

Earth and Planetary Science

The Department of Earth and Planetary Sciences offers a PhD degree in Earth and Planetary Science. The central objective of the graduate program is to encourage creative thinking and develop the capacity for independent and original research. A strong undergraduate background in the physical sciences is especially helpful, and a significant number of our graduate students have their training in physics, chemistry, mathematics, engineering, or astronomy. Graduate students are formally accepted into the Earth and Planetary Science program, and they normally work directly toward a PhD.

The department offers a one-year MA program; however, admission to the program is available only to graduates of our bachelor's degree program in Earth and Planetary Science. We do not accept applications to the MA program from other majors or universities.

Admission to the University

Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (<https://grad.berkeley.edu/admissions/choosing-your-program/list/>) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (<https://grad.berkeley.edu/admissions/steps-to-apply/>).

Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (<https://grad.berkeley.edu/admissions/steps-to-apply/requirements/>). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (<https://guide.berkeley.edu/archive/2024-25/graduate/degree-programs/>).

Where to apply?

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

Candidates for the PhD degree must pass the oral qualifying examination by the end of the second year and complete a thesis to the satisfaction of the appointed thesis committee. Students must have two research propositions to present at the qualifying examination, each developed under the supervision of a different professor on substantially different topics. There are no required courses for the PhD program.

The master of arts degree requires 24 semester units of upper division and graduate courses with at least 12 units of graduate coursework, followed by a comprehensive oral examination.

Research units can count toward the 24 total, but not toward the 12 grad level. 200-level seminars can only be counted toward the total 24 credits if they require active student participation in a focused topic area (e.g. pass/fail seminars in which students passively listen do not qualify).

Specifically:

- EPS 255 (Department Seminar), EPS 260 (intro to faculty research for 1st-year PhD students), EPS 254 (BSL seminar), EPS 298 (BASC seminar), EPS 290 research group meetings, and similar seminars cannot be used to satisfy MA requirements.
- EPS 256 (Earthquake of the Week) can be used if taken for a letter grade.
- EPS 290 courses can be used only if they have a focus and title that distinguishes them from research group meetings. E.g. in Fall 2020 Bruce Buffett taught "Computational Methods in GFD" as EPS 290, and William Boos taught "Global Circulation of Planetary Atmospheres" as EPS 290; both could be used toward the grad-level MA credits.
- EPS 280 (research with a faculty advisor) can be used for up to 6 units total, but may not be counted toward the 12 grad-level credits required for the MA (they can count toward the 24 unit total).

Your faculty advisor and the graduate student services advisor will need to approve your courses for the MA.

The MA program is open only to students who have completed their undergraduate degree in our department.

Please see here (<https://docs.google.com/document/d/113eCsONDOKHjz7b0-URpJKjSPzxWbhwJPesffHbq8tA/edit/>) for an overview of our MA program.

Curriculum

Electives, as per specialized study list		24
12 units must be graduate courses		
12 additional units may be graduate or upper division courses		
EPS 200	Problems in Hydrogeology	4
EPS 204	Elastic Wave Propagation	3
EPS 203	Introduction to Aquatic and Marine Geochemistry	4
EPS 207	Laboratory in Observational Seismology	3
EPS 209	Matlab Applications in Earth Science	2
EPS 210	Exploration, Ore Petrology, and Geochemistry	4
EPS 212	Advanced Stratigraphy and Tectonics	3
EPS 214	Igneous Petrology	4
EPS 216	Active Tectonics	3
EPS 217	Fluvial Geomorphology	4

EPS 220	Advanced Concepts in Mineral Physics	3
EPS 224	Isotopic Geochemistry	4
EPS 225	Topics in High-Pressure Research	2
EPS 229	Introduction to Climate Modeling	3
EPS 230	Radiation and Its Interactions with Climate	3
EPS 236	Geological Fluid Mechanics	4
EPS C241	Stable Isotope Ecology	5
EPS C242	Glaciology	4
EPS C249	Solar System Astrophysics	3
EPS 250	Advanced Topics in Earth and Environmental Sciences	3
EPS 251	Carbon Cycle Dynamics	3
EPS 254	Advanced Topics in Seismology and Geophysics	1
EPS 255	Advanced Topics in Earth and Planetary Science	1
EPS 256	Earthquake of the Week	2
EPS 260	Research in Earth Science	2
EPS 271	Field Geology and Digital Mapping	4
EPS C276	Seismic Hazard Analysis and Design Ground Motions	3
EPS 280	Research	1-12
EPS 290	Seminar	1-6
EPS C292	Planetary Science Seminar	1
EPS C295Z	Energy Solutions: Carbon Capture and Sequestration	3
EPS 298	Directed Group Study for Graduates	1-9

