

# Master of Science in Geology

## Geology Graduate Programs

KU Geology is comprised of students, faculty, staff, and alumni who are inspired by a collaborative and multidisciplinary mission to undertake scientific discovery that benefits society.

Our program is large enough to be led by world-renowned faculty with expertise in areas that span the geosciences, from energy to the environment, volcanology to the cryosphere, microbes to ancient rock, and more. At the same time, we are small enough to offer personalized, student-centered learning experiences. We are located in the world class Earth, Energy, and Environment Center (<https://eeec.ku.edu/>), which houses state-of-the-science laboratories, collaborative spaces, and classrooms.

Our program provides students with a comprehensive curriculum in geoscience with unique research opportunities, including acclaimed field experiences. KU Geology runs one of the oldest field camps in the nation (established in 1922 in Cañon City, CO) and our program emphasizes field instruction at all levels and in locations near and far.

Our students are generously supported by scholarships and resources (<http://geo.ku.edu/facilities/>) that allow them to take advantage of all that KU Geology has to offer. Geoscience is a prolific field, with high demand for our graduates in careers that significantly impact society. We maintain a long tradition of connecting our graduates to career and interview opportunities, as well as to our GHawk Community of successful geoscience alumni and professionals around the world.

We invite you to explore further information about KU Geology on our website (<http://geo.ku.edu/>) and we welcome all inquiries related to our program.

## Admission to Graduate Studies

### Admission Requirements

- All applicants must meet the requirements outlined in the Admission to Graduate Study (<https://policy.ku.edu/graduate-studies/admission-to-graduate-study/>) policy.
- Bachelor's degree: A copy of official transcripts showing proof of a bachelor's degree (and any post-bachelor's coursework or degrees) from a regionally accredited institution, or a foreign university with equivalent bachelor's degree requirements is required.
- English proficiency: Proof of English proficiency (<https://gradapply.ku.edu/english-requirements/>) for non-native or non-native-like English speakers is required. There are two bands of English proficiency, including Admission and Full proficiency. For applicants to online programs, Full proficiency is required.

### Graduate Admission

Admission is based on academic records including GPA and general preparedness in geology and supporting sciences, letters of recommendation, and the applicant's stated academic and professional interests and goals. An attempt is made to balance the interests of

students with the availability of faculty members to supervise them and laboratory space in which they may work.

\*\*Graduate Record Examination (GRE) scores are not required for the application. Applicants may choose to submit GRE scores if they feel it will help inform the department of their academic abilities. However, choosing not to submit scores will not affect your chances of admission.\*\*

**The Department of Geology will review your application only after the application process is complete. \*Please note that it is essential for all applicants to contact and communicate with a potential faculty supervisor in the Geology Department. Their evaluation and acceptance of graduate students is an important part of the admission evaluation.**

You will need the following for your application:

1. **Official transcripts and proof of graduation:** U.S. universities generally indicate on transcripts if a degree has been conferred. However, if such a statement does not appear on a transcript, separate proof in the form of a degree certificate or diploma, issued directly by the institution, is required. Photocopies are not accepted. Transcripts from all post secondary institutions that you have attended are necessary for your application. Failure to provide them could result in delay processing your application. If a student is admitted before completing his or her undergraduate degree, the documentation proving he or she did graduate must be supplied to the Dept. of Geology *before the end* of the student's first semester at KU.
2. **3 Letters of Recommendation:** You will be asked for the names and email addresses of three people who can write a recommendation letter describing your qualifications for graduate school in geology. Once you submit the application, an email will be sent requesting a letter from each person that you name. Once the applicant submits the online application form (see point 1), referees will receive an email notification with detailed instructions on how to submit a letter of reference.
3. **Resume/CV:** Please include awards, extra curricular activities (student organizations, community outreach), presentations, and publications.
4. **Personal Statement:** This is included in the on-line application form and should be about 2 pages, typed. The Graduate Studies Committee places considerable importance on the thoughtfulness of your remarks – in particular, we are interested in learning about (1) your specific interests within geology and why they are important and interesting to you, (2) what you envision as your educational and career objectives and how a degree from KU Geology helps to meet those objectives, and (3) which of our faculty members you think would be an appropriate graduate advisor and mentor.

**The Department of Geology will review your application only after the application process is complete.**

Submit your graduate application online (<https://gradapply.ku.edu/apply/>).

