2025-2026 Earth and Planetary Science Course Offerings (Tentative)

Course Number	Units	Course Title	Prerequisites	Fall	Winter	Spring	Summer
GEO 001	4	The Earth's Crust and Interior	Prerequisite(s): none. An introduction to the physical development of the Earth. Emphasis will be on Earth materials (rocks and minerals), processes (weathering, erosion, mountain building), structures (folds and faults), and current theories regarding the Earth's crust and interior.	✔	✔		
GEO 002	4	Earth's Climate Through Time	Prerequisite(s): none. An introduction to the history of Earth's changing climate and its relationship to the evolution of life on human to geologic time scales. Topics include the interrelationships among short- and long-term carbon cycling; plate tectonics; ocean and atmosphere circulation; and greenhouse gases through time.		✔		
GEO 003	4	Headlines in the History of Life	Prerequisite(s): none. Evolution of life beginning with precellular life. Topics include the origin of sex, multicellularity, vertebrate classes, morphological specializations, adaptive radiations, extinction dynamics, and the biology of dinosaurs. Cross-listed with BIOL 010.	✔			
GEO 004	4	Natural Hazards and Disasters	Prerequisite(s): ENGL 001A or equivalent (may be taken concurrently). Application of basic principles of climate and geology to recognition of natural hazards and their mitigation. Topics include fires, freezes, floods, winds, landslides, volcanic eruptions, earthquakes and tsunamis. Emphasis is on confronting hazards of concern to home-buyers, planners, and conservationists in the western United States, especially southern California.		✔		
GEO 005	4	Geoscience in Movies	Prerequisite(s): none. Introduction to Earth, Atmospheric and Planetary Sciences using movies as support for visual learning. Topics include: Earth structure and tectonic processes, climate change, impact craters and space exploration. Lectures: Earth science concepts and their portrayal in movies. Weekly assignments: reading from the class textbook, scientific magazines and journals; viewing films.			✔	
GEO 006	4	Planets in Science Fiction	Prerequisite(s): none. Introduces the history of discoveries in planetary science and exoplanets and the influence on popular culture, movies, television, literature, and video games. Topics include planet discovery and exploration, planetary habitability, desert worlds, water worlds, moons, and terraforming in the context of science fiction.		✔		
GEO 008	4	Earthquake Country	Prerequisite(s): none. An introduction to the study of earthquakes and the problems of living in earthquake country. Why earthquakes occur, how they are recorded, and what the effects are on man and his structures. The scientific and social consequences of earthquake prediction.	✔			
GEO 009	4	Oceanography	Prerequisite(s): none. Introduction to the geological, physical, chemical, and biological processes related to the characteristics and evolution of the ocean. Explores the oceans role in regulating climate and the cycling of elements on Earth's surface. Illustrates how the oceans have been, and continue to be, a critical influence on life on Earth. Credit is awarded for one of the following GEO 009 or GEO 009H.	✔	✔		
GEO 011	4	Global Climate Change	Prerequisite(s): none. Provides an understanding of Earth's feedback systems that regulate the climate over long- and short-term time scales. Includes oceanic and atmospheric circulation patterns, the major reservoirs and global carbon cycle, and the influence and origin of greenhouse gases. Investigates sustainability, climate change policies, adaptation, and mitigation. Credit is awarded for one of the following GEO 011 or GEO 011H.			✔	

