

**GG 210 O'AHU FIELD GEOLOGY**  
1 Credit  
Wednesday, 1430-1730

**INSTRUCTOR:** Prof. Floyd W. McCoy  
**OFFICE:** Hale Imiloa 115  
**OFFICE HOURS:** Mon. 2:00-4:00; Tues. 4:00 – 5:30; Tues.-Th. 10:00-11:30  
**TELEPHONE/E-MAIL:** 236-9115/fmccoy@hawaii.edu  
**EFFECTIVE DATE:** Fall, 2014

**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**

Fifteen half-day field and laboratory sessions relating to the geology of O'ahu.

**Activities Required at Scheduled Times Other Than Class Times**

Completion of laboratory and/or field reports, and the practicum, may require repeat visits to the laboratory and field sites. Especially significant or unusual events related to this course that do not occur during class time may require alterations to the class schedule to incorporate these events, and result in a regularly-scheduled exercise to be either cancelled or re-scheduled.

**STUDENT LEARNING OUTCOMES**

The student learning outcomes for the course are:

- Understand through field observation, with field and laboratory exercises, geological processes that construct, modify, and destroy the Hawaiian landscape.
- Realize the hazards, mitigation of these hazards and benefits of Hawaiian volcanism, and its relationship to island culture(s).
- Appreciate current research and studies of Hawaiian volcanism through visits to appropriate museums and research laboratories.
- Understand the vastness of geological time applied to Hawaii, and how time is measured thus the time-scale known.

**COURSE CONTENT**

*Concepts or Topics*

- Identification of common rocks and minerals with focus on those found in Hawaii.
- Recognition in the field of the common rock and sediment types found in Hawaii, with an understanding of their origin.
- Recognition in the field of landscape features, with an understanding of their origin.
- Geologic time.
- Stratigraphic relationships.
- Interpretation of geological features in terms of their origin and preservation.
- Application of concepts noted above to the geologic history of O'ahu.
- Use of various types of instruments in the field for mapping and acquiring information on geological structures.

*Skills or Competencies*

1. Understand the scientific method, and how it is used and applied.
2. Observe and interpret geologic and landscape features.
3. Apply descriptive and interpretive observations into a coherent and understandable report.
4. Appreciate geologic time, and its recognition in Hawaii's geology.
5. Appreciate the geologic past with the capability to predict a geologic future.

## COURSE TASKS, ASSESSMENT AND GRADING

- Examinations:** No examinations will be given. One practicum may be given either at a field site, or in the laboratory, at the end of the course, usually during the last scheduled field trip. This practicum may revisit a field site requiring a summary report of a page or two concerning the geology and geologic history, with sketches and maps where appropriate. The practicum might, instead, involve laboratory work.
- Grading Scheme:** Participation during 13 class sessions is required. At 3 points/class for attendance and 5 points for the subsequent report, this = 80 points. The final practicum = 20 points. Total possible points = 100. An alphabetic grade will then be assigned with:
- |                                                                                                                                                                                                                   |                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| A = 100 - 90 points                                                                                                                                                                                               | D = 69 - 60 points                              |
| B = 89 - 80 points                                                                                                                                                                                                | F < 59 points                                   |
| C = 79 - 70 points                                                                                                                                                                                                | C/NC = credit/no credit for those so registered |
| N = course not completed due to unforeseen difficulties, this grade rarely given                                                                                                                                  |                                                 |
| I = incomplete; assigned only after discussion with instructor; must be changed to an A - D letter grade the following semester, or the I becomes a permanent F grade (unless otherwise noted by the instructor). |                                                 |
- Extra/Special Credit:** Various meetings, symposia and exhibits can be used in lieu of scheduled field trips and laboratory sessions. These may be mentioned in class, but please see the instructor before assuming some activity may count for extra/special credit.