Earth and Planetary Science

EPS 200 Problems in Hydrogeology 4 Units

Terms offered: Spring 2022, Spring 2021, Fall 2019

Current problems in fluid flow, heat flow, and solute transport in the earth. Pressure- and thermal-driven flow, instability, convection, interaction between fluid flow and chemical reactions. Pore pressure; faulting and earthquakes; diagenesis; hydrocarbon migration and trapping; flow-associated mineralization; contaminant problems.

Rules & Requirements

Prerequisites: Physics 7A-7B, Chemistry 1A-1B, Math 53 and 54; open to senior undergraduates with appropriate prerequisites

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics C200 and Geology C200

EPS 203 Introduction to Aquatic and Marine Geochemistry 4 Units

Terms offered: Spring 2023, Spring 2022, Spring 2021

Introduction to marine geochemistry: the global water cycle; processes governing the distribution of chemical species within the hydrosphere; ocean circulation; chemical mass balances, fluxes, and reactions in the marine environment from global to submicron scales; carbon system equilibrium chemistry and biogeochemistry of fresh and salt water; applications of natural and anthropogenic stable and radioactive tracers; internal ocean processes. Students participate in a one day field trip to sample and analyze waters in the vicinity of Tomales Bay and Point Reyes. 3 hours of lecture and 1.5 hours of discussion week, and a 10 hour field trip.

Rules & Requirements

Prerequisites: Chemistry 1A, Mathematics 1A, or 16A. C82 recommended

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Bishop

EPS 204 Elastic Wave Propagation 3 Units

Terms offered: Fall 2012, Fall 2007, Fall 2004

Wave propagation in elastic solids; effects of anelasticity and anisotropy; representation theorems; reflection and refraction; propagation in layered media; finite-difference and finite-element methods.

Rules & Requirements

Prerequisites: 104 or equivalent; 121; Physics 105

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 204

EPS 207 Laboratory in Observational Seismology 3 Units

Terms offered: Fall 2023, Spring 2022, Spring 2021

Group problem solving of current seismological topics. Analysis, inversion, and numerical modeling of seismic waveform data to investigate questions regarding the physics of the earthquake source and seismic wave propagation. Application of current developments and techniques in seismological research.

Rules & Requirements

Prerequisites: 121 or 130 or 204 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 207

EPS 209 Matlab Applications in Earth Science 2 Units

Terms offered: Spring 2011, Fall 2002

Introduction to Matlab programming with toolboxes. Applications come from Earth sciences and related fields including biology. Topics range from image processing, riverbed characterization, landslide risk analysis, signal processing, geospatial and seismic data analysis, and machine learning to parallel computation. Designed for beginning graduate students.

Rules & Requirements

Prerequisites: Some programming experience in any language

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 1 hour of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

EPS 210 Exploration, Ore Petrology, and Geochemistry 4 Units

Terms offered: Fall 2012, Fall 2011, Spring 2010

Overview of geological, petrological, and geochemical analysis of ore forming processes including sedimentary, magmatic, hydrothermal, and geothermal resources. Geochemical rock buffers and hydrothermal phase equilibria. Electro-geochemistry of near surface oxidation of primary ores related to climate change, hydrological evolution, and tectonics. Exploration for earth materials for conventional and sustainable technologies including multiple junction semiconductor photo-voltaic cells. Mass balance modeling of ore-forming systems and soils. Environmental management of exploration sites. Lab includes macroscopic and X-ray identification of ore and alteration minerals and ore microscopy. Field trips use digital GIS mapping methods for rock type, structure, mineralization, and wall rock alteration. Integration interpretation of geophysics with geology.

Rules & Requirements

Prerequisites: 101 or 271; 100A-100B; 118 recommended

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Brimhall

Formerly known as: Geology 205

EPS 212 Advanced Stratigraphy and Tectonics 3 Units

Terms offered: Spring 2011, Spring 2009, Spring 2008

Evolution of the earth in response to internal, surficial and extraterrestrial processes.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 212

EPS 214 Igneous Petrology 4 Units

Terms offered: Spring 2024, Spring 2020, Spring 2017

The composition, generation, and cooling of magmas to form igneous rocks. The physical and thermodynamic properties of silicate liquids.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 214

EPS 215 Geomorphology 4 Units

Terms offered: Fall 2025

Quantitative examination of landforms, runoff generation, weathering, mechanics of soil erosion by water and wind, mass wasting, glacial and periglacial processes and hillslope evolution as well as principles of scientific writing and communication.

