Bachelor of Science in Geology

Why study geology?

In Geology you get to apply techniques and knowledge from chemistry, physics, biology and math to answer important questions about Earth processes, history and future. Geologists are in demand to evaluate geologic hazards, evaluate natural resources, and understand the environment including water quality and climate change.

Geology BS Program

The B.S. program provides intensive training in geology and other sciences. B.S. majors may choose a concentration in environmental geology, geophysics, or Earth & Space. The the geophysics concentration combines basic training in geology with training in mathematics, engineering, physics, and geophysics. The environmental geology concentration combines training in geology with many different sciences. The Earth & Space concentration prepares students for apply for secondary education teacher licensure.

First- and Second-Year Preparation

Students interested in geology, especially in the B.S. degree, should see a department advisor as soon as possible. They should enroll in mathematics, chemistry, and English in addition to Introduction to Geology and electives. Students should plan to take GEOL 360 or GEOL 370 in the summer after completing the introductory geology course.

Advising

Developing a strong relationship with a faculty advisor helps students get the most out of their educational programs in the shortest time. Most courses for majors are offered in only one semester each year. Advisors can guide the student through complexities of the curriculum or into a specialized program.

Undergraduate Admission

Admission to KU

All students applying for admission must send high school and college transcripts to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu/) for application deadlines and specific admission requirements.

Visit the International Support Services (http://www.iss.ku.edu/) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of the University Registrar (https://registrar.ku.edu/credittransfer/) website.

Code	Title	Hours
Core 34 General Education		**34**
The KU Core 34 is comprised of 34-35 credit hours typically completed during the first two years of study. The Core 34 consists of the following requirements: English (6), Communications (3), Math & Statistics (3), Natural & Physical Sciences with lab (4-5), Social & Behavioral Sciences (6 in two different disciplines), Arts & Humanities (6 in two different disciplines), US Culture (3), and Global Culture (3)		
MATH 125 Calculus I is the "math pathway" course. If a student is not ready to start in Calculus 1, this degree will take more than 4 years to complete. This course will fulfill your Core 34 Math and Statistics requirement.		
GEOL 101 and GEOL 103 are required courses of the major. Students are strongly advised to satsify 4 credits of their Core 34 Natural and Physical Sciences by taking these courses.		
Prerequisite Knowledge		
MATH 125	Calculus I	
or MATH 145	Calculus I, Honors	
MATH 126	Calculus II	4
or MATH 146	Calculus II, Honors	
CHEM 130	General Chemistry I	5
or CHEM 190 & CHEM 191	Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	
CHEM 135	General Chemistry II	5
or CHEM 195 & CHEM 196	Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	
PHSX 211 & PHSX 216	General Physics I and General Physics I Laboratory	5
or PHSX 213	General Physics I Honors	
PHSX 212 & PHSX 236	General Physics II and General Physics II Laboratory	4
or PHSX 214	General Physics II Honors	
BIOL 152	Principles of Organismal Biology	3
or BIOL 153	Principles of Organismal Biology, Honors	
EECS 138	Introduction to Computing: _____	3
or C&PE 325	Numerical Methods and Statistics for Engineers	
or GEOL 503	Numerical Methods in the Earth Sciences	
Major Requirements		
GEOL 101	The Way The Earth Works	3
GEOL 103	Geology Fundamentals Laboratory	2
GEOL 304	Historical Geology	3
GEOL 311	Mineralogy and Structure of the Earth	3
GEOL 312	Mineral Structures and Equilibria Laboratory	1
GEOL 331	Sedimentology and Stratigraphy	4
GEOL 360	Field Investigation	2-3
or GEOL 370	Study Abroad in Greece: Natural Environment and Civilizations	
GEOL 512	Igneous and Metamorphic Petrology	3
GEOL 513	Petrology Laboratory	1
GEOL 561	Field Geology	3
GEOL 562	Structural Geology	4
Geology Required Electives		**18**

At least one course from each of the four categories listed below: Life; Water & Climate; Rocks; Quantitative Methods. Additional elective credit requirements fulfilled by 500 level and above geology courses. Additionally, 3 hours of GEOL 121 or GEOL 142 if taken before the student has completed 60 hrs; 3 hours of GEOL 370 if student has completed GEOL 360; GEOL 391 or GEOL 399 can also count towards these 6 credit hours. NOTE: some courses may require additional prerequisites.