Inquiries may be sent to the department **Graduate Program Coordinator**

## M.S. Degree Requirements

While completing the following degree requirements, graduate students are expected to understand and follow Office of Graduate Studies policies

relevant to their student status and academic standing. These policies can be found in the Policy Library (<https://policy.ku.edu/>).

Prerequisites normally include credit in one year each of general biology, general chemistry, general physics, and calculus, plus junior- or senior-level courses in mineralogy, petrology, structural geology, paleontology, stratigraphy, geophysics, and a summer course in field geology. Students planning to do research in geophysics also should have more advanced backgrounds in calculus and physics. Incoming graduate students meet with their advisor before enrollment to identify needed prerequisites and to set up curricula aimed at providing a broad background in geology at the intermediate to advanced level during the first year. Some prerequisites may be waived at this time if they are deemed nonessential. Prerequisite courses may not count toward graduate degrees.

Geology has many fields, and the department tailors each student's curriculum to the needs of the individual.

## Thesis Option (M.S. Degree)

Code	Title	Hours
GEOL 701	Graduate Students Professional Skills & Ethics	2
GEOL 899	Master's Thesis	6
Electives: These courses are selected with the student's faculty advisor. They may be Geology courses or courses outside of the department.		22
<b>Total Hours</b>		<b>30</b>

At least 50% of coursework for the master's degree must be taken at 700 level or above. The student sets the curriculum in consultation with a 3-member advisory committee selected from the Graduate Faculty and approved by the Graduate Advisor. Course work counted toward the degree must be distributed to provide a comprehensive general knowledge of geology in addition to discipline related knowledge required for the thesis. It may include courses in departments other than Geology.

Although the Department of Geology does not award a master's degree in geophysics, students can take coursework in geophysics at the master's level. The requirements for the degree are overseen by geophysics faculty within the Department and scientists on the staff of the Kansas Geological Survey. Similar arrangements with faculty outside the Department can be made for students interested in the following fields of Geology: geobiology, glaciology, hydrogeology, paleontology, sedimentology, or tectonics.

Students seeking to earn an M.S. in geology must maintain at least a 3.0 grade-point average in geology.

## Thesis Proposal:

Students must submit a thesis research proposal by the end of their first year in the M.S. program. If the student chooses to do so, the proposal can be made available for review by other members of the department, although final approval rests with the advisory committee and the Director of Graduate Studies. There is no formal defense of the thesis proposal. The thesis advisor and committee will work with the student on the proposal until it is acceptable. Once the committee approves and signs the proposal, the document must be submitted to the Director of Graduate Studies for department approval.

## Thesis Defense:

Students must complete an oral presentation and defense of their thesis. Students should submit their thesis directly to their advisors. The advisor's

approval must be received before a "clean and complete" version of this document is passed on to other committee members and the final oral defense is scheduled. Before the final oral defense can be held, the thesis must have the approval of the student's committee and a copy of the thesis must be shared to the entire faculty for comment for at least one week.

The M.S. thesis defense starts with a twenty-minute presentation by the student with a summary of the thesis research. Following the presentation, students, other guests, and faculty members may ask questions of the student; such questions typically are related to the presentation. After the question period, all guests are excused, and questioning continues with only the committee and the student. After this second period of questioning the student is excused and the committee discusses the defense.

The student can receive a satisfactory or unsatisfactory grade for the defense from each committee member. Department guidelines consider that a student passes the defense if a majority of the committee views the defense to be satisfactory. The defense may be repeated once, if an unsatisfactory grade is received.

## Coursework Only Option (M.S. Degree)

Code	Title	Hours
GEOL 701	Graduate Students Professional Skills & Ethics	2
Electives: These courses are selected with the student's faculty advisor. They may be Geology courses or courses outside of the department		34
<b>Total Hours</b>		<b>36</b>

A student may complete an M.S. degree program based primarily on course work and specialized skills. To complete this degree option, coursework and two written reports based on small projects (non-thesis with projects) or a single written report on a prescribed topic (non-thesis without projects) must be completed. At least 50% of coursework for the master's degree must be taken at 700 level or above. The student determines the structure of the curriculum and projects in consultation with an advisory committee of 5 faculty members.

A student must declare an intention to follow the coursework only option during the first semester of graduate study. The coursework only degree is a terminal degree and normally cannot lead to doctoral study. In addition to maintaining a 3.0 grade-point average in course work, the student must demonstrate proficiency in the areas of geology covered by the program. This is accomplished by satisfactory performance on a series of written examinations assembled and administered by the advisory committee (non-thesis with projects) or an oral examination (non-thesis without projects). These constitute the final examination for the degree and may be repeated once, if necessary.

