

GG 212 FIELD GEOLOGY OF MAUI

1 Credit

March 23 – 27, 2013

INSTRUCTOR: Dr. Floyd W. McCoy
OFFICE: Hale Imiloa 115
OFFICE HOURS: Mon. 3:00-5:30; Th. 2:30 – 3:30
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EFFECTIVE DATE: Spring, 2013

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

A four-day field course on the island of Maui that incorporates two, or more, extensive field laboratory exercises. A survey of Hawaiian volcanology and geomorphology illustrated by field studies of Haleakala and West Maui volcanoes. Students are responsible for air and ground transportation, meals, and lodging.

Activities Required at Scheduled Times Other Than Class Times: None.

STUDENT LEARNING OUTCOMES

Student learning outcomes for this course are:

1. Students can explain the relevance of geology and geophysics to human needs, including those appropriate to Hawaii, and be able to discuss issues related to geology and its impact on society and planet Earth.
2. Students can apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve real-world problems in geology and geophysics.
3. Students use the scientific method to define, critically analyze, and solve a problem in earth science.
4. Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.
4. Students can evaluate, interpret, and summarize the basic principles of geology and geophysics, including the fundamental tenets of the sub-disciplines, and their context in relationship to other core sciences, to explain complex phenomena in geology and geophysics.

COURSE CONTENT

Concepts or Topics

- Geography of Hawaiian volcanoes.
- Structure of Hawaiian volcanoes.
- Rocks and minerals.
- Extrusive and intrusive igneous rocks.
- Hawaiian-type eruptions.
- Stages of Hawaiian volcanism.
- Mechanical and chemical weathering.
- Landscape evolution; geomorphic cycle.
- Rock cycle.
- Absolute and relative dating.
- Geologic time.
- Volc. hazards and mitigation.

Skills or Competencies

1. Understand the scientific method, and how it is used and applied.
2. Understand the metric system.
3. Apply and demonstrate an understanding of physical, chemical, and biological processes to interpreting geological events and processes.
4. Distinguish and reject *faux* science and misrepresentations of science.
5. Appreciate the spectrum of science and engineering endeavours that underlie the study of the earth.
6. Comprehend the benefits and dangers of volcanism to society, and the mitigation of geological hazards.

COURSE TASKS/OBJECTIVES

We spend five days on Maui studying the geologic structure and history of this island through observations of landscapes and exposures in the field that portray (1) construction of Haleakala and West Maui volcanoes through their shield-building, pre-caldera, and post-caldera stages; (2) post-erosional (rejuvenated) volcanics; (3) processes of erosion and deposition; and (4) the future of the island in terms of geologic and anthropogenic processes. An additional objective is to present, discuss, and use the scientific method in application to understanding this geological history and evolution of Maui, and, by extrapolation, any Hawaiian island. To assist in these objectives, two or more extensive field laboratory exercises will be done.

Course tasks include: full participation on all five days of the course, including all stops, hikes, and field exercises. The latter involves laboratory exercises collecting and recording data at rock and sediment exposures on irregular ground, in the sun, among and within bushes, then interpreting that data in a field report that must be submitted prior to the end of the semester.

ASSESSMENT TASKS AND GRADING

The course grade is partially determined by full participation (attendance and discussion) in all five days of the course [50% of the final grade], with one letter-grade reduction for each day, or any portion of a day, of missed participation, and by grades on the laboratory exercises [50% of the final grade]. There are no examinations.

LEARNING RESOURCES

Prior to the field course, please read:

Macdonald, Abbott & Peterson: *Volcanoes in the Sea, The Geology of Hawaii*; Univ. Hawaii Press, 1983 2nd ed. (or any edition), chapters 6-10, 14-16, 20. [Basic text on Hawaiian geology.]

Also recommended for background understanding:

Hazlett and Hyndman, *Roadside Geology of Hawaii*; Mountain Press, 1996 [well written and understandable].

Sinton, J., 2006, Maui Field Trip [detailed and advanced geology] (download from <http://www.soest.hawaii.edu/asp/GG/resources/ftguides.asp>)

Volcanowatch 2009 [written for the lay public] (download from <http://hvo.wr.usgs.gov/volcanoes/haleakala/>)

Additional reading and resources will be announced during the semester prior to the class.