Life		
GEOL 316	Geochemistry	
GEOL 521 & GEOL 523	Paleontology and Paleontology Laboratory	
Rocks		
GEOL 535	Petroleum and Subsurface Geology	
GEOL 538	Basin Analysis	
GEOL 539	Sequence Stratigraphy	
GEOL 572	Geophysics	
Water and Climate		
GEOL 552	Introduction to Hydrogeology	
GEOL 554	Contaminants in Groundwater	
GEOL 555	Climate Science	
GEOL 558	Applied Groundwater Modeling	
Quantitative Methods		
GEOL 501	Simple Error Analysis for Earth Scientists	
GEOL 502	Linear Algebra for Earth Scientists	
GEOL 503	Numerical Methods in the Earth Sciences	
GEOL 504	Inverse Problems for Geoscientists	
General Electives		**7-6**
Students will need to complete additional 500 level and above geology elective credits to reach the required 120 hours. GEOL 391 and GEOL 399 can also count. NOTE: some courses may require additional prerequisites.		
Capstone		
GEOL 560	Introductory Field Geology	3
Total Hours		**120**

Major Hours & Major GPA

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/).

Earth and Space Science Licensure Concentration

This program fulfills the requirements for a Bachelor of Science degree in geology. The program also meets course requirements necessary to gain state licensure eligibility in earth and space science to become a secondary teacher in Kansas, but completion of the program does not guarantee the student's licensure. This list is a guideline. Contact the geology department for further information about meeting degree and additional licensure requirements (https://stemteach.ku.edu/degree-planning/earth-space-science/). You may also contact the STEMTeach Office for information about similar tracks resulting in eligibility for licensure in this and other science and mathematics fields.

Code	Title	Hours
Core 34 General Education		**34**
The KU Core 34 is comprised of 34-35 credit hours typically completed during the first two years of study. The Core 34 consists of the following requirements: English (6), Communications (3), Math & Statistics (3), Natural & Physical Sciences with lab (4-5), Social & Behavioral Sciences (6 in two different disciplines), Arts & Humanities (6 in two different disciplines), US Culture (3), and Global Culture (3)		
MATH 125 Calculus I is the "math pathway" course. If a student is not ready to start in Calculus 1, this degree will take more than 4 years to complete. This course will fulfill your Core 34 Math and Statistics requirement.		
Geology Prerequisite or Co-requisite Knowledge		
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible. These hours do not contribute to the minimum number of hours required for the major.		
MATH 125	Calculus I	
or MATH 145	Calculus I, Honors	
MATH 126	Calculus II	4
or MATH 146	Calculus II, Honors	
CHEM 130	General Chemistry I	5
or CHEM 190 & CHEM 191	Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	
CHEM 135	General Chemistry II	5
or CHEM 195 & CHEM 196	Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	
PHSX 211 & PHSX 216	General Physics I and General Physics I Laboratory	5
or PHSX 213	General Physics I Honors	
or PHSX 114	College Physics I	
BIOL 150	Principles of Molecular and Cellular Biology	3
or BIOL 151	Principles of Molecular and Cellular Biology, Honors	
ASTR 191	Contemporary Astronomy	3
EECS 138	Introduction to Computing: _____	3
or GEOL 503	Numerical Methods in the Earth Sciences	
Geology Core Knowledge and Skills		
Majors must complete the following core courses:		
GEOL 101	The Way The Earth Works	3
GEOL 103	Geology Fundamentals Laboratory	2
GEOL 171	Earthquakes and Natural Disasters	3
GEOL 304	Historical Geology	3
GEOL 311 & GEOL 312	Mineralogy and Structure of the Earth and Mineral Structures and Equilibria Laboratory	4
GEOL 331	Sedimentology and Stratigraphy	4
GEOL 360	Field Investigation	2-3
or GEOL 370	Study Abroad in Greece: Natural Environment and Civilizations	

GEOL 512 & GEOL 513	Igneous and Metamorphic Petrology and Petrology Laboratory	4
GEOL 521 & GEOL 523	Paleontology and Paleontology Laboratory	4
GEOL 552	Introduction to Hydrogeology	3
GEOL 562	Structural Geology	4
GEOL 572	Geophysics	3
General Electives		**16-15**
Students will need to complete additional general elective credits to reach the required 120 hours.		
Capstone		
GEOL 560	Introductory Field Geology	3
Total Hours		**120**

Major Hours & Major GPA

While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/).