## LEARNING RESOURCES

- Textbooks (optional):** Macdonald, Abbott and Peterson; *Volcanoes in the Sea, The Geology of Hawaii*, Univ. Hawaii Press, 1983 (2nd edition)  
*or*  
 Macdonald and Abbott; *Volcanoes in the Sea, The Geology of Hawaii*, Univ. Hawaii Press, 1970 (1<sup>st</sup> edition)

- Ancillary Reading and Events:** Supplementary, non-required reading is in libraries at all campuses, both on reserve and on open shelves; you are encouraged to peruse this literature; numerous seminars, talks, symposia and exhibits occur throughout the university system and at various museums, you are particularly encouraged and welcomed to these; announcements made in class, posted on the Marine Option Program bulletin board in Hale 'Imiloa at WCC, or listed on the website; posters depicting various aspects of geology and field trips are on bulletin boards in the Hale 'Imiloa foyer.

Especially encouraged is the SOEST Open House at UHM, Friday & Saturday, October 21 & 22.

## Additional Information

- Logistics:** Class time 1430 - 1730 Wednesday afternoon; one or two meetings may be on a Friday afternoon or Saturday morning; for field trips, every effort will be made to finish by 1730, but there may be occasions when remoteness of field areas or traffic prevents finishing on time (also consider additional time needed for driving home after field trips).
- Meeting Time & Place:** 1430 in Hale 'Imiloa building at WCC, room 113; you may also meet us at a field site but be sure you know the location for rendezvous, that you have any appropriate passes/permissions for entry, and that there have been no last-minute changes.
- Transportation to Field Sites:** Via personal vehicle or car-pool.
- Field Conditions:** Field sites are all accessible by good roads and car; all hikes are over somewhat smooth ground and good trails; be prepared for hot sun and little shade; no sites are accessible for the handicapped; all sites may be considered dangerous in that they are adjacent to cliffs, coastlines, etc., and caution is required.
- Weather Problems:** Field trips may be rescheduled or cancelled due to severe weather (heavy rain island-wide, strong winds, high surf, etc.), to problems related to site access, or to scheduling problems by visiting scientists.  
*note: check the recorded message at 236-9115 each week for updates.*

**Reports:**

*for field trips* - a written report must be submitted after each field trip, of at least one page in length, that summarizes briefly, succinctly and thoroughly, the purpose and observations made during the trip; please follow this format: (1) a statement identifying the problem(s) being observed; (2) hypotheses on how this has come to be in terms of earth processes, including the factor of geologic time; (3) our observations, including a presentation of data collected to interpret these observations (if data are collected); (4) results and conclusions, with discussion. Sketches and/or maps are encouraged. Submission deadline is the week following the field trip; for each week the report is late, there will be a decrease of one alphabetic grade unit; reports may be submitted at the next class meeting, at Hale 'Imiloa, room 115, or via e-mail.

*for laboratory meetings* – exercises will be done in class and submitted at the end of the class meeting.

**Other Field Trips:**

Not required but highly recommended, all have the same prerequisites as this ( GG 210) field course; each requires registration at WCC; 1 credit awarded for each course; to obtain credit, you must participate on all four days of the trip (five days for GG 213) and pass either a written final examination at WCC or an examination administered on the internet; complete course descriptions are given in the WCC catalog, on the WCC website; titles in bold letters below are courses offered this semester.

**GG 211 - Big Island Field Geology:** fall semester; four days during either Veteran's Day week-end or Thanksgiving Day week-end; involves short hikes and one difficult hike onto lava flows, with one day on the summit of Mauna Kea (a harsh, cold, high-altitude environment).

GG 212 - Maui Field Geology: spring semester, 2013; during first four days of spring recess; involves a difficult one-day hike into Haleakala.

GG 213 – Molokai, Lanai and Kahoolawe Field Geology: spring semester, 2014; during first five days of spring recess; involves hiking to Kalaupapa and possibly one night there in rustic accommodations, a one day hike around the Kalaupapa peninsula, and four-wheel driving over rough roads on Lanai.

**GG 214 - Kauai and Ni'ihau Field Geology: spring semester, 2015; first four days of spring recess involves short easy hikes.**

A tentative schedule of field and laboratory meetings will be distributed at the first class meeting.

