

Syllabus: EARTH 399: Earth Materials and Structures

Lectures T Th 12:00-1:15, Lab F 1:30-4:20

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This lecture-laboratory-field course (ERTH 399) is designed for upper-division students in either of the Earth Sciences Dept. BA tracks. The first 1/3 of the course will cover structural geology, and the next 2/3 will cover minerals and rocks as well as a few other topics. Lectures will cover key concepts of mineral and rock formation, the information they carry about the past processes and environments, formation mechanisms of various features such as faults, folds, and landslides, and how these can be used to piece together the geologic history of a particular location. The labs will cover identifying minerals and rocks in hand-sample and in thin-section, and will include field trips to measure and record the orientation of rocks and faults, as well as the signs of landslides.

ERTH 399 SYLLABUS (Fall semester)

Date	Topic(s)	SLOs
8/25	Course Introduction, Relative ages	1, 2, 3,
8/27	Strikes, dips, and stereonet	4, 5
8/28	<i>Strike, dip, and stereonet exercise</i>	
9/1	Faults: types and identification	1, 2, 3,
9/3	Faults: tectonic settings	4, 5
9/4	<i>Topographic cross section lab</i>	
9/8	Folds: types and identification	1, 2, 3,
9/10	Faults and Folds: tectonic settings	4, 5
9/11	<i>Geologic map and cross section lab</i>	
9/15	Magma production	1, 2, 3,
9/17	Mineral families	4, 5
9/18	<i>Strikes, dips, and faults with stereonets</i>	
9/22	No class	1, 3, 4, 5
9/24	Mineral bonding and properties	
9/25	<i>Hand-sample mineral identification</i>	
9/29	Magma compositions	1, 2, 3,
10/1	Cooling and igneous textures	4, 5
10/2	<i>Petrographic microscope intro.</i>	
10/6	Types of volcanic activity	1, 3, 4, 5
10/8	Types of volcanoes	
10/9	<i>Volcanic rock identification</i>	
10/13	Types of intrusive rocks	1, 3, 4, 5
10/15	Tectonic setting of intrusive rocks	
10/16	<i>Intrusive rock identification</i>	
10/20	Hawaiian volcanism	1, 3, 4, 5
10/22	Products of Hawaiian volcanism	
10/23	<i>Volcanic rock field trip</i>	
10/27	Terrestrial sedimentary environments	1, 3, 4, 5
10/29	Marine sedimentary environments	
10/30	<i>Sedimentary rock identification</i>	
11/3	Election Day	1, 3, 4, 5
11/5	Metamorphic grade and metamorphic rocks	
11/6	<i>Metamorphic rock identification</i>	
11/10	Chemical weathering processes	1, 3, 4, 5
11/12	Clays, oxides, hydroxides, precipitates	
11/13	<i>Clay mineral identification lab</i>	

11/17	Soils: basic concepts	1, 3, 4, 5
11/19	Hawaiian soils	
11/20	<i>Hawaiian soils ID and field trip</i>	
11/24	Rock and soil strength, slope stability	1, 3, 4, 5
11/26	THANKSGIVING	
11/27	THANKSGIVING	
12/1	Landslide case studies I	1, 3, 4, 5
12/3	Landslide case studies II	
12/4	<i>Landslide field trip I</i>	
12/8	Roles of organisms and the biosphere in geologic processes I	1, 3, 4, 5
12/10	Roles of organisms and the biosphere in geologic processes II	

*Student Learning Objectives (SLOs)

The Earth Sciences Dept. adopted the following SLOs, and below each one we detail how it will be addressed by the proposed EARTH 333 course:

1. Students can explain the relevance of geology and geophysics to human needs, including those appropriate to Hawai'i, and be able to discuss issues related to geology and its impact on society and planet Earth.

ERTH 333 will address the formation and occurrence of various Earth materials, and will give students a background on where particular resources are and aren't, and why these resources have this distribution.

2. Students can apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve real-world problems in geology and geophysics.

ERTH 333 will give students extensive hands-on experience at identifying minerals and rocks using both simple and complex tools (hand lenses and petrographic microscopes, respectively). In the structural geology portion of the class they will use compasses to determine the orientation of structures in the field, and gain experience plotting these data using a variety of graphical techniques. They will learn how their rock identifications and lab measurements can and cannot be extrapolated to real-world situations.

3. Students use the scientific method to define, critically analyze, and solve a problem in earth science.

ERTH 333 will give students the opportunity to compare, and explain differences between, theoretical treatments of mineral, rock, and structural geology concepts to those encountered in the real world.

4. Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.

ERTH 333 students will be required to turn in written lab assignments that address practical Earth Science problems.

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.

Both in the workforce and when dealing with the public (or students in a class), an earth scientist is expected to be able to identify common minerals and rocks. Earth scientists are also expected to be able to read topographic maps and to identify structural features such as faults and landslides in field settings.

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.

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:**

<http://www.manoa.hawaii.edu/titleix/resources.html#confidential>

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, contact: Dee Uwono, Title IX Coordinator (808) 956-299 t9uhm@hawaii.edu