Environmental Geology Concentration

Code	Title	Hours
Core 34 General Education		**34**
The KU Core 34 is comprised of 34-35 credit hours typically completed during the first two years of study. The Core 34 consists of the following requirements: English (6), Communications (3), Math & Statistics (3), Natural & Physical Sciences with lab (4-5), Social & Behavioral Sciences (6 in two different disciplines), Arts & Humanities (6 in two different disciplines), US Culture (3), and Global Culture (3)		
MATH 125 Calculus I is the "math pathway" course. If a student is not ready to start in Calculus 1, this degree will take more than 4 years to complete. This course will fulfill your Core 34 Math and Statistics requirement.		
GEOL 101 and GEOL 103 are required courses of the major. Students are strongly advised to satsify 4 credits of their Core 34 Natural and Physical Sciences by taking these courses.		
Prerequisite Knowledge		
MATH 125	Calculus I	
or MATH 145	Calculus I, Honors	
MATH 126	Calculus II	4
or MATH 146	Calculus II, Honors	
CHEM 130	General Chemistry I	5
or CHEM 190 & CHEM 191	Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	
CHEM 135	General Chemistry II	5
or CHEM 195 & CHEM 196	Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	
PHSX 211 & PHSX 216	General Physics I and General Physics I Laboratory	5
or PHSX 213	General Physics I Honors	
or PHSX 114	College Physics I	
PHSX 212 & PHSX 236	General Physics II and General Physics II Laboratory	4
or PHSX 214	General Physics II Honors	
or PHSX 115	College Physics II	
BIOL 150	Principles of Molecular and Cellular Biology	3
or BIOL 151	Principles of Molecular and Cellular Biology, Honors	
BIOL 152	Principles of Organismal Biology	3
or BIOL 153	Principles of Organismal Biology, Honors	
EECS 138	Introduction to Computing: _____	3
or C&PE 325	Numerical Methods and Statistics for Engineers	
or GEOL 503	Numerical Methods in the Earth Sciences	
Major Requirements		
GEOL 101	The Way The Earth Works	3
GEOL 103	Geology Fundamentals Laboratory	2
GEOL 304	Historical Geology	3
GEOL 311	Mineralogy and Structure of the Earth	3
GEOL 331	Sedimentology and Stratigraphy	4
GEOL 151	Environmental Geology	3
GEOL 360	Field Investigation	2-3
or GEOL 370	Study Abroad in Greece: Natural Environment and Civilizations	
GEOL 521	Paleontology	3
GEOL 541	Geomorphology	4
GEOL 552	Introduction to Hydrogeology	3
GEOL 562	Structural Geology	4
GEOL 572	Geophysics	3
Geology Required Electives		**9**
Majors must complete additional courses numbered 500 or above. The following are recommended. NOTE: some courses may require additional prerequisites.		
GEOL 391	Special Studies in Geology	
GEOL 535	Petroleum and Subsurface Geology	
GEOL 715	Geochemistry	
GEOL 751	Physical Hydrogeology	
CE 770 & CE 771	Concepts of Environmental Chemistry and Environmental Engineering Laboratory	
GEOG 558	Spatial Data Analysis	
GEOL 753	Chemical and Microbial Hydrogeology	
BIOL 400	Fundamentals of Microbiology	
General Electives		**5-4**
Students will need to complete additional 500 level and above geology elective credits to reach the required 120 hours. NOTE: some courses may require additional prerequisites.		
Capstone		
GEOL 560	Introductory Field Geology	3
Total Hours		**120**

Major Hours & Major GPA

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/).

Geophysics Concentration

Code	Title	Hours
Core 34 General Education		**34**
The KU Core 34 is comprised of 34-35 credit hours typically completed during the first two years of study. The Core 34 consists of the following requirements: English (6), Communications (3), Math & Statistics (3), Natural & Physical Sciences with lab (4-5), Social & Behavioral Sciences (6 in two different disciplines), Arts & Humanities (6 in two different disciplines), US Culture (3), and Global Culture (3)		
MATH 125 Calculus I is the "math pathway" course. If a student is not ready to start in Calculus 1, this degree will take more than 4 years to complete. This course will fulfill your Core 34 Math and Statistics requirement.		
GEOL 101 and GEOL 103 are required courses of the major. Students are strongly advised to satsify 4 credits of their Core 34 Natural and Physical Sciences by taking these courses.		
Prerequisite Knowledge		
MATH 125	Calculus I	
or MATH 145	Calculus I, Honors	
MATH 126	Calculus II	4
or MATH 146	Calculus II, Honors	
MATH 127	Calculus III	4
or MATH 147	Calculus III, Honors	
MATH 290	Elementary Linear Algebra	2-3
or MATH 291	Elementary Linear Algebra, Honors	
or GEOL 502	Linear Algebra for Earth Scientists	
MATH 320	Elementary Differential Equations	3
CHEM 130	General Chemistry I	5
or CHEM 190 & CHEM 191	Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	
CHEM 135	General Chemistry II	5
or CHEM 195 & CHEM 196	Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	
PHSX 211 & PHSX 216	General Physics I and General Physics I Laboratory	5
or PHSX 213	General Physics I Honors	
PHSX 212 & PHSX 236	General Physics II and General Physics II Laboratory	4
or PHSX 214	General Physics II Honors	
PHSX 313	General Physics III	3
PHSX 521	Mechanics I	3
PHSX 531	Electricity and Magnetism	3
or EECS 220	Electromagnetics I	
EECS 138	Introduction to Computing: _____	3
or C&PE 325	Numerical Methods and Statistics for Engineers	
or GEOL 503	Numerical Methods in the Earth Sciences	
Major Requirements		
GEOL 101	The Way The Earth Works	3
GEOL 103	Geology Fundamentals Laboratory	2
GEOL 304	Historical Geology	3
GEOL 311	Mineralogy and Structure of the Earth	3
GEOL 331	Sedimentology and Stratigraphy	4
GEOL 360	Field Investigation	2-3
or GEOL 370	Study Abroad in Greece: Natural Environment and Civilizations	
GEOL 512	Igneous and Metamorphic Petrology	3
GEOL 562	Structural Geology	4
GEOL 572	Geophysics	3
Additional Geology Courses		
GEOL 578	Seismic Data Analysis and Interpretation	3
GEOL 504	Inverse Problems for Geoscientists	3
Technical Required Electives		**6**
At least 6 hours from the list below or other 500 and above Geology, Physics, Mathematics, Engineering, or Computer Science. NOTE: some courses may require additional prerequisites.		
GEOL 535	Petroleum and Subsurface Geology	
GEOL 536	Geological Log Analysis	
GEOL 552	Introduction to Hydrogeology	
MATH 581	Numerical Methods	
Capstone		
GEOL 560	Introductory Field Geology	3
Total Hours		**120-122**

