GEOLOGY, BACHELOR OF SCIENCE

College of Letters & Science

“Civilization exists by geological consent—subject to change without notice.” — Will Durant

Geology is the study of the Earth, and in particular its history, structure, and the processes that have molded our planet and its biosphere. Geology involves the origin of continents & ocean basins, earthquakes & volcanoes, variations in global climate, and how these physical changes impact the evolution of life. All of these planetary processes are viewed through the prism of “deep time,” a perspective unique to geologists and one that distinguishes geology from most of the other physical sciences.

A significant component of geology is oriented toward the interaction between humans and the Earth. This aspect includes the study of resources such as minerals, oil, and water; identification & mitigation of Earth hazards such as earthquakes, landslides, floods, and volcanic eruptions; identification & mitigation of polluted ground water; land use planning; and the study of ancient & modern climate change.

The Program

Students interested in becoming professional geologists or continuing their geological studies at the graduate level should choose the Bachelor of Science degree program. The Bachelor of Arts program is for students interested in an interdisciplinary program of study, or who plan to go into pre-college teaching. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study.

Undergraduate Research

The geosciences span many disciplines at UC Davis, and students have opportunities to participate in undergraduate research (https://eps.ucdavis.edu/students/undergrad/gel/research/) in a variety of interest areas. Many students choose to complete a senior thesis to develop their research and writing skills during their senior year.

Internships & Careers

A degree in Geology provides students with knowledge and practical experience needed to pursue careers (https://eps.ucdavis.edu/students/careers/) in the geosciences (government, private sector, research, teaching). The major program includes flexibility to participate in research, internships, and fieldwork to help prepare students for these career paths. The requirements for a B.S. in Geology satisfy the coursework required for the Professional Geologist licensing process in the State of California.

Global Learning in Geology

Consider studying or interning abroad through programs available through the Global Learning Hub (https://eps.ucdavis.edu/students/undergrad/gel/studyabroad/).

Get Involved

Find your community (https://eps.ucdavis.edu/students/undergrad/gel/involved/) through clubs, events, seminars, and workshops relating to geoscience.

Graduation Honors

Students graduating from the College of Letters & Science are eligible for Departmental Honors, depending on their GPA and whether or not they complete a Senior Thesis. Students who graduate with a GPA in the top percentages of their college (https://catalog.ucdavis.edu/academic-information-policies-regulations/honors-prizes/) will automatically graduate with Honors. Students who qualify for Honors at graduation may also be eligible for High Honors or Highest Honors, based upon the quality of their Senior Thesis (https://eps.ucdavis.edu/students/undergrad/gel/research/) (course number 194A-194B) or Senior Honors Thesis (course number 194HA-194HB). It is Department of Earth and Planetary Sciences policy that an "A-" grade on the thesis will earn the student High Honors, and an "A" grade will earn the student Highest Honors.

Advising

Visit the staff major advisor (https://eps.ucdavis.edu/students/undergrad/advising/) for help navigating major requirements and planning for your degree. Visit the faculty major advisors (https://eps.ucdavis.edu/students/undergrad/advising/) for additional advice on courses, careers, and graduate school. Faculty advisors: R. Motani, D. A. Osleger, M. Rudolph.

Visit the College of Letters & Science advisors (https://lettersandscience.ucdavis.edu/advising/) for help navigating university requirements (https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/) and college requirements (https://catalog.ucdavis.edu/academic-information-policies-regulations/college-major-minor-information/).

Graduate Study

The coursework, research and internship opportunities, and fieldwork requirements in the Geology major help prepare students to enter graduate programs (https://eps.ucdavis.edu/students/careers/gradschool/) to continue their studies and prepare for their career. Students should meet with advisors and faculty to build a strong application for graduate school through additional independent research or other co-curricular involvements.

The major requirements below are in addition to meeting University Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/) & College Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/); unless otherwise noted. The minimum number of units required for the Geology Bachelor of Science is 104.

Code	Title	Units
Preparatory Subject Matter		
Geology		
GEL 050	Physical Geology	3
GEL 050L	Physical Geology Laboratory	2
GEL 053	Introduction to Geobiology	3
GEL 055	Introduction to Geochemistry	3
GEL 056	Introduction to Geophysics	4
GEL 060	Earth Materials: Introduction	4
Mathematics		
Choose a series		11-12

MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
or		
MAT 021A & MAT 021B & MAT 022A	Calculus and Calculus and Linear Algebra	
or		
MAT 016A & MAT 016B & MAT 016C & MAT 022A	Short Calculus and Short Calculus and Short Calculus and Linear Algebra	
or		
MAT 019A & MAT 019B & MAT 019C & MAT 022A	Calculus for Data-Driven Applications and Calculus for Data-Driven Applications and Calculus for Data-Driven Applications and Linear Algebra	
Chemistry		
Choose a series:		10
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Statistics		
Choose one:		4
STA 013	Elementary Statistics	
or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
Physics		
Choose a series:		8-10
PHY 007A & PHY 007B	General Physics and General Physics	
PHY 009A & PHY 009B	Classical Physics and Classical Physics	
PHY 009HA & PHY 009HB	Honors Physics and Honors Physics	
Preparatory Subject Matter Subtotal		52-55
Depth Subject Matter		
Geology Courses		
GEL 101	Structural Geology	3
GEL 101L	Structural Geology Lab	2
GEL 103	Field Geology	4
GEL 105	Earth Materials: Igneous Rocks	4
GEL 107	Earth History: Paleobiology	3
GEL 107L	Earth History: Paleobiology Laboratory	2
GEL 108	Earth History: Paleoclimates	3
GEL 109	Earth History: Sediments & Strata	3
GEL 109L	Earth History: Sediments & Strata Laboratory	2
Upper Division Electives		
Choose 18 units:		18

