

**GG 101 Dynamic Earth**  
Three Credits  
Tues. - Thurs. 11:30-12:45  
Hale Imiloa room 113 (Geology Laboratory)

**INSTRUCTOR:** Dr. Floyd W. McCoy  
**OFFICE:** Hale Imiloa 115  
**OFFICE HOURS:** Mon., Tues. 2:00 – 4:30; Tues. 2:00-3:30  
**TELEPHONE:** 236.9115  
**EFFECTIVE DATE:** Spring, 2015

### **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**

The natural physical environment; the landscape; rocks and minerals, rivers and oceans; volcanism, earthquakes, and other processes inside the Earth; effects of human use of the Earth and its resources.

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

Additional resources besides the textbook are needed, including a variety of books and magazines available in the WCC library, as well as selected websites and other sources of scientific information – these will be announced and identified as appropriate in class.

### **STUDENT LEARNING OUTCOMES**

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.
5. 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.

*To be ignorant of what occurred before you were born is to always remain a child...  
[Marcus Tullius Cicero; Roman statesman, senator, orator, philosopher: 106-43 BCE]*

## COURSE CONTENT

### *Concepts or Topics*

- Structure of the earth
- Plate tectonics
- Hot spot/midplate volcanoes
- Geography of Hawaiian volcanoes
- Structure of Hawaiian volcanoes
- Rocks and minerals
- Extrusive and intrusive igneous
- Hawaiian-type eruptions
- Predicting Hawaiian eruptions
- Types and classification of igneous rocks
- Formation & crystallization of igneous rocks
- Types of eruptions
- Stages of Hawaiian volc. & island evolution
- Geologic history of Oahu
- Mechanical and chemical weathering
- Ground water
- Mass wasting; aeolian processes
- Glaciers, glaciation and sea-level changes
- Landscape evolution; geomorphic cycle
- Rock cycle
- Absolute and relative dating
- Age of the Hawaiian Islands
- Geologic time
- Volc. hazards: identification, management, mitigation

### *Skills or Competencies*

1. Understand the scientific method, and how it is used and applied.
2. Understand the metric system.
3. Apply an understanding of physical, chemical, and biological processes to interpreting geological events and processes.
4. Use basic mathematical statements to describe geological properties and processes.
5. Distinguish and reject *faux* science and misrepresentations of science.
6. Appreciate the technology behind the science of geology.
7. Develop an appreciation for geology and rocks good for jocks.
8. Appreciate the spectrum of science and engineering endeavors that underlie the study of the earth.
9. Appreciate the history, literature, music, and mythology of the earth.
10. Comprehend the benefits and dangers of volcanism to society, and the mitigation of geological hazards.

## COURSE TASKS, ASSESSMENT AND GRADING

**Type of examination:** written; questions require essays of varying length from short (single sentence) to longer (no more than a 10 minute composition); some questions may involve the use of maps and cross-sections.

**Examination schedule:**

One midterm: 1 hour, covering all material discussed up to the examination date; if this examination is not taken on schedule, a make-up exam. can be given but will have different and more difficult questions.

Final exam.: 2 hours, concerned with the entire course, with some emphasis on the last half of the course; must be taken on scheduled date – no retakes or early takes are possible except in exceptional cases.

Extra/special credit: discouraged; none routinely awarded; no term papers are required; under unusual circumstances, extra/special credit might be devised via consultation with the instructor.

Assignments/class participation: to be announced in class; assignments will be online

**Grading scheme:** letter grades calculated from an average of all test and assignment scores, and consideration of classroom interaction; midterm = 30%, final = 50%, assignments/participation = 20% of the total grade; letter grades assigned with:

A = 90 - 100%    B = 80 - 89%                      C = 70 - 79%                      D = 60 - 69%

F = < 60%            N = course not completed due to unforeseen difficulties

C/NC = credit/no credit option, assigned only via registration

I = incomplete due to unusual circumstances; assigned only with permission of the instructor; no credit given until this grade is changed to an A-D letter grade - it is your responsibility to make this change.

*“Civilization occurs with the consent of geology.”*  
 [Will Durant, American historian]

## LEARNING RESOURCES [aka, Textbook...]

Fletcher, C., 2011, Physical Geology – The Science of the Earth; John Wiley & Sons

Additional resources will be provided via the website for this textbook, as well as from other sources as appropriate (such as following any and all super volcanic eruptions, megatsunami, megaeearthquakes, and/or megalandslide events).

## Additional Information

**Field Courses:** Not required but highly recommended; 1 credit awarded for each course; to obtain credit for neighborhood island field trips, you must participate on every day of the trip, pass a written final examination, and submit one or more laboratory reports from field exercises; the Oahu field-trip course has different requirements that are noted below; complete course descriptions are given in the WCC catalog and on the WCC website. Each course involve field exercises, with data analyses done after the trip and a complete report submitted prior to the end of the semester.

GG 210 – Oahu Field Geology: every fall semester; Wednesday afternoons, 1330–1615, meet in Hale 'Imiloa Building (WCC) or at field site; short, easy hikes throughout the island to observe, discuss and map geologic features, field activities are mixed with laboratory exercises; transportation to field sites via private cars; course grade is a function of participation on fieldtrips and satisfactory completion of laboratory exercises [next offered fall, 2015].

GG 211 – Big Island Field Geology: every fall semester; four days during either Veteran's Day week-end or Thanksgiving Day week-end; involves short hikes and two difficult hikes (onto lava flows and on Mauna Kea), with one day on the summit of Mauna Kea (a harsh, cold, high-altitude environment) [next offered fall, 2015].

GG 212 – Maui Field Geology: spring semester, 2016; during first five days of spring recess; may involve a difficult one-day hike into Haleakala; also involves field lab. exercise(s) in difficult terrain.

GG 213 – Molokai, Lanai and Kaho'olawe Field Geology: spring semester, 2017; during first five days of spring recess; involves hiking down to Kalaupapa with a day hike around the Kalaupapa/Kalawao peninsula, and four-wheel driving on rough roads on Lanai; also involves field lab. exercise(s) in difficult terrain.

GG 214 – Kauai and Ni'ihau Field Geology: spring semester, 2014; first five days of spring recess; involves short easy hikes; also involves field lab. exercises.

*Note: All field classes require medical clearance and legal waiver forms; all involve hiking over irregular ground and can be difficult with potentially dangerous conditions; students are responsible for their expenses during the trip including transportation. Field conditions for these field courses are not receptive for handicap participation, nor can accommodation be provided,*

## 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](mailto:lemke@hawaii.edu), or you may stop by Hale 'Akoakoa 213 for more information.*

**A schedule of class lectures and examination dates will be provided in class.**

*“Study nature, not books.”*  
 [Louis Agassiz, Prof. of Geology, Harvard Univ.]