

ERTH 103 Geology of the Hawaiian Islands (Fall 2020, Tuesday, Thursday, 10:30-11:45 am)

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Office Hours: W 10:00-12:00 or by appointment

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

The goal is to tour Hawai'i Nei geologically, from SE to NW, following this tentative schedule:

date	topic(s)	pages in book	SLOs*
8/25	Intro. to Geology, Earth Layers, Plate Tectonics I	1-7	1, 3, 5
8/27	Partial Melting, Volcano Evolution	1-7, demo	3, 5
9/1	Minerals, Igneous Rocks	7-17	3, 5
9/3	Lō'ihi	1-7	3, 5
9/8	Hawaiian Eruption Styles	18-24, 73-74	1, 3, 5
9/10	'A'ā and Pāhoehoe lava flows	24-30, 57-61, 85-88	1, 3, 5
9/15	Kīlauea and Mauna Loa	50-64, 96-105, 117-124	1, 3, 5
9/17	Calderas and Rift Zones	17-18, 22-24, 65-97	3, 5
9/19	Saturday Field Trip to SE O'ahu (all-day)		
9/22	Earthquakes	97-101	1, 3, 5
9/24	Last Activity at Kīlauea		
9/29	Tsunami	57-62, handout	1, 3, 5
10/1	Midterm I		
10/6	Mauna Kea, Glaciers	53-55, 114-122, 124-127	3, 5
10/8	Hualālai, Magmatic Differentiation	53, 106-111	3, 5
10/13	Kohala, Soils, and Soil Formation (talk topics due)	36-41, 111-114	1, 3, 5
10/15	Streams, Water Erosion	38-41, 55-56	3, 5
10/20	Rejuvenation	14	3, 5
10/22	Maui (East and West)	128-173	3, 5
10/24	Saturday Field Trip to North Shore (all-day)		
10/27	Lāna'i and Kaho'olawe	174-188	3, 5
10/29	East and West Moloka'i, Aeolian Processes	45-49, 190-207	3, 5
10/30	Exam review		
11/1	Midterm II		
11/3	Holiday (Election Day)		
11/5	O'ahu (Ko'olau and Wai'anae)	208-252	3, 5
11/10	Giant Avalanches and Submarine Geology	33-35, 179-181, 192-193	3, 5
11/12	Kaua'i	254-289	3, 5
11/13-11/15	Possible Field trip to Big Island (optional, ~\$150 + airfare)		
11/24	Ni'ihau, Papahānaumokuākea	handout	3, 5
11/26	Holiday (Thanksgiving)		
12/1	Shorelines and Sea Level Change	31-33, 41-45, handout	1, 3, 5
12/3	Groundwater Hydrology (talk slides due)	handout	1, 3, 5
12/8	Student Presentations I		3, 4, 5
12/10	Student Presentations II		
12/17	Final Exam, (Thursday of finals' week), 9:45-11:45 am		

Every person living in Hawai'i, whether you grew up here or are visiting only for a semester, should know how the mountains, valleys, beaches, reefs, etc. formed, what processes shaped them to what they are today, what processes provide for, and threaten, our resources and our safety, and how Hawaiians in olden days managed to use these resources without modern materials. EARTH103 is a start to your understanding of these things. To complete your knowledge you should also take OCN 201, BOT 105, MET 101, and many others.



ERTH103 covers geological and geophysical processes (earthquakes, erosion, eruptions, etc.) as well as the geology of specific places (Hawai'i nei). In the past the processes have come first because it made sense for students to have this understanding before applying it to specific Hawaiian islands, volcanoes, valleys, etc. In this version of EARTH103, however, we will interleave processes and places, starting from Lō'ihi (the youngest Hawaiian volcano) and moving NW along the chain to finish at Meiji seamount (the oldest Hawaiian volcano). We will cover processes along the way as we need them. For example, Lō'ihi is an active volcano so while there we'll have to cover how magma is produced. However, erosion only becomes a major geological process once a volcano starts to die off so we won't cover it until we get to Mauna Kea and Kohala, and so on. The goal is that by the end of the semester you will be able to look at the entire Hawaiian-Emperor volcanic chain and understand how it got there, why it is not the same all along the chain, and what the geologic future may hold.

In EARTH103, as in all your classes, the important thing is not what I teach you, but what you learn. Learning is an active process – you have to do something to learn. 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 remember that you did know those facts at one time so that if you ever need to know them again, you'll have the resources to get the answers.

Course work will include:

- reading assignments
- class lectures and activities
- field trips (you must go on 2)
- 2 mid-terms and a final
- an oral presentation

Grades will be based on:

- 2 mid-terms (15% each)
- 1 non-cumulative final (15%)
- 2 field trips (15% each)
- your presentation (15%)
- weekly sketches (10%)

Powerpoint presentations, exam reviews, and field trip photos will be found

There is one term project, 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. There are deadlines during the semester so that you can't save it all up until the last minute. Note that the presentations will take place on Dec. 8 and 10.

You are required to go on two field trips. Note that the O'ahu field trips last pretty much all day, so you'll need to bring lunch, water, sun protection, rain protection, and something to write with.

There are photos of previous field trips on the web at:

http://www.soest.hawaii.edu/GG/FACULTY/ROWLAND/GG103/GG103Field_trips_web.htm

Please do the reading before coming to class. The book is meant to be used as you drive or hike around Hawai'i Nei, and doesn't contain much in the way of process explanations. However, it is cheap, and will probably be much more useful to you in the future than a typical geology textbook. There will be additional reading assignments for topics not covered by the book.

Neighbor island field trips will leave Honolulu late on a Friday and arrive back in Honolulu late on Sunday. They are optional because the cost will be ~\$150 + your airfare. If you go on one of these trips, they can count for your field trip requirement for EARTH103 as long as you write 2 pages about something geological that you learned. There are photos of previous Kīlauea field trips on the web at:

http://www.soest.hawaii.edu/GG/FACULTY/ROWLAND/GG103/Kilauea/Kilauea_web.htm

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 in this same room), read in news articles related to Earth science, and look around at your natural surroundings wherever you go. **BECOME A GEO-NERD!**

***SLOs - Student Learning Objectives**

EARTH undergraduate courses have to consider how they address a number of SLOs, which the Department has decided are key attributes and/or abilities of any EARTH 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.

CHEATING (ON EXAMS, FOR EXAMPLE), IS TOTALLY UN-COOL AND VIOLATES THE UHM STUDENT CODE OF CONDUCT (SEE <http://www.catalog.hawaii.edu/about-uh/campus-policies1.htm#integrity> IN THE ON-LINE UH CATALOG). CHEATING WILL NOT BE TOLERATED, AND WILL RESULT IN A GRADE OF F FOR THE COURSE AND A LETTER SENT TO YOUR ACADEMIC DEAN EXPLAINING THE REASON FOR THE F.

Disability access: If you have a disability and related access needs the Department will make every effort to assist and support you. For confidential services, students are encouraged to contact the Office for Students with Disabilities (known as Kōkua) located on the ground floor (Room 013) of the Queen Lili'uokalani Center for Student Services. URL: www.hawaii.edu/kokua and email: kokua@hawaii.edu

Title IX: The University of Hawaii 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. For more information regarding sex discrimination and gender-based violence, the University's Title IX resources and the University's Policy, go to: <http://www.hawaii.edu/titleix>