ADDITIONAL IMPORTANT INFORMATION

Itinerary

Will be provided later in the semester – realize that it is tentative, expect changes due to weather conditions, permit/access restrictions and constraints, tsunami, earthquakes and megalandslides, etc.

Organization, Constraints and Field Conditions

Five days are spent on West Maui and Haleakala volcanoes – five long days in the sun, rain, heat and cold. Be prepared for all of these conditions. Be prepared for hikes through brush, slippery soil, and loose rocks or sand – good hiking shoes are suggested.

Field exercises may be sited within rugged conditions with brush, Kiawe trees, loose boulders, slippery soils, and such. Be prepared for these conditions. Expect a field exercise to take anywhere from an hour to an entire afternoon. Equipment, forms, pencils, etc., needed for field exercises will be provided.

An alternate field site for one day may be a hike into and out of Haleakala “crater”. You will be notified well in advance, before arrival on Maui, if this option will occur. This hike is difficult- about 12 miles long; down Sliding Sands trail [from 10,000 ft. (3000 m) down to 6000 ft (1820 m)]; across the “crater” floor of loose ash and cinders;

then ascending Halema'u trail [to 8000 ft. (2430 m)] over lava flows and slippery soil. This is a wilderness area (no emergency facilities; everything taken in must be carried out including all wastes) in an awesome, dramatic, geological setting. If you smoke, have respiratory problems (asthma, etc.), are pregnant, or have not hiked long distances, do not attempt the hike.

Safety and Health

These are outlined on the separate packet of information and waiver/medical forms. These will be made available early in the semester, and you will be notified of their availability by email. The medical form must be submitted before you may participate on the trip – if you arrive on Maui without this form, you may not participate in the course. With this form is a sheet outlining field conditions – show this to your physician.

Be aware that Dengue Fever has been reported on Maui, particularly in Hana, where we will spend a day. Be aware that we will be near streams and still fresh water (lo'i) at many locations where Leptospirosis may be a contaminant (for more information, see the sheet incorporated into the packet of information sheets/forms). Swimming, where time permits, especially in the lava tubes at Wainapanapa State Park or Seven Sacred Pools, is at your own risk.

First aid kits will be available in the lead van.

If you have participated on prior geology field courses and submitted waiver/medical forms, you do not have to submit a new set of these forms.

What to Expect/what to Bring

It should be sunny and warm. However expect cool weather especially on Haleakala, and rain in Hana. Bring a bathing suit for swimming if there is time during the field trip (or after returning). Most field sites are a short hike from the highway over easy terrain. One of the sites for the field exercise will be a longer hike through, and within grass, Kiawe, and loose boulders. Good hiking shoes are recommended.

If the Haleakala hike is done, bring: a small backpack for carrying cameras, sun screen, water (at least a quart), and food; comfortable and broken-in hiking shoes; a hat; bandages and/or moleskins in case of blisters; jackets and light rain-gear. It is also recommended to leave extra water and snacks in the van for consumption after the hike. A flashlight is recommended in case of darkness while hiking out, as well as for visiting the lava tube near Holua cabin.

Transportation on Maui

Vans are rented – students are expected to ride in these vans. If you choose otherwise, then you assume the responsibility of keeping up with the class at all times on often difficult and narrow roads, in addition to all other responsibilities accompanying your borrowed/rented vehicle.

Travel, Expenses, Facilities and Food

It is your responsibility to book transportation to and from Maui, and accommodations on Maui. We meet every morning at the Maui Seaside hotel (Kahului) in the lobby (Dr. McCoy may be reached here). Lunches will be in the field, either as a picnic or at a local restaurant (see the Itinerary). Other meals are your choice.

If the Haleakala hike is done, lunch will be in the “crater”. Food and drink must be purchased the day before, then carried in during the hike, with all garbage taken out (it is a wilderness area) – there will not be time to purchase food the morning of the hike.

Students are responsible for all expenses. Course fees represent estimated total costs for vans, gasoline, and admission fees. All other expenses (hotels, food, drinks, etc.) are your responsibility.

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will

help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale 'Akoakoa 213 for more information

PLEASE NOTE: ACCOMODATION FOR THOSE WITH PHYSICAL DISABILITIES IS DIFFICULT TO ARRANGE AND ADAPT FOR, DUE TO ARDUOUS AND REMOTE OUTDOOR CONDITIONS.