ERTH 103 Geology of the Hawaiian Islands

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

Optional text: Roadside Geology of Hawai‘i (Hazlett & Hyndman; out of print – 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***
Week 1	Intro. to Geology, Earth Layers, Plate Tectonics I	1-7	1, 3, 5
	Plate Tectonics II	handout	3, 5
Week 2	Minerals, Igneous Rocks	7-17	3, 5
	Partial Melting, Lō‘ihi	demo	3, 5
Week 3	Kīlauea and Mauna Loa	50-64, 96-105, 117-124	1, 3, 5
	Calderas and Rift Zones	17-18, 22-24, 65-97	3, 5
Week 4	Earthquakes	97-101	1, 3, 5
	Tsunami	57-62, handout	1, 3, 5
Week 5	Hawaiian Eruption Styles	18-24, 73-74	1, 3, 5
	‘A‘ā and Pāhoehoe lava flows	24-30, 57-61, 85-88	1, 3, 5
Week 6	Mauna Kea, Glaciers	53-55, 114-122, 124-127	3, 5
	Midterm I		
Week 7	Hualālai, Magmatic Differentiation	53, 106-111	3, 5
	Kohala, Soils, and Soil Formation (Topics due)	36-41, 111-114	1, 3, 5
Week 8	Streams, Water Erosion	38-41, 55-56	3, 5
	East Maui, Haleakalā	128-132, 147-173	3, 5
Week 9	West Maui and Rejuvenation	129-130, 132-146	3, 5
	Lāna‘i and Kaho‘olawe	174-188	3, 5
Week 10	East and West Moloka‘i, Aeolian Processes	45-49, 190-207	3, 5
	O‘ahu (Ko‘olau and Wai‘anae)	208-252	3, 5
Week 11	Holiday (Election Day)		
	Midterm II		
Week 12	Holiday (Veterans’ Day)		
	Giant Avalanches and Submarine Geology	33-35, 179-181, 192-193	3, 5
Week 13	Kaua‘i	254-289	3, 5
	Ni‘ihau, Papahānaumokuākea	handout	3, 5
Week 14	Shorelines and Sea Level Change	31-33, 41-45, handout	1, 3, 5
	Holiday (Thanksgiving)		
Week 15	Groundwater Hydrology (talk slides due)	handout	1, 3, 5
	Geologic Age Dating	30-31	3, 5
Week 16	Student Presentations		3, 4, 5
	Life Stages of Hawaiian Volcanoes	13-17	3, 5
	Final Exam, (Tuesday of finals’ week), 9:45-11:45 am		

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.

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. ERTH103 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 geophysicsl 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 ERTH103, 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 we'll have to cover how magma is produced there. 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 ERTH103, 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
-virtual field trips (you must "go on" one)
-2 mid-terms and a final
-an oral presentation

Grades will be based on:

-2 mid-terms (20% each)
-1 non-cumulative final (20%)
-1 field trip (20%)
-your presentation (20%)

There is a web site for this class where powerpoint presentations, exam reviews, and field trip photos can be found: ***http://www.soest.hawaii.edu/GG/FACULTY/ROWLAND/GG103/GG103_web.htm***

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.

You are required to go on an online field trip. In the wonderful past, these were in-person, and hopefully in the future will be as well There are photos of previous field trips on the web at:
http://www.higp.hawaii.edu/~scott/GG103/NorthShore/Fall_2006/
http://www.higp.hawaii.edu/~scott/GG103/Waianae/Fall_2006/
http://www.higp.hawaii.edu/~scott/GG104/SE_Oahu/2008_field_trip/Album1.htm

Please do the reading before coming to class. The book 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 would. There will be additional reading assignments for topics not covered by the book.

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 and bring 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 Sciences undergraduate courses have to consider how they address a number of 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.

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.