Choose from courses GEL 130-GEL 194 or pre-selected non-GEL courses. Only one of GEL 181/EDU 181 or GEL 183/EDU 183 or GEL 185A or 185B or 186 may be applied toward elective credit. Pre-selected non-GEL courses in related fields: CHE 100, ECI 171/ECI 171L, ECI 175, ESM 100, ESM 186, ESP 152, HYD 144, HYD 146, LDA 150/ABT 150, SSC 100, WFC 102. Other courses in related fields must be approved in advance by the major advisor. No more than 3 units of upper division elective credit for courses GEL 115-GEL 120. No more than 6 units of upper division elective credit for GEL 192 or GEL 194A-GEL 194B or GEL 194HA-GEL 194HB. Students who receive approval to do a senior thesis for part of the capstone requirement may not use GEL 194A-GEL 194B or GEL 194HA-GEL 194HB for the upper division elective courses.

GEL 130	Non-Renewable Natural Resources
GEL 131	Risk: Natural Hazards & Related Phenomena
GEL 132	Introductory Inorganic Geochemistry
GEL 133	Environmental Geochemistry
GEL 134	Environmental Geology & Land Use Planning
GEL 136	Ecogeomorphology of Rivers & Streams
GEL 138	Introductory Volcanology
GEL 139	Rivers: Form, Function & Management
GEL 140	Introduction to Process Geomorphology
GEL 141	Evolutionary History of Vertebrates
GEL 142	Basin Analysis
GEL 143	Advanced Igneous Petrology
GEL 144	Historical Ecology
GEL 145	Advanced Metamorphic Petrology
GEL 146	Radiogenic Isotope Geochemistry & Cosmochemistry
GEL 147	Geology of Ore Deposits
GEL 148	Stable Isotopes & Geochemical Tracers
GEL 149	Geothermal Systems
GEL/ESP 150A	Physical & Chemical Oceanography
GEL/ESP 150B	Geological Oceanography
GEL/ESP 150C	Biological Oceanography
GEL 152	Paleobiology of Protista
GEL 156/HYD 146	Hydrogeology & Contaminant Transport
GEL 160	Geological Data Analysis
GEL 161	Geophysical Field Methods
GEL 162	Geophysics of the Solid Earth
GEL 163	Planetary Geology & Geophysics
GEL 175	Advanced Field Geology
GEL/EDU 181	Teaching in Science & Mathematics
GEL 182	Field Studies in Marine Geochemistry
GEL/EDU 183	Teaching High School Mathematics & Science
GEL 185A	Conceptual Integrated Science for Non-Science Majors: The Physical World
GEL 185B	Conceptual Integrated Science for Non-Science Majors: Earth System Science
GEL 186	Facilitating Learning in STEM Classrooms
GEL 190	Seminar in Geology

GEL 192	Internship in Geology	
GEL 194A	Senior Thesis	
GEL 194B	Senior Thesis	
GEL 194HA	Senior Honors Project	
GEL 194HB	Senior Honors Project	
CHE 100	Environmental Water Chemistry	
EDU/GEL 181	Teaching in Science & Mathematics	
EDU/GEL 183	Teaching High School Mathematics & Science	
ECI 171	Soil Mechanics	
ECI 171L	Soil Mechanics Laboratory	
ECI 175	Geotechnical Earthquake Engineering	
ESM 100	Principles of Hydrologic Science	
ESM 186	Environmental Remote Sensing	
ESP 152	Coastal Oceanography	
HYD/EBS 144	Groundwater Hydrology	
HYD 146/GEL 156	Hydrogeology & Contaminant Transport	
LDA/ABT 150	Introduction to Geographic Information Systems	
SSC 100	Principles of Soil Science	
WFC 102	Field Studies in Fish Biology	
Capstone		
Choose two summer field courses. A senior thesis may only be substituted for one of the summer field courses with the consent of the thesis advisor and an undergraduate advisor. The decision to undertake a thesis in lieu of a summer field course must be declared by the end of the spring term of a student's junior year.		8-10
Choose two:		
GEL 110A	Summer Field Geology: Structures & Neotectonics	
GEL 110B	Summer Field Geology: Volcanology	
GEL 110C	Summer Field Geology: Special Projects	
GEL 194A & GEL 194B	Senior Thesis and Senior Thesis	
or GEL 194HA & GEL 194HB	Senior Honors Project and Senior Honors Project	
Depth Subject Matter Subtotal		52-54
Total Units		**104-109**