Rules & Requirements

Credit Restrictions: Students will receive no credit for EPS 215 after completing EPS 117, or EPS 217. A deficient grade in EPS 215 may be removed by taking EPS 117, or EPS 217.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: MADISON DOUGLAS

EPS 216 Active Tectonics 3 Units

Terms offered: Fall 2025, Fall 2023, Fall 2021

This course is a graduate course designed to introduce students in the earth sciences to the geology of earthquakes, including tectonic geomorphology, paleoseismology and the analysis and interpretation of geodetic measurements of active deformation. While the focus will be primarily on seismically active faults, we will also discuss deformation associated with landslides, regional isostatic rebound, and volcanoes, as well as measurements of global plate motions. We will address methods and applications in paleoseismology, tectonic geomorphology, and geodesy. The course will address measurement techniques (e.g., GPS, leveling, etc.), data analysis and inversion, and subsequent modeling and interpretation of the data. The integration of geodetic measurements with geologic and seismologic data allows an improved understanding of active processes.

Rules & Requirements

Prerequisites: 116 or equivalent, Physics 7A or equivalent, or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 207

EPS 217 Fluvial Geomorphology 4 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018

Application of fluid mechanics to sediment transport and development of river morphology. Form and process in river meanders, the pool-riffle sequence, aggradation, grade, and baselevel.

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 217

EPS 220 Advanced Concepts in Mineral Physics 3 Units

Terms offered: Fall 2022, Fall 2021, Spring 2020

A combined seminar and lecture course covering advanced topics related to mineral physics. The interface between geophysics with the other physical sciences is emphasized. Topics vary each semester.

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 220

EPS 224 Isotopic Geochemistry 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

An overview of the use of natural isotopic variations to study earth, planetary, and environmental problems. Topics include geochronology, cosmogenic isotope studies of surficial processes, radiocarbon and the carbon cycle, water isotopes in the water cycle, and radiogenic and stable isotope studies of planetary evolution, mantle dynamics, volcanoes, groundwater, and geothermal systems. The course begins with a short introduction to nuclear processes and includes simple mathematical models used in isotope geochemistry.

Rules & Requirements

Prerequisites: Chemistry 1A-1B, Mathematics 1A-1B

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: David Shuster

EPS 225 Topics in High-Pressure Research 2 Units

Terms offered: Spring 2023, Spring 2022, Fall 2021

Analysis of current developments and techniques in experimental and theoretical high-pressure research, with applications in the physical sciences. Topics vary each semester.

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 225

EPS 229 Introduction to Climate Modeling 3 Units

Terms offered: Fall 2022, Spring 2021, Spring 2018

This course emphasizes the fundamentals of the climate system via a hierarchy of climate models. Topics will include energy balance, numerical techniques, climate observations, atmospheric and oceanic circulation and heat transports, and parameterizations of eddy processes. The model hierarchy will also explore nonlinear and stochastic processes, and biogeochemistry. Students will build computational models to investigate climate feedbacks, climate sensitivity, and response times.

Rules & Requirements

Repeat rules: Course may be repeated for credit with instructor consent.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Fung

Formerly known as: Earth and Planetary Science C229/Integrative Biology C229

EPS 230 Radiation and Its Interactions with Climate 3 Units

Terms offered: Fall 2023, Fall 2021, Fall 2019

Introduction to role of radiative processes in structure and evolution of the climate system. Electromagnetism; solar and terrestrial radiation; interactions of radiation with Earth's atmosphere, ocean, and land surface; greenhouse and runaway greenhouse effects; radiative balance of the climate system; energy-balance climate models; effects of clouds and aerosols; interactions of radiation with atmospheric and oceanic dynamics; radiative processes and paleoclimate; radiative processes and anthropogenic global warming.

Rules & Requirements

Prerequisites: Physics 105, 110A, 110B

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Collins

EPS 236 Geological Fluid Mechanics 4 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021

An advanced course in the application of fluid mechanics in the earth sciences, with emphasis on the design and scaling of laboratory and numerical models. Principles of inviscid and viscous fluid flow; dynamic similarity; boundary layers; convection; instabilities; gravity currents; mixing and chaos; porous flow. Applications to mantle convection, magma dynamics, atmosphere and ocean dynamics, sediment/debris flows, and hydrogeology. Topics may vary from year to year.