GEO 013	4	Our Planetary Neighbors: The Solar System and Beyond	Prerequisite(s): none. A survey of the planets in the solar system focusing on comparative planetology. Explores the formation, structure, composition, and evolution of rocky and gas giant planets. Also addresses the night sky, the Earth's Moon, gravity, planetary motion, radiation, minor bodies, and exoplanets.	✔			
GEO 080	4	Astrobiology: The Search For Life in the Universe	Prerequisite(s): none. Are we alone in the universe? This basic human question, once solely the domain of philosophy and science fiction, is now a field of considerable scientific research. Lecture and lab topics include the history of life on Earth, habitability in the solar system, and discovery of planets around other stars.			✔	
GEO 100	5	Igneous and Metamorphic Petrology	Prerequisite(s): GEO 115 and GEO 122 with grades of "C-" or better. An introduction to the nomenclature and classification of igneous and metamorphic rocks. Includes identification of the major rock-forming minerals and common rocks in hand samples and thin sections, as well as interpretation of rock fabrics and textures. Explores tectonic setting and the origins of major rock types.		✔		
GEO 101A	3	Field Geology	Prerequisite(s): GEO 115 with a grade of C- or better; or consent of instructor. Introduces geologic field mapping, aerial photograph interpretation, scaled vector graphic cartography, and professional report writing for igneous and metamorphic rock terranes.		✔		
GEO 101B	3	Field Geology	Prerequisite(s): GEO 115 with a grade of C- or better; or consent of instructor. Introduces geologic field mapping, aerial photograph interpretation, scaled vector graphic cartography, and professional report writing for stratified sedimentary rock terranes.			✔	
*GEO 102A	8	Summer Field Geology	Prerequisite(s): GEO 100 with a grade of C- or better; GEO 116 with a grade of C- or better; GEO 118 with a grade of C- or better, may be taken concurrently; GEO 101A with a grade of C- or better; GEO 101B with a grade of C- or better, may be taken concurrently; or consent of instructor. Intensive field training in the collection, interpretation, and communication of geologic data. Covers advanced geological mapping, sections, and production of professional geological reports. Requires multi-week fieldwork in summer. Course materials fee charged. GEO 102B the field component is required. Graded In Progress (IP) until GEO 102A and GEO 102B are completed, at which time a final grade is assigned.			✔	
*GEO 102B	1	Summer Field Geology	Prerequisite(s): GEO 100 with a grade of C- or better; GEO 116 with a grade of C- or better; GEO 118 with a grade of C- or better; GEO 101A with a grade of Cor better or GEO 101B with a grade of C- or better; or consent of instructor. Intensive field training in the collection, interpretation, and communication of geologic data. Covers advanced geological mapping, sections, and production of professional geological reports. Requires multi-week fieldwork in summer. Course materials fee charged. Graded In Progress (IP) with GEO 102A. Offered in Summer only				✔
GEO 111	4	Numerical Skills in Geoscience	Prerequisite(s): MATH 007B or MATH 009B or MATH 009HB; or equivalent; or consent of instructor. Introduces the basic principles of how computer programs are written and numerical models are constructed, as well as teaches data processing and visualization skills. Fosters an ability to apply numerical techniques to problems in the Earth and Environmental Sciences.	✔			
GEO 115	5	Geologic Maps and Landforms	Prerequisite(s): GEO 001, may be taken concurrently; MATH 005A or MATH 006B or MATH 007A or MATH 009A or MATH 09HA. Examines characteristic patterns of bedrock outcrops, surficial deposits, the related landforms, and their representation on maps. Covers unconformities, folds, faults, intrusions, alluvial fans, river terraces, and landforms indicative of glaciers, volcanoes, landslides, and earthquakes. Applies map information to resource and hazard evaluation.	✔			

GEO 116	5	Structural Geology	Prerequisite(s): GEO 115 with a grade of “C-” or better; PHYS 002A or PHYS 02HA or PHYS 040A or PHYS 040HA; or consent of instructor. Examines geological structures in the field. Covers the graphical solution of structural problems and laboratory map study, the genesis of rock structures, the physics of rock deformation, and Mohr diagrams and elementary stress analysis.		✔		
GEO 118	5	Sedimentology and Stratigraphy	Prerequisite(s): GEO 115 with a grade of “C-” or better. A study of the principles of sedimentology and the comparative study of the origins of sediments and sedimentary rocks from various modern and ancient clastic, carbonate, and mixed siliciclastic-carbonate depositional environments. Emphasizes field and stratigraphic relationships, as well as petrographic and hand specimen identification.			✔	
GEO 122	5	Mineralogy	Prerequisite(s): both CHEM 001B and CHEM 01LB or both CHEM 01HB and CHEM 1HLB (CHEM 001B, CHEM 01LB, CHEM 01HB, and CHEM 1HLB may be taken concurrently); GEO 001 with a grade of “C-” or better. Provides an introduction to common and important minerals and their identification using structural, crystallographic, and optical microscopy methods. Stresses distinctive structural and chemical features, diagnostic physical and optical properties, anthropogenic uses, commonly associated minerals, and the growth and development of minerals in various geologic environments.	✔			
GEO 136	4	Introduction to Molecular and Petroleum Geochemistry	Prerequisite(s): both CHEM 001C and CHEM 01LC or both CHEM 01HC and CHEM 1HLC or equivalents; a grade of “C-” or better in one of the following courses: GEO 001, GEO 002, GEO 009 or GEO 011. Explores the global carbon cycle and the origin and fate of organic carbon molecules throughout Earth’s history. Covers production and composition of biogenic matter and microbial, chemical, and thermal processing of sedimentary organic matter, leading to oil, gas, and coal formation. Addresses important applications to the petroleum and environmental sectors.			✔	
GEO 147	4	Active Tectonics and Remote Sensing	Prerequisite(s): GEO 001, GEO 115; or consent of instructor. A computer-based course that introduces active tectonics and the earthquake cycle and how they are studied using remote sensing data. Explores examples of actively deforming areas from around the world using computer visualization software and freely available data sources (satellite imagery, digital topography, GPS and earthquake data).			✔	
GEO 150	1	Your Future in the Earth and Planetary Sciences	Prerequisite(s): restricted to class level standing of junior, or senior. An exploration of potential careers and futures in the Earth and Planetary Sciences. Topics include career planning, exploring different job possibilities in the public and private sectors, applying for jobs and internships, undergraduate and graduate research, the graduate school application process, academic careers, and fellowships. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 3 units.			✔	
GEO 152	4	Principles of Invertebrate Paleobiology and Paleoecology	Prerequisite(s): BIOL 005C with a grade of “C-” or better or BIOL 010/GEO 003 with a grade of “C-” or better. Topics include evolution and the fossil record, paleoecology, classification theory; the nature of adaptive radiations, and extinctions. Cross-listed with BIOL 152.		✔		
GEO 157	4	Introduction to Geographical Information Science	Prerequisite(s): upper division standing. Introduces the fundamental theory and application of geographical information science. Topics include geographic information systems, data structures, databases, and spatial data models. Explores various spatial data, including their coordinate systems, data acquisition, and associated errors. Introduces data analysis methods within geographical information systems.			✔	
GEO 160	4	Global Climate Change	Prerequisite(s): upper-division standing or consent of instructor; PHYS 002B or PHYS 02HB or PHYS 040B or PHYS 040HB recommended. Surveys historical and paleoclimate		✔		