During or after the period of residence, a student who wishes to change to an M.S. (thesis) program or a Ph.D. program must petition the Geology Graduate Studies Committee.

Code	Title	Hours
Electives are selected with approval from the advisor and are tailored to fit the needs of the individual student, and may include other classes outside of this list:		
GEOL 503	Numerical Methods in the Earth Sciences	2-3
GEOL 504	Inverse Problems for Geoscientists	3
GEOL 511	Raman Spectroscopy of Crystalline Solids	3

GEOL 512	Igneous and Metamorphic Petrology	3	GEOL 783	Managing Museums	3
GEOL 513	Petrology Laboratory	1	GEOL 784	Museum Education and Public Engagement	3
GEOL 521	Paleontology	3	GEOL 785	Introduction to Collections Management and Utilization	3
GEOL 523	Paleontology Laboratory	1	GEOL 791	Advanced Topics in Geology: _____	1-5
GEOL 524	Mammalian Paleontology	4	GEOL 814	Professional Science Masters Environmental Geology Capstone I	1
GEOL 533	Shales and Other Mudstones	3	GEOL 815	Professional Science Masters Environmental Geology Capstone II	2
GEOL 535	Petroleum and Subsurface Geology	4	GEOL 837	Geoscience and Petroleum Engineering	3
GEOL 536	Geological Log Analysis	1	GEOL 851	Field and Laboratory Methods: Physical Hydrogeology	1
GEOL 538	Basin Analysis	3	GEOL 853	Field and Laboratory Methods: Chemical Hydrogeology	1
GEOL 539	Sequence Stratigraphy	3	GEOL 855	Field and Laboratory Methods: Environmental Geophysics	1
GEOL 541	Geomorphology	4	GEOL 856	Field and Laboratory Methods Special Topics: _____	1
GEOL 542	Energy and Society	3	GEOL 891	Special Studies in Geology	1-5
GEOL 543	Environmental Ethics: A View from the National Parks	3			
GEOL 548	Geology and Culture of Polynesia	3			
GEOL 552	Introduction to Hydrogeology	3			
GEOL 554	Contaminants in Groundwater	3			
GEOL 555	Climate Science	3			
GEOL 556	Field Methods in Hydrology	3			
GEOL 557	Environmental Site Operations, Management, and Safety: HAZWOPER Health and Safety Standards	3			
GEOL 558	Applied Groundwater Modeling	3			
GEOL 560	Introductory Field Geology	3			
GEOL 561	Field Geology	3			
GEOL 562	Structural Geology	4			
GEOL 563	Tectonics and Regional Geology	3			
GEOL 572	Geophysics	3			
GEOL 578	Seismic Data Analysis and Interpretation	3			
GEOL 591	Topics in Geology: _____	1-5			
GEOL 599	Preparation for Professional Geologist Licensure Exams	1			
GEOL 701	Graduate Students Professional Skills & Ethics	2			
GEOL 715	Geochemistry	3			
GEOL 717	Geochronology	3			
GEOL 718	Stable Isotope Geochemistry	1-3			
GEOL 723	Museum Internship	1-6			
GEOL 728	Paleopedology	3			
GEOL 729	Ichology	3			
GEOL 731	Terrigenous Depositional Systems	4			
GEOL 732	Carbonate Depositional Systems	3			
GEOL 733	Shales and Other Mudstones	3			
GEOL 738	Basin Analysis	3			
GEOL 739	Sequence Stratigraphy	3			
GEOL 751	Physical Hydrogeology	3			
GEOL 753	Chemical and Microbial Hydrogeology	3			
GEOL 754	Contaminant Transport	3			
GEOL 755	Site Assessment	3			
GEOL 758	Applied Groundwater Modeling	3			
GEOL 761	Topics in Regional Field Geology: _____	1-5			
GEOL 771	Advanced Geophysics: _____	1-3			
GEOL 773	Seismology	3			
GEOL 780	Preventive Conservation in Museums	3			
GEOL 781	Introduction to Museum Exhibits	3			

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

- Demonstrate the ability to identify and articulate a significant problem in the geosciences.
- Demonstrate familiarity with previous work and published literature relevant to both the research topic.
- Demonstrate familiarity with methods that are commonly used within the discipline.
- Demonstrate the ability to produce a significant contribution to knowledge within the discipline.
- Demonstrate the ability to communicate effectively through technical writing.
- Demonstrate the ability to defend the work when questioned by advisory committee and peers.