Rules & Requirements

Prerequisites: Continuum/fluid mechanics at the level of 108 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 238

EPS C241 Stable Isotope Ecology 5 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022, Spring 2021, Spring 2020, Spring 2019, Spring 2016

Course focuses on principles and applications of stable isotope chemistry as applied to the broad science of ecology. Lecture topics include principles of isotope behavior and chemistry, and isotope measurements in the context of terrestrial, aquatic, and marine ecological processes and problems. Students participate in a set of laboratory exercises involving preparation of samples of choice for isotopic analyses, the use of the mass spectrometer and optical analysis systems, and the analysis of data.

Rules & Requirements

Prerequisites: Graduate standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructors: Amundson, Dawson, Mambelli

Also listed as: ESPM C220/INTEGRI C227

EPS C242 Glaciology 4 Units

Terms offered: Spring 2024, Spring 2021, Spring 2020, Spring 2018

A review of the mechanics of glacial systems, including formation of ice masses, glacial flow mechanisms, subglacial hydrology, temperature and heat transport, global flow, and response of ice sheets and glaciers. We will use this knowledge to examine glaciers as geomorphologic agents and as participants in climate change.

Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Cuffey

Formerly known as: 241

Also listed as: GEOG C241

EPS C249 Solar System Astrophysics 3 Units

Terms offered: Fall 2019, Fall 2018, Fall 2017

The physical foundations of planetary sciences. Topics include planetary interiors and surfaces, planetary atmospheres and magnetospheres, and smaller bodies in our solar system. The physical processes at work are developed in some detail, and an evolutionary picture for our solar system, and each class of objects, is developed. Some discussion of other (potential) planetary systems is also included.

Rules & Requirements

Prerequisites: 149, 169, C160A or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructors: Chiang, de Pater

Also listed as: ASTRON C249

EPS 250 Advanced Topics in Earth and Environmental Sciences 3 Units

Terms offered: Fall 2016, Fall 2014, Fall 2013

Review of recent literature and discussion of ongoing research at the interface between earth science and environmental science.

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 250

EPS 251 Carbon Cycle Dynamics 3 Units

Terms offered: Spring 2025, Fall 2023, Fall 2021

In this course, we will focus on the (unsolved) puzzle of the contemporary carbon cycle. Why is the concentration of atmospheric CO₂ changing at the rate observed? What are the terrestrial and oceanic processes that add and remove carbon from the atmosphere? What are the processes responsible for long-term storage of carbon on land and in the sea? Emphasis will be placed on the observations and modeling needed to evaluate hypotheses about carbon sources and sinks. Past records will be examined for clues about sensitivity of carbon processes to climate variations.

Hours & Format

Fall and/or spring: 15 weeks - 6 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 219

EPS 254 Advanced Topics in Seismology and Geophysics 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

Lectures on various topics representing current advances in seismology and geophysics, including local crustal and earthquake studies, regional tectonics, structure of the earth's mantle, and core and global dynamics.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 250

EPS 255 Advanced Topics in Earth and Planetary Science 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024

Lectures on various topics representing current advances in all aspects of earth and planetary science.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of colloquium per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

EPS 256 Earthquake of the Week 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Each week, the seismicity of the previous week, in California and worldwide, is reviewed. Tectonics of the region as well as source parameters and waveforms of interest are discussed and placed in the context of ongoing research in seismology.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of discussion per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geophysics 255

EPS 260 Research in Earth Science 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Weekly presentations to introduce new graduate students and senior undergraduates to current research conducted in the Department of Earth and Planetary Science.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Formerly known as: Geology 260

EPS 271 Field Geology and Digital Mapping 4 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Geological mapping, field observation, and problem solving in the Berkeley hills and environs leading to original interpretation of geological processes and history from stratigraphic, structural, and lithological investigations. Integration of the Berkeley hills geology into the tectonic and paleo-climatic record of the Coast Ranges and California as a whole through systematic field mapping in key localities and reading of original literature. Training in digital field mapping, use of digital base maps, and use of global positioning systems.

Rules & Requirements

Prerequisites: 50 or equivalent introductory course for majors

Credit Restrictions: Students will receive no credit for 271 after taking 101.