			change using basic principles on gas laws, radiant energy exchange, atmospheric circulation and oceanography, and proxy data. Topics include variability in modern climate, greenhouse gases, global warming, El Nino, Pacific decadal oscillation, ozone hole, volcanism, ice age climate, and Milankovitch cycles. Also covers stable isotope profiles, plate tectonics, greenhouse climates, paleo vegetation, modern species diversity, and snowball Earth.				
GEO 161	4	Cenozoic Climate Change	Prerequisite(s): one of the following courses with a grade of "C-" or better; GEO 001 or GEO 002 or GEO 009 or GEO 011. Examines physical, chemical, and biological evidence of climatic and environmental change throughout the Cenozoic Era (last 65 million years) to provide a framework for understanding natural environmental change and for predicting future change. Introduces students to computer-based numerical methods of data analysis for interpreting past records of environmental change.			✔	
GEO 163	4	Global Physical Climatology	Prerequisite(s): PHYS 002B or PHYS 02HB or PHYS 040B or PHYS 040HB; restricted to class level standing of junior, or senior. Introduces elemental physical components of the Earth's climate system that include the atmosphere, the ocean, the land surface, and the cryosphere. Topics include global energy balance, atmospheric general circulation, ocean general circulation, atmosphere-ocean interaction, hydrological cycle, land surface processes, cryosphere, and natural climate variability.	✔			
GEO 169	4	California Vegetation	Prerequisite(s): BIOL 005C with a grade of "C-" or better or BIOL 010/GEO 003 with a grade of "C-" or better. Survey of the flora, distribution, and ecology of California ecosystems, including Mediterranean shrubland, conifer forests, desert scrub, valley for fields, and exotic grasslands. Discusses vegetation in relation to climate, physiography, fire, landscape steady states, biological invasions, paleobotany, and broad-scale change due to land development, invasive species, grazing, and fire suppression.	✔			
GEO 182	4	Planetary Astrobiology For Science Majors	Prerequisite(s): CHEM 001B or CHEM 01HB; MATH 007B or MATH 009B or MATH 09HB; PHYS 002B or PHYS 02HB or PHYS 040B or PHYS 040HB; or consent of instructor. An overview of the origin, evolution, distribution, and future of life in the universe. Explores the physics and chemistry of life; formation and evolution of planets; origin of life; habitable environments in the solar system (Mars, Venus, icy moons); exoplanet biosignatures; and the search for extraterrestrial intelligence.		✔		
GEO 201A	2	Research and Proposal Design	Prerequisite(s): graduate standing. Teaches the fundamentals of research topic selection and development of hypotheses. Addresses presentation techniques and design of research projects, experiments, and field campaigns. Includes preparation and discussion of small grant proposals, as well as short oral presentations related to applicable areas of study. Graded Satisfactory (S) or No Credit (NC).		✔		
GEO 201B	2	Proposal Writing and Review	Prerequisite(s): graduate standing, GEO 201A; or consent of instructor. Covers the writing and review processes for major grant proposals. Includes the preparation, review, ranking, and summarizing of full-length federal grant proposals in accordance with federal panel guidelines. Graded Satisfactory (S) or No Credit (NC).			✔	
GEO 206B	4	Stratigraphy	Prerequisite(s): GEO 118; graduate standing; and consent of instructor. Covers time stratigraphy and biostratigraphy with an emphasis on their principles, history, and methods. Includes reading and analysis of pertinent literature and field trips.		✔		
GEO 212	4	Ecological Systems in Space and Time	Prerequisite(s): one upper-division undergraduate course in population or community ecology or paleoecology; graduate standing; or consent of instructor. Focuses on how ecological systems are interpreted and reconciled at the community, landscape, and paleontological scales. Addresses the role of extrinsic factors operating at each of these		✔		

