Graduate Courses 2020-2021

Fall 2020

Course	Course Title	Units	Instructor
GEL 298	Coastal Ecogeomorphology *Application required for enrollment*	2	Pinter
GEL 298	Foundations of Paleobiology CRN: 35433	3	Gold
GEL 290	Seminar	1	TBD
GEL 294	Structure & Tectonics forum	1	Roeske
GEL 390	Methods of Teaching Geology	2	TBD

Winter 2021

Course	Course Title	Units	Instructor
GEL 214	Active Tectonics	3	Oskin
GEL 240	Foundations of Geophysics	3	Rudolph & Stewart
GEL 260	Paleontology	3	Vermeij
GEL 281N	Instrumental Techniques	3	Yin
GEL 290	Seminar	1	TBD
GEL 294	Structure & Tectonics forum	1	Roeske

Spring 2021

Course	Course Title	Units	Instructor
GEL 230	Geomorphology and River Management *Application required for enrollment*	3	Pinter
GEL 298	Topics in Planetary Science CRN: TBD	3	Sumner
GEL 290	Seminar	1	TBD
GEL 294	Structure & Tectonics forum	1	Roeske

Course Descriptions

Fall 2020

GEL 298: Foundational Topics in Paleobiology (Gold)

This course covers basic principles of paleontology, evolution, ecology, and microbiology in order to provide graduate students with a common background. Students will learn how to recognize various modes of bias in the fossil record and develop testable hypotheses that account for these biases. An emphasis will be placed on computational tools, databases, and methodologies.

Note: This course is one of several regular 'core classes' being developed to strengthen our graduate curriculum.

GEL 298: Coastal Ecogeomorphology (Pinter)

Coastal Ecogeo is an interdisciplinary graduate seminar that will integrate the geology, ecology, and marine biology of Baja California Sur and the Sea of Cortez. The Sea of Cortez/Gulf of California is marginal sea that opened when the Baja California Peninsula was rifted off the western Mexican mainland at about 6 Ma. The Baja California margin of the Gulf of California makes an ideal natural laboratory for studying continental rifting and associated volcanic activity. The Gulf of California is also one of the most productive ecosystems in the world, thanks to upwelling of deep water from the Pacific into warm waters of the Gulf. This includes abundant fish, shrimp, sharks, sea lion and sea elephants, sea turtles, rays, and a wide variety of types of whales, as well as intertidal to shallow subtidal benthic marine invertebrates. The course will be followed by an optional, private kayaking trip along the eastern coast of Baja California in the vicinity of Loreto, Baja California Sur. Trip participants will be expected to help organize logistics for the field trip, including food, gear, transportation and field itineraries.

Winter 2021

GEL 214: Active Tectonics (Oskin)

Active Tectonics. This course examines tectonic processes through the lens of active orogens and surface processes. The course builds on foundational concepts in structural geology and geophysics, and introduces quantitative geomorphology as a means to characterize and measure tectonic deformation. The course is lecture and probem-set based, culminating in a field trip and mapping exercises.

GEL 240: Foundations of Geophysics (Rudolph and Stewart)

This course presents foundational concepts in geophysics at a level accessible to all graduate students in the EPS department. Topics to be covered include the geophysical constraints on the large-scale structure and dynamics of Earth and planetary interiors such as seismology, gravity, heat flow, magnetic field, and geodesy. We will explore the physics of the processes that shape planetary surfaces and interiors including impact events, differentiation, mantle convection, and tectonics. The course will include a computer laboratory with hands-on programming activities in Python that reinforce the concepts covered in lecture.

Format: Lectures, weekly problem sets/labs, midterm, final

Note: This course is one of several regular 'core classes' being developed to strengthen our graduate curriculum.

GEL 260: Paleontology (Vermeij)

This course will explore a broad topic of interest (still to be decided). We will read and discuss relevant papers and there will be a short final presentation and paper.

GEL 281N: Instrumental Techniques (Yin)

This course is designed to familiarize students with analytical facilities available in the Department of Earth and Planetary Sciences and in other campus and regional facilities.

Each week there will be a lecture providing background on one or more instruments, followed by hands-on demonstrations and instruction in the lab. Students are expected to attend all lectures and labs, and all participants must register for the course. In addition to the scheduled lectures and labs, each student will be required to participate in one of group research projects using a particular instrument suite. Project results will be presented to the class and instructors by each group at the end of the quarter.

Spring 2021

GEL 230: Geomorphology and River Management (Pinter)

The course is a multidisciplinary study of the ecology, geomorphology and management of rivers of the US West, and one river (TBD) in particular. The field of watershed science, including the study of rivers and streams, is inherently multidisciplinary, involving a broad array of physical, biological, and social sciences. Traditional education programs emphasize in-depth study within a specific discipline, whereas most careers in water-related science and management rarely are limited to a single discipline. The ability to work collaboratively with professionals from different backgrounds is fundamental to success in watershed science and management, and indeed in most applied-science fields. Comprised of upper-division undergraduate students and first-year graduate students, this course will bring together students from a range of biological and physical sciences to address the geology, ecology, and management of a targeted river and watershed, tentatively either the Snake, Rogue, and/or Klamath Rivers. The course will be followed by an optional, private rafting and research expedition on the study river. Trip participants will be expected to help organize logistics for the field trip, including food, gear, transportation and field itineraries.

GEL 298: Topics in Planetary Science (Sumner)

Habitable Planets - This class will focus on how the integration of different ideas and approaches are used to assess habitability for Earth, Mars, other solar system bodies, and exoplanets. It will consist of about 5 weeks of lectures, exercises and reading about basic concepts related to habitability on terrestrial planets and ocean worlds and about 5 weeks of discussion, reading and projects on special topics of interest to those in the class. Ideas covered will include: 1) Water on rocky planets, sources and formation of oceans; 2) Carbon and why we think that all life is likely based on carbon; 3) Roles of tectonics in carbon cycling; 4) Greenhouse gases, solar energy, tidal heating, and liquid water, e.g. "Habitable Zones"; 5) Energy sources for life, including energy harvesting at the origin of life vs energy harvesting after billions of years of evolution; 6) Life-planet co-evolution and sustained habitability (or not): and 7) Catastrophic events and the end of habitability