities, and redox reactions.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

GEOL 418 Chemistry of Natural Waters
Crosslisted with: GEOL 818, NRES 419, NRES 819
Prerequisites: CHEM 109A/L and CHEM 110A/L, CHEM 113A/L and CHEM 114.
Description: Principles of water chemistry and their use in precipitation, surface water, and groundwater studies. Groundwater applications used to determine the time and source of groundwater recharge, estimate groundwater residence time, identify aquifer mineralogy, examine the degree of mixing between waters of various sources and evaluate what types of biological and chemical processes have occurred during the water's journey through the aquifer system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $25

GEOL 419 Applications of Remote Sensing in Agriculture and Natural Resources
Crosslisted with: PLAS 419, GEOG 419, NRES 420, AGRO 819, GEOG 819, GEOL 819, NRES 820
Prerequisites: Junior standing
Description: Introduction to the basic methods and practical applications of remote sensing to map, monitor and assess agricultural and natural resources and other environmental changes
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Course and Laboratory Fee: $35

GEOL 423 Quaternary Paleoclimatology and Paleoecology
Crosslisted with: BIOS 423, BIOS 823, GEOL 823
Prerequisites: 12 hrs GEOL or BIOS.
Description: Analysis and interpretation of the Quaternary period's paleoecological data. Patterns of long-term climate variation. Distribution patterns and responses of organisms and ecosystems to Quaternary environmental change.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 424 Biogeochemical Cycles
Crosslisted with: BIOS 424, BIOS 824, GEOL 824
Prerequisites: CHEM 109A and 109L or CHEM 113A and 113L; 12 hrs GEOL or BIOS.
Description: Chemical cycling at or near the earth's surface, emphasizing interactions among the atmosphere, biosphere, geosphere and hydrosphere. Modern processes, the geological record, and human impacts on elemental cycles.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 430 Quantitative Methods in Paleontology
Crosslisted with: GEOL 830
Prerequisites: GEOL 301.
Description: Numerical and statistical analysis of paleontological data including biometry, syn-ecology, and quantitative biostratigraphy.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 431 Micro-paleontology
Crosslisted with: GEOL 831
Prerequisites: At least one of GEOL 103, GEOL 105, or LIFE 121.
Description: Morphology, classification, ecology and geological application of common fossil and extant marine, brackish, and freshwater microfossils.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $20

GEOL 436 Cenozoic Mammal Evolution
Crosslisted with: GEOL 836, NRES 436, NRES 836
Prerequisites: Junior or Senior Standing
Description: Survey of mammalian evolution with emphasis on the origin, radiation, and phylogenetic relationships of Cenozoic fossil mammals. Overview of climatic and ecological changes affecting mammalian adaptations and hands on experience with fossil specimens.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

GEOL 440 Tectonics
Crosslisted with: GEOL 840
Prerequisites: GEOL 400.
Description: Theory of plate tectonics; tectonic controls on rock assemblages; interpretation of regional structure and tectonic history; origin and tectonic evolution of terrestrial planets.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $10

GEOL 441 Geophysics
Crosslisted with: GEOL 841
Prerequisites: PHYS 141 or PHYS 211
Description: Geophysical techniques to study the Earth: seismology, gravity, magnetics and heat flow.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

GEOL 442 Environmental Geophysics
Crosslisted with: GEOL 842
Prerequisites: MATH 106 or STAT 218; PHYS 141 or PHYS211; GEOL 101 or 106
Description: Application of near-surface geophysical methods, namely seismic, ground-penetrating radar, and microgravimetry to groundwater, engineering, environmental, and archaeological investigations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Experiential Learning: Case/Project-Based Learning

GEOL 444 Earth and Environmental Microbiology
Crosslisted with: BIOS 444, BIOS 844, GEOL 844
Prerequisites: 3 hours of BIOS or 3 hours of LIFE; 3 hours of CHEM
Description: An introduction into the role that microorganisms play and have played in natural and man-made environments. Topics covered include microbial diversity and physiology in soil, sediment, and water; microbes in Earth history; biogeochemical cycling; mineral formation and dissolution; biodegradation and bioremediation; biotechnology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 445 Advanced Geophysics
Crosslisted with: GEOL 845
Prerequisites: GEOL 441
Description: Integrative analysis of geophysical data (gravity, magnetics, seismic) with geological information (well logs, tectonic history, etc.)
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

GEOL 446 Exploration Geophysics
Crosslisted with: GEOL 846
Prerequisites: GEOL 485
Description: Geophysical methods used for petroleum exploration: potential fields, seismology, electrical and electromagnetic surveying.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $25

GEOL 451 Invertebrate Paleobiology
Crosslisted with: BIOS 451, BIOS 851, GEOL 851
Prerequisites: At least one of: GEOL 103, GEOL 105, LIFE 121
Description: Overview of the key traits, relationships and evolutionary dynamics of invertebrate animals over Earth's history, particularly over the Phanerozoic (i.e., the last 540 million years). Emphasis on the use of invertebrate fossil record to test ideas about long term evolutionary patterns as well as learning the histories and basic anatomies of major invertebrate taxa.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

GEOL 453 GIS in Earth and Atmospheric Sciences
Crosslisted with: GEOL 853, METR 453, METR 853
Prerequisites: Junior or above standing; and one of the following: GEOL 100 or 101, or METR 100
Description: Basic concepts of GIS, hands-on experience with various case studies from geology, meteorology, climatology and environmental applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