			scales. Also examines the historical development of our understanding of ecological systems at various scales. Cross listed with EEOB 212, and ENTM 212.				
GEO 240	1	Seminar in Earthquake Processes and Geophysics	Prerequisite(s): graduate standing or consent of instructor. Explores selected contemporary topics in the areas of earthquake and fault processes, geophysics, active tectonics, and seismology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable to a maximum of 12 units.	✔			
GEO 242	4	Numerical Methods and Modeling in the Geosciences	Prerequisite(s): graduate standing or consent of instructor. Covers numerical computing methods and their application to problems of geological and geophysical interest. Methods include linear least-squares, matrix factorization, decomposition and inversion, nonlinear optimization, and Monte Carlo analysis and data visualization and their implementation in the MATLAB language. Applications include time series analysis, seismic tomography, and geodetic data inversion. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.	✔			
GEO 250	1	Graduate Seminar in Geological Sciences	Prerequisite(s): graduate student status. Oral reports by graduate students, faculty, and visiting scholars on current research topics in geological sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable	✔	✔	✔	
GEO 261	1	Atmosphere, Ocean and Climate Dynamics Seminar	Prerequisite(s): graduate standing or consent of instructor. Explores selected contemporary topics in the areas of atmospheric science, oceanography, climate dynamics, aerosol physics, and climate change through the twentieth and twenty-first centuries. Graded Satisfactory (S) or No Credit (NC).	✔			
GEO 264	3	Biogeochemical Cycles Through Time	Prerequisite(s): BIOL 010/GEO 003; CHEM 001C or equivalent; GEO 001; GEO 002; or consent of instructor. A comprehensive exploration of the major biogeochemical cycles at and near Earth's surface. Emphasis is on microbially mediated cycling of elements and isotopes within diverse sedimentary environments and the cause-and-effect relationships with the ocean and atmosphere. Explores 4 billion years of biosphere evolution in light of these cycles. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor.			✔	
GEO 265	1-3	Special Topics in Earth and Environmental Sciences	Prerequisite(s): graduate standing. Involves oral presentations and small-group discussions of selected topics in the areas of biogeochemistry, global climate change, geomicrobiology, earth surface processes, and interplanetary life. Graded Satisfactory (S) or No Credit (NC). Course is repeatable as content changes to a maximum of 10 units. Cross-listed with ENSC 265.			✔	
GEO 266	4	A Practical Introduction to Earth System Modeling and Dynamics	Prerequisite(s): graduate standing; or consent of instructor. Introduction to, and practical hands-on learning in, Earth system modelling and dynamics. Development of a variety of new computer skills and experience with data analysis and visualization techniques, and an understanding of climate, global carbon cycling, and marine ecology, plus past and future global change.	✔			
GEO 270	4	Fundamentals of Digital Signal Processing in Geosciences	Prerequisite(s): graduate standing; or consent of instructor. Introduction to the central concepts of digital signal processing that are routinely used in a range of disciplines in geosciences. Emphasizes understanding and implementations of theoretical concepts, methods, and algorithms. Includes Fourier series of periodic and non-periodic signals; linear systems; convolution; windowing; sampling; zero padding; auto and cross correlation; and digital filtering.		✔		

GEO 283	1	Graduate Seminar in Astrobiology	Prerequisite(s): graduate standing; or consent of instructor. Offers lectures, discussions, and reports by students, faculty, and invited scholars on current research topics in Astrobiology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.	✔	✔		
GEO 290	1-6	Directed Studies	Prerequisite(s): graduate standing; and consent of instructor. Research and special studies in the geological sciences. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.		✔	✔	

- GEO 190 limited to total of 6 units. Cannot be applied to meet degree requirements without prior faculty advisor consent.
- GEO 195A is the first installment of what is to be a series of GEO 195A-B-C enrollment across the school year. Minimum enrollment of 3 units per quarter with the sum total of GEO 195A-B-C enrollment not to exceed 9 units.
- Courses not offered every year. GEO 140 essential for GEOPHYS, GEO 151 for EPS GEOBIOL, GEO 137 for EPS Climate Change
- Graduate level courses (200 level and above) require instructor approval and petition with major advisor. Must consult with LFA and Academic Advisor before enrollment.
- GEO 102B is only offered in Summer. Must enroll in GEO 102A for Spring first, then advisor will facilitate enrollment for GEO 102B with Summer Sessions.