Hours & Format

Fall and/or spring: 15 weeks - 7 hours of fieldwork and 2 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Brimhall

EPS C276 Seismic Hazard Analysis and Design Ground Motions 3 Units

Terms offered: Spring 2025, Spring 2023, Spring 2021

Deterministic and probabilistic approaches for seismic hazard analysis. Separation of uncertainty into aleatory variability and epistemic uncertainty. Discussion of seismic source and ground motion characterization and hazard computation. Development of time histories for dynamic analyses of structures and seismic risk computation, including selection of ground motion parameters for estimating structural response, development of fragility curves, and methods for risk calculations.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructor: Abrahamson

Also listed as: CIV ENG C276

EPS 280 Research 1 - 12 Units

Terms offered: Fall 2025, Summer 2025 3 Week Session, Spring 2025
Individual conferences to be arranged. Provides supervision in the preparation of an original research paper or dissertation.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-12 hours of independent study per week

Summer:

6 weeks - 3-30 hours of independent study per week

8 weeks - 2-23 hours of independent study per week

10 weeks - 2-18 hours of independent study per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

EPS 290 Seminar 1 - 6 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024

Topics will be announced each semester.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2-6 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Formerly known as: Geology 290

EPS C292 Planetary Science Seminar 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024, Spring 2024, Fall 2023

The departments of Astronomy and Earth and Planetary Science offer a joint research seminar in advanced topics in planetary science, featuring speakers drawn from graduate students, postdoctoral researchers, faculty, and visiting scholars. Topics will span planetary interiors; surface morphology; atmospheres; dynamics; planet formation; and astrobiology. Speakers will vary from semester to semester. Meetings will be held once a week for 1 hour each, and the schedule of speakers will be determined on the first day of class. To pass the class, participants will be required to give a 30-minute presentation, either on their own research or on recent results from the literature.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-1 hours of seminar per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Also listed as: ASTRON C292

EPS C295Z Energy Solutions: Carbon Capture and Sequestration 3 Units

Terms offered: Fall 2018, Spring 2017, Spring 2015, Spring 2014, Spring 2013

After a brief overview of the chemistry of carbon dioxide in the land, ocean, and atmosphere, the course will survey the capture and sequestration of CO₂ from anthropogenic sources. Emphasis will be placed on the integration of materials synthesis and unit operation design, including the chemistry and engineering aspects of sequestration. The course primarily addresses scientific and engineering challenges and aims to engage students in state-of-the-art research in global energy challenges.

Rules & Requirements

Prerequisites: Chemistry 4B or 1B, Mathematics 1B, and Physics 7B, or equivalents

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: Letter grade.

Instructors: Bourg, DePaolo, Long, Reimer, Smit

Also listed as: CHEM C236/CHM ENG C295Z

EPS 298 Directed Group Study for Graduates 1 - 9 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Graduate

Grading: The grading option will be decided by the instructor when the class is offered.

Formerly known as: Geology 298

EPS C301 Communicating Ocean Science 4 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019, Spring 2015, Fall 2014, Spring 2014, Spring 2013

For graduate students interested in improving their ability to communicate their scientific knowledge by teaching ocean science in elementary schools or science centers/aquariums. The course will combine instruction in inquiry-based teaching methods and learning pedagogy with six weeks of supervised teaching experience in a local school classroom or the Lawrence Hall of Science with a partner. Thus, students will practice communicating scientific knowledge and receive mentoring on how to improve their presentations.

Rules & Requirements

Prerequisites: One course in introductory biology, geology, chemistry, physics, or marine science required and interest in ocean science, junior, senior, or graduate standing; consent of instructor required for sophomores

Hours & Format

Fall and/or spring: 15 weeks - 2.5 hours of lecture, 1 hour of discussion, and 2 hours of fieldwork per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Professional course for teachers or prospective teachers

Grading: Letter grade.

Instructor: Ingram

Also listed as: GEOG C301/INTEGBI C215

EPS 375 Professional Preparation: Supervised Teaching of Geology and Geophysics 1 - 6 Units

Terms offered: Fall 2021, Fall 2020, Fall 2019

Discussion, curriculum, class observation, and practice teaching in geology, geophysics, and earth science.

Rules & Requirements

Prerequisites: Graduate standing and appointment as graduate student instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of discussion per week

Additional Details

Subject/Course Level: Earth and Planetary Science/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Formerly known as: Earth and Planetary Science 300