GEOL 455 Computational Methods for Modeling Earth Systems
Crosslisted with: GEOL 855
Prerequisites: GEOL 200; MATH 106
Description: A practical introduction to modeling and computational techniques that bridges subdisciplines of geology, with a focus on fluid transport modeling.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR

GEOL 457 Ecosystem Ecology
Crosslisted with: BIOS 457, BIOS 857, GEOL 857
Prerequisites: BIOS 207 and CHEM 110A and 110L and Senior standing
Description: Processes controlling the cycling of energy and elements in ecosystems and how both plant and animal species influence them. Human-influenced global and local changes that alter these cycles and ecosystem functioning.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: BSEN 954, NRES 954
ACE: ACE 10 Integrated Product

GEOL 460 Summer Field Course
Prerequisites: GEOL 400.
Notes: Students must sign up with the department during the Fall semester prior to the camp.
Description: Six weeks advanced study of selected field problems. Conducted in a geologically classic area where all major rock types are studied in a variety of geologic situations.
Credit Hours: 6
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option
Offered: SUMMER
ACE: ACE 10 Integrated Product
Course and Laboratory Fee: $100
Experiential Learning: Fieldwork

GEOL 475 Water Quality Strategy
Crosslisted with: NRES 475, NRES 875, SOIL 475, PLAS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 875, AGST 475, AGST 875
Prerequisites: Senior undergraduate or graduate student status.
Notes: Capstone course.
Description: Introduces methods to identify, analyze, strategize, justify and develop planning approaches to protect water quality from nonpoint source contamination. Focuses on identifying present water quality issues and situations, investigating adverse impacts on whole systems and subsystems over time, developing effective planning strategies, and assessing strategy effectiveness.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
ACE: ACE 10 Integrated Product

GEOL 484 Water Resources Seminar
Crosslisted with: PLAS 484, GEOG 484, NRES 484, NRES 884, AGRO 884, GEOG 884, GEOL 884
Prerequisites: Junior or above standing
Description: Seminar on current water resources research and issues in Nebraska and the region.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

GEOL 488 Groundwater Geology
Crosslisted with: GEOL 888, NRES 488, NRES 888
Prerequisites: GEOL 100-level course; MATH 106 or equivalent.
Description: Occurence, movement, and development of water in the geologic environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: GEOL 986; NRES 918
Course and Laboratory Fee: $10

GEOL 491 Special Topics in Geology
Crosslisted with: GEOL 891
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

GEOL 496 Independent Study in Geology
Prerequisites: Permission.
Description: Independent study under direction of a faculty member.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

GEOL 497 Economic and Exploration Geology
Crosslisted with: GEOL 897
Prerequisites: GEOL 301.
Notes: A required parallel course will be indicated by the instructor. Field trips which are required and supported by alumni endowment may be scheduled during semester breaks. Course content will vary on a 3-year rotational basis. Combined lectures, seminars, weekend short courses, and field trips.
Description: E.F. Schramm Course in Economic Geology. Aspects of fossil fuel geology and exploration.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 6
Grading Option: Graded with Option

GEOL 499 Undergraduate Thesis
Prerequisites: Permission.
Description: Independent research leading to a thesis.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

GEOL 499H Honors Undergraduate Thesis
Prerequisites: Permission. Credit toward the degree cannot be earned in both GEOL 499 and GEOL 499H.
Description: Independent research leading to a thesis.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

Career Information

The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Transferable Skills

- Read, understand, and critically review scientific information
- Use quantitative analysis techniques
- Analyze and explain data
- Understand and operate within ethical framework for professional work in the field
- Demonstrate ethical conduct in research activities
- Communicate results of scientific experiments to scientific and non-scientific audiences
- Make predictions using mathematical, statistical, and scientific modeling methods
- Understand and use proper laboratory and technical skills and instruments
- Understand and utilize a variety of research methodologies
- Conduct and present research to large and small groups
- Integrate information and perspectives from multiple disciplines to solve problems
- Design and implement research experiments
- Apply mathematical and scientific skills to solve real-world problems
- Comprehend and critically evaluate complex information
- Define problems and identifying causes

Jobs of Recent Graduates

- Drafter, Manilli Wagner – Lincoln, NE
- ESL English Teacher, Lenzkids – Jinan, China
- Geochemist, SGS – Muscat, Oman

Internships

- Geologist, Shell Inc. – Houston TX
- Integrated Water Management Specialist Assistant, Nebraska Department of Natural Resources – Lincoln NE
- Student Intern - Hydrology, United States Geological Survey – Lincoln NE
- Geology Intern, Twin Rivers Testing & Environmental – North Platte NE
- Integrated Water Management Technical Assistant, Nebraska Department of Natural Resources – Lincoln NE
- Integrated Water Management Intern, State of Nebraska Department of Natural Resources – Lincoln NE

Graduate & Professional Schools

- Master's Degree, Material Science, University of Dayton – Dayton, OH
- Master's Degree, STEM Education, University of Iowa – Iowa City, IA
- Master's Degree, Geology, University of Nebraska - Lincoln – Lincoln, NE
- Juris Doctor Degree, University of Maryland School of Law – Baltimore, MD