GEOLOGY OF THE HAWAIIAN ISLANDS

DEPARTMENT OF EARTH SCIENCES | SOEST | UNIVERSITY OF HAWAIʻI AT MĀNOA

WHO, WHAT, WHERE, WHEN...

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OFFICE: POST 614A

CLASS TIME: TTh 10:30-11:45
MEETING ROOM: ZOOM
OFFICE HOURS: M 11:30 - 1:30

COURSE BASICS

Every person living in Hawaiʻi, whether you grew up here or are visiting only for a semester, should know how the mountains, valleys, beaches, reefs, formed, what processes shaped them, what processes provide for, and threaten, our resources and our safety, and how Hawaiians historically used these resources without modern materials. ERTH103 covers geological and geophysical processes, as well as the geology of specific places (Hawaiʻi Nei). We will interleave processes and places, starting from Lōʻihi (the youngest Hawaiian volcano) and moving NW along the chain to finish at Meiji seamount (the oldest Hawaiian volcano). The goal is that by the end of the semester you will be able to look at the entire Hawaiian-Emperor volcanic chain, understand how it got there, why it is not the same all along the chain, and what the geologic future may hold.

SUGGESTED COMPLEMENTARY COURSES

To further your knowledge of the environment of the Hawaiian islands, you may also be interested in taking OCN 201, BOT 105, MET 101. There is no lab for this class, however, you are encouraged to sign up for the Dynamic Earth laboratory (ERTH 101L). It is a separate class

and will give you lots of good hands-on experience. You are also encouraged also to attend department seminars (Fridays at 3:30), read and bring in news articles related to Earth science, and look around at your natural surroundings wherever you go.

HOW TO APPROACH THIS COURSE

In ERTH103, as in all your classes, the important thing is not what I teach you, but what you learn. Learning is an active process. The knowledge doesn't just flow into your brain - you have to pull it in. The best way to pull it in is to take notes during class and to take notes while you do the reading. The reading is key because there is no way we can cover every topic in class. Instead, class should be where the more difficult concepts are discussed and explained. I don't expect that 5 years from now you will remember every single fact that gets covered in the class. But I do want you to understand the logic and how assess the resources we use to learn so that you can get the answers again later.

TEXT

Roadside Geology of Hawai'i (Hazlett & Hyndman; order from web)

COURSEWORK AND GRADING

In order to master the material in this course you should complete all reading assignments, attend (in person or virtually) all lectures, be an active participant in all class activities, and complete the assigned virtual field trips. You should complete any assigned reading before the class. Our main text is meant to point out features as you drive or hike around Hawai'i Nei, and is relatively light on process explanations. But it is much cheaper than a geology textbook, and will probably be more useful in the long run. We will supplement this with additional assigned reading when necessary.

You will demonstrate your understanding of the course material through exams and a term project. The term project will require a 2-slide, 2-minute oral presentation that discusses a place in Hawai'i. You will compare the Hawaiian explanation of how that place formed (or a legend about the place) to the western geological explanation of how that place formed. You will have to submit incremental assignments for the term project throughout the semester, so don't expect to leave it all until the last minute.

Your grade will be based on the following:
2 Mid-Terms (15% each)
1 Non-Cumulative Final (15%)
1 Virtual Field Trip (15%)
1 Term Project (15%)
Weekly Check-Ins (15%)
Class Engagement (10%)

WEEK	TOPICS	READING	SLOs
1	Introduction Earth Layers and Plate Tectonics,	1-7 handout	1,3,5 3,5
2	Minerals, Igneous Rocks Partial Melting, Lōʻihi	7-17 demo	3,5 3,5
3	Kīlauea and Mauna Loa Calderas and Rift Zones	50-64, 96-105, 117-124 17-18, 22-24, 65-97	1,3,5 3,5
4	Earthquakes Tsunamis	97-101 57-62, handout	1,3,5 1,3,5
5	Hawaiian Eruption Styles ʻAʻā and Pāhoehoe Lava Flows	18-24, 73-74 24-30, 57-61, 85-88	1,3,5 1,3,5
6	Mauna Kea, Glaciers **Midterm I**	53-55, 114-122, 124-127	3,5
7	Hualālai, Magmatic Differentiation Kohala, Soils, and Soil Formation **Project Topics Due**	53, 106-111 36-41, 111-114	3,5 1,3,5
8	Streams, Water Erosion East Maui, Haleakalā	38-41, 55-56 128-132, 147-173	3,5 3,5
9	West Maui, Rejuvenation Lānaʻi and Kohoʻolawe	129-130, 132-146 174-188	3,5 3,5
10	East and West Molokaʻi, Aeolian Processes Oʻahu (Koʻolau and Waiʻanae)	45-49, 190-207 208-252	3,5 3,5
11	**Midterm II** Giant Avalances and Submarine Geology	33-35, 179-181, 192-193	3,5
12	Kauaʻi *No Class (Veterans' Day)*	254-289	3,5
13	Niʻihau, Papahānaumokuākea Shorelines and Sea Level Change	handout 31-33, 41-45, handout	3,5 1,3,5
14	Groundwater Hydrology **Talk Slides Due** *No Class (Thanksgiving)*	handout	1,3,5
15	Geologic Age Dating Life Stages of Hawaiian Volcanoes	30-31 13-17	3,5 3,5
16	Student Presentations Student Presentations		3,4,5
	Final Exam - Thursday, December 16	**9:45 - 11:45 am**	

EARTH LEARNING OBJECTIVES

Earth Sciences undergraduate courses have to consider how they address a number of Student Learning Objectives (SLOs), which the Earth Sciences Department has decided are key attributes and/or abilities of any Earth Sciences student. They are (in no particular order):

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.

STUDENT CONDUCT AND ACADEMIC INTEGRITY

University guidelines for acceptable student conduct are very specific and will be strictly followed. Please read the guidelines and contact me if you have any concerns. Cheating, of any form, will not be tolerated. Blind copying of intellectual material (text) from resources such as books, journals, and the internet is plagiarism and is illegal.

TITLE IX

The University of Hawai'i is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know is experiencing any of these, the University has staff and resources on your campus to support and assist you. Staff can also direct you to resources that are in the community. Here are some of your options:

As members of the University faculty, your instructors are required to immediately report any incident of potential sex discrimination or gender-based violence to the campus Title IX Coordinator.Although the Title IX Coordinator and your instructors cannot guarantee confidentiality, you will still have options about how your case will be handled. Our goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, use the confidential resources available here. If you wish to directly REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, find contact information here: https://manoa.hawaii.edu/titleix/

DISABILITY ACCESS

The Earth Sciences Department will make every effort to assist those with disability and related access needs. For confidential services, please contact the Office for Students with Disabilities (known as "Kokua") located in the Queen Lili'uokalani Center for Student Services (Room 013): KOKUA Program; 2600 Campus Road; Honolulu, Hawaii 96822. Voice: 956-7511; Email: kokua@hawaii.edu; URL: www.hawaii.edu/kokua

BASIC NEEDS

Basic needs include food and housing, childcare, mental health, financial resources and transportation, among others. Student basic needs security is critical for ensuring strong academic performance, persistence and graduation and overall student well being. If you or someone you know are experiencing basic needs insecurity, please see the following resources: https://www.hawaii.edu/student-basic-needs/.