## TENTATIVE SCHEDULE OF FIELD AND LABORATORY MEETINGS

CHANGES WILL OCCUR THAT SHALL BE ANNOUNCED IN ADVANCE WHENEVER POSSIBLE  
CALL 236-9115 FOR UP-DATED MESSAGES

**Lab.:** indicates laboratory sessions at WCC, Hale 'Imiloa room 113.

**Field:** indicates field meetings; assemble by 1400 at Room 113, Hale 'Imiloa, or you may meet us at the field site - directions provided are from the WCC campus.

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| Aug.  | 27 | <b>Lab.: Orientation, introduction, legal issues, discussion of field conditions, safety issues, etc.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Sept. | 3  | rescheduled for Saturday, Sept. 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|       | 6  | <b>Field: Geology of the Mokapu Peninsula</b> (bring a driver's license or a state ID card; you must wear shoes – no slippers). We join a tour by the Kailua Hawaiian Civic Club, Ahahui Malama I Ka Lokahi and the Kailua Historical Society that will focus on geology, archaeology, and biology.<br><u>location/access:</u> meet at 0800 at the Ulupo Heiau (behind the Kailua YMCA). We will car pool from here or take vans to the entry gate to the marine base.<br><u>field conditions</u> windy and sunny.                                                                                                                                                                                                                                                                                                                                                                                                                       |
|       | 10 | <b>Field: Nu'uuanu Pali overlook</b> , we travel to the Pali overlook to start an orientation on how to read the landscape and what it means in the geosciences – geomorphology, geology & geologic history of windward Oahu, and some basic concepts of geology.<br><u>location/access:</u> turn off onto old Pali Road on Honolulu side of Pali tunnels, drive to Pali overlook, park and lock your car; meet at sign in parking lot.<br><u>field conditions</u> strong winds and possible rain - short walk down abandoned old Pali Road; slippers okay.                                                                                                                                                                                                                                                                                                                                                                              |
|       | 17 | <b>Lab.: The Beauty of Minerals &amp; Mineral Identification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|       | 24 | <b>Lab.: Rocks I – Igneous and Metamorphic Rocks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Oct.  | 1  | <b>TBA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|       | 8  | rescheduled for Saturday, Oct. 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|       | 11 | <b>Field: the geology of Windward 'Oahu – visits to: Ulupo Heiau, Pali, Ameron quarry, Na Pohaku o Hauwahine</b> -, A detailed look at the geomorphology, geology & geologic history of windward Oahu. We join a public tour of the geology of Kailua and Kawainui marsh.<br><u>location/access:</u> meet at 0800 at Ulupo Heiau (behind Kailua YMCA, off Kailua Road)<br><u>field conditions:</u> hot and sunny, the quarry will be dusty; a short hike on a good trail goes into Na Pohaku o Huawahine, with steep steps down to the marsh at the base of the outcrop where it is muddy; shoes required in the quarry.                                                                                                                                                                                                                                                                                                                 |
|       | 15 | <b>Field: Kaimuki spatter cone, Diamond Head summit – the geology of Leeward 'Oahu.</b> Involves a hike up to the summit of Diamond Head on a good trail, including two long flights of stairs, with spectacular geology and views.<br><u>location/access:</u> Meet first at the Kaimuki fire station; take H-1 to Kaimuki, off at Koko Head exit, turn right and station is directly ahead, park in lot to left of station or somewhere nearby.<br>For the hike up Diamond Head, drive down Pahoia Ave., right onto 18th Ave. to end, then right and then an immediate left onto road through tunnel into Diamond Head crater, park in lot and lock car. We must enter the park together for free parking (via a permit) – if you are late, then you must pay a parking fee.<br><u>field conditions:</u> hot and sunny (usually) with little shade; hike to summit is along good trail including two long sets of steps; slippers okay. |
|       | 22 | <b>Field: Ko'olau dike complex.</b><br><u>location/access:</u> Along H-3, between the last two exits (Kailua exit and Kaneohe Bay Drive) on the Kailua side of the highway - enter H-3 towards Kaneohe Bay Dr./Mar. Corps Base from Kamehameha Hgwy, drive makai towards Kaneohe Bay Drive and the Mokapu Peninsula, pull off at the road cut ~ 150 meters past the scenic pull-out (or park here and walk down to the road cut), park on the grassy area along the verge but well off the highway – turn on your hazard lights.<br><u>field conditions:</u> grassy area adjacent to (on the verge), but well off of, a busy highway; sunny with showers; slippers okay.                                                                                                                                                                                                                                                                 |
|       | 29 | <b>Lab.: Rocks II – Sedimentary Rocks &amp; Sediments</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

