GG 611 Accelerated Introduction to Geology
Fall 2014 Class Schedule: MWF 9:00-10:00; POST 702

Coordinator: Patty Fryer (956-3146; POST 504A; patty@hawaii.edu)
additional instructors: Jeff Taylor (956-3899; POST 524C; gjtaylor@higp.hawaii.edu)
Garrett Apuzen-Ito (956-9717; POST 810; gito@hawaii.edu)
Clint Conrad (956-6649; POST 804; clintc@hawaii.edu)
Emilio Herrera-Bervera (956-6192; POST 716; herrero@soest.hawaii.edu)
Stephen Martel (956-7797; POST 805; smartel@hawaii.edu)
Aly I. El-Kadi; 956-6331; POST 709A; aly@soest.hawaii.edu
Steven Stanley (956-7889; POST 719D; stevenst@hawaii.edu)

August 25 Mon. Fryer/Taylor Introduction: origin of the solar system
August 27 Wed. Taylor Composition of the Earth
August 29 Fri. Taylor Minerals and their properties

September 1 Mon. No class Labor Day
September 3 Wed. Fryer Igneous rocks and their classification
September 5 Fri. Fryer Cont.
September 8 Mon. Taylor Melting and crystallization; phase diagrams
September 10 Wed. Taylor Cont.
September 12 Fri. Taylor Petrogenetic processes
September 15 Mon. Taylor Cont.
September 17 Wed. Taylor Cont.
September 19 Fri. Taylor Physical properties of magmas and magma migration
September 22 Mon. Taylor Mineralogy and petrology of the mantle
September 24 Wed. Taylor Cont.
September 26 Fri. Fryer Metamorphism: mineralogy, facies
September 29 Mon. Fryer Phase diagrams
October 1 Wed. Fryer Metamorphic rocks, multi-stage metamorphism
October 2 Fri. Fryer Cont.
October 6 Mon. Fryer Metamorphism as a global process
October 8 Wed. Fryer Cont.
October 10 Fri. Apuzen-Ito Seismology: sources, recording devices,
October 13 Mon. Apuzen-Ito Wave propagation
October 15 Wed. Apuzen-Ito Earth structure

October 15 Wed. First 3 instructors Mid-term take-home exam: Due. Oct 22
October 17 Fri. Conrad Gravity, the geoid
October 20 Mon. Conrad Cont.
October 22 Wed. Conrad Mantle dynamics
October 24 Fri. Herrero-Bervera The Earth's core & composition
October 27 Mon. Herrero-Bervera Geomagnetism, paleomagnetism
October 29 Wed. Herrero-Bervera Calibration of the geological time scale
October 31 Fri. Martel Rheology and structure
November 3 Mon. Martel Folds, faults
November 5 Wed. Martel Deformation mechanisms, isostasy
November 7 Fri. El-Kadi Hydrology and groundwater
November 10 Mon. El-Kadi Cont.
November 12 Wed. El-Kadi Cont.
November 14 Fri. Stanley Weathering and soils
November 17 Mon. Stanley Sediment types; alluvial and deltaic environments
November 19 Wed. Stanley Shorelines and shelves
November 21 Fri. Stanley Shallow-water carbonate environments
November 24 Mon. Stanley Deep-sea sediments
November 26 Wed. Stanley Geological time

November 28 Fri. No class Thanksgiving & following Friday
December 1 Mon. Stanley Evolution of atmosphere and oceans
December 3 Wed. Stanley Cont.
December 5 Fri. Stanley Evolution of life, and the fossil record
December 8 Mon. Stanley Cont.
December 10 Wed. Stanley Cont.

December 10 Wed. last 5 instructors Final take-home exam: Due Dec. 17

Grading will be based on responses to the mid-term and final examinations and on any homework
assigned by instructors.

Some **field trips** (on weekend days) will be included in the course, weather and access permitting.

**Course Objectives:**
1. To introduce the non-Geology BA/BS graduate students to the fundamental aspects of the geologic sciences.
2. To give students from other fields a grasp of the underlying principles that govern geologic processes.
3. To provide students with an accelerated introduction to the fields of excellence within the department.
4. To let students meet and interact with a number of active researchers in diverse fields within the department.

**Learning Objectives:** *The student will be able*
1. to describe the general chemical composition of the Earth, the origin of the elements, the processes by which minerals and magmas form and the nature of volcanism within the context of tectonic processes.
2. to explain concepts of solid-state changes in mineral assemblages in rocks as a reflection of changes in physical and chemical environments within the Earth as they relate to various geologic processes.
3. to recognize the mechanisms of propagation of elastic waves through the Earth and interpret their significance for determining large-scale Earth structures and the consequences of earthquakes.
4. to categorize phenomena that affect variations in density of Earth materials and how changes in physical/chemical parameters affect dynamics of the interior of the Earth that affect global processes.
5. to contrast the Earth's core, mantle and crust in terms of magnetic properties of minerals and processes and to state what factors permit a calibration of the geologic time scale using data from measurements of rock magnetism.
6. to interpret the processes that control the deformation of the Earth's lithosphere.
7. to describe the nature of movement of water through and within the Earth's crust.
8. to contrast the processes of weathering of materials exposed on the Earth's surface and categorize types of soils that result.
9. to describe the nature of sediments deposited in a variety of geologic environments.
10. to summarize the salient aspects of geologic time in terms of the evolution of atmosphere, oceans and life on Earth.

**NOTE:** students enrolled in this course are expected also to enroll in a GG-300-level course (choice of which should be made in consultation with the student's advisor).

**Students with disabilities** may contact the KOKUA office at http://www.hawaii.edu/kokua/ for assistance. The KOKUA office provides a variety of types of advice and assistance. All possible accommodations for student needs associated with any type of disability will be provided during this course.