Major Hours & Major GPA

While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/).

Code	Title	Hours
The following courses are required for licensure for students pursuing the Co-Major in Science Education.		
CHEM 130	General Chemistry I	5
CHEM 135	General Chemistry II	5
MATH 125	Calculus I	4
MATH 126	Calculus II	4
BIOL 150	Principles of Molecular and Cellular Biology	3

PHSX 114	College Physics I	4
or PHSX 211 & PHSX 216	General Physics I and General Physics I Laboratory	
or PHSX 213	General Physics I Honors	
ASTR 191	Contemporary Astronomy	3
ATMO 105	Introductory Meteorology	5
GEOL 101	The Way The Earth Works	3
GEOL 103	Geology Fundamentals Laboratory	2
GEOL 171	Earthquakes and Natural Disasters	3
GEOL 311 & GEOL 312	Mineralogy and Structure of the Earth and Mineral Structures and Equilibria Laboratory	4
GEOL 331	Sedimentology and Stratigraphy	4
GEOL 360	Field Investigation	2
GEOL 512 & GEOL 513	Igneous and Metamorphic Petrology and Petrology Laboratory	4
GEOL 521 & GEOL 523	Paleontology and Paleontology Laboratory	4
GEOL 552	Introduction to Hydrogeology	3
or GEOL 572	Geophysics	
GEOL 562	Structural Geology	4

Sample 4-year plans for the BS degree in Geology with the following concentrations can be found below or by using the left-side navigation.

- BS in Geology (https://catalog.ku.edu/liberal-arts-sciences/geology/bs/geology/) (no concentration)
- Concentration in Earth & Space Science (https://catalog.ku.edu/liberal-arts-sciences/geology/bs/earth-space-conc/)
- Concentration in Environmental Geology (https://catalog.ku.edu/liberal-arts-sciences/geology/bs/environmental-geology-conc/)
- Concentration in Geophysics (https://catalog.ku.edu/liberal-arts-sciences/geology/bs/geophysics/)

At the completion of this program, students will be able to:

- Understand the hazards posed by geologic processes for human lives and communities as well as the impact of humans on the Earth System. (Hazards and Human Impacts)
- Apply concepts from physics, chemistry, biology, mathematics, and spatial reasoning to understand Earth's systems, cycles, and evolution. (Interdisciplinary Thinking)
- Formulate hypotheses, qualify results by stating assumptions and caveats, and test hypotheses using modern techniques. (Geologic Inquiry)
- Critically evaluate Earth Science literature and spatial data (e.g., maps, remote sensing, 3D models). (Evaluating Geologic Data)
- Present, formally and extemporaneously, geological information in written form, graphically, and orally. (Communication Skills)

Departmental Honors

Pursuit of departmental honors in Geology is by invitation from the Department of Geology honors coordinator.
Requirements include:
3.50 or higher KU geology-courses GPA at graduation.
Completion of at least 2 credit hours of GEOL 399.

Completion and successful defense of an honor's thesis.

Additional requirements and more information may be obtained from the Department of Geology honors coordinator and web site.