- Nov. 5 **Lab.: Sediments, Stratigraphy, Geologic Time**
- 12 **Field: Molokai–Lanai Overlook – explosive volcanism, sea-level changes, isostasy**  
*location/access:* park in pull-off just before Hanauma Bay (coming from the windward/Waimanalo side), past the Blow Hole pull-off; lock your car since we'll be down the slope out of sight; double parking okay.  
*field conditions:* hot and sunny, no shade; tricky descent to site over loose ash and pebbles; dangerous setting on ledge/bench often swept by high waves (access during high waves impossible) – please keep away from the edge of the bench and watch for rogue waves.
- 19 **TBA**
- 26 **No meeting** – field prep. for GG 211 Big Island field geology course
- Dec. 3 **Field: Practicum – Alala Point, Kailua.**  
*location/access:* point of land at the Lanikai end of Kailua Beach; park in the parking lot at the boat ramp.  
*field conditions:* sunny or rainy; possibly wet from waves depending upon tides and waves; if it is high tide, wading through tidal pools will be necessary, hot and sunny with no shade, access is over the ledge along the coastline from Kailua Beach, thus use caution especially for high waves.
- Alternate sites: **Field: Sinkholes of the Ewa Plain – karst landscapes, fossil beds, evidence for climate change.**  
*Location/access:* travel H-1 towards Ko Olina/Waiamae, exit at Campbell Industrial Park/Kalaeoloa Blvd., continue along Kalaeoloa towards the industrial park (makai), turn right onto Malakole Rd. (right turn is immediately upon entering the industrial park past an unused guard shack); the sinkhole site is on the right (mauka) side of the road near/beneath the overhead conveyor belt – park where other cars are parked.  
*field conditions:* hot and sunny with some shade; irregular ground with numerous pits, holes and collapsed caves, in sharp limestones; kiawe bushes/trees with sharp thorns; wear proper shoes and clothing (slippers not recommended), gloves are recommended.
- Field: Kailua Beach Surveys – marine geology and contemporary nearshore processes.**  
*Location/access:* Kailua Beach, park in the parking area adjacent to the boat ramp at the Lanikai end of the beach, be sure to lock your car – surveys will be done adjacent to the boat ramp.  
*field conditions:* hot and sunny with no shade, be prepared to get wet while surveying offshore.
- Field: Kahe Beach Park, Waianae – possible deposits left by tsunami, relic fossil coral reef,** a long trip from Kaneohe so we will not be able to spend that much time at the site, but *please note – this is a long trip and may extend beyond 1615 (especially with the long drive back).*  
*location/access:* this is immediately past the Kahe power plant, turn into a small road beyond the park that crosses over the old railroad tracks, turn left and go to the end of this little road and that will be the beach park; lock your car for sure because we will be below the seacliff out of sight of the cars.  
*field conditions:* hot and sunny with no shade, access is down the cliff to a boulder beach thus use caution especially watch for high waves (and two years ago there were some homeless people living near here).
- Field: B.P. Bishop Museum – exhibits on volcanism and the geologic evolution of the Hawaiian Islands** (and, by extrapolation, most volcanic island chains on this planet).  
*location/access:* Likelike highway across Pali, turn left onto N. School St., then right onto Kapalama St., right again onto Fernandez St. and left into the museum.  
*field conditions:* delightful and fascinating.