

ERTH 309 - SEDIMENTARY PROCESSES & ENVIRONMENTS - SPRING 2024

4 Credit Hours

Prerequisite: EARTH 200 or 201 (or permission)

NOTE: EARTH 333 IS NOT A REQUIRED PREREQUISITE!**Contact Craig Glenn for a Prerequisite Override**Lecture: MWF 11:30-12:20 Primarily Online-Synchronous
(Occasional In-Person Sync Lectures, POST 703, TBD)

Lab: W 1:30-4:20 In-person, POST 703

Instructor: Craig Glenn: POST 720A; 956-2200/394-5155; glenn@soest.hawaii.edu (or cglenn@hawaii.edu)

Office Hours: After lecture or by appointment

Teaching Assistant: TBD

This course is devoted to understanding the environments that form, transport and deposit sediments on land and in the oceans, and to interpreting those environments and processes from the sedimentary record.

The study of sediments (sedimentology) naturally encompasses the study of modern earth surface environments, and the processes that result in the deposition of sediments that each type of environment has left in its wake. Sediments cover the majority of Earth's surface, record much of Earth's history, and contain all of Earth's fossil record. The premise that many of the fundamental processes affecting the earth today are much like those in the past is the key basis for understanding depositional systems and how ancient sediments formed. From modern sediment compositions, textures, sedimentary structures, fossils and geochemistry we decipher Earth's past terrestrial and marine environments, climates, ecosystems, mountain building and plate tectonics. In addition, sediment systems act as excellent archives of environmental change and are thus important for informing modern environmental management strategies.

MATERIALS YOU WILL USE:

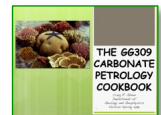
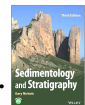
- (1) **Textbook:** G. Nichols, 2023, *Sedimentology and Stratigraphy, 3rd Edition (only)*; E-Book or Hard Copy.
- (2) **Other required readings:** will be posted on Lulima.
- (3) **Lecture slides:** posted on Lulima following lecture (<https://lulima.hawaii.edu/portal>).
- (4) **Labs:** Labs build upon and follow lectures. "Craig Glenn's Lab Cookbooks" and other texts provided.
- (5) **Useful Resources:**

Geology and Earth Science Definitions: <https://geology.com/geology-dictionary.shtml>Wikipedia Glossary of Geology: https://en.wikipedia.org/wiki/Glossary_of_geology

Glossary of Geology (5th Ed/AGI): Hard Copy Text or iPad/iPhone or Kindle, or Nook Version:

<https://www.americangeosciences.org/pubs/glossary/#online>

- (7) **Required Supplies:** A 10X (or 20X) Hand Lens! (Buy on Amazon.com or elsewhere)

**GRADING****ALL LABS ARE DUE BEFORE EACH NEW LAB SECTION BEGINS (LAB OVERLAPS ARE NOT ALLOWED)****MIDTERMS (NON-CUMULATIVE) ARE SCALED BY NUMBER OF LECTURES FOR EACH SEGMENT COVERED****ATTENDANCE IS REQUIRED AND INCLUDED AS PART OF YOUR GRADE****COURSE GRADE: 4 MIDTERMS + QUIZZES = 65%, LABS = 30%, IN-CLASS PARTICIPATION = 5%**



ERTH 309 - SEDIMENTARY PROCESSES & ENVIRONMENTS - SPRING 2024

Lecture: MWF 11:30-12:20 Primarily Online-Synchronous

[Occasional In-Person Sync Lectures, POST 703, TBD]

Lab: W 1:30-4:20 In-person, POST 703

- TENTATIVE LECTURE AND LABORATORY SCHEDULE -

<u>DATE</u>	<u>TOPIC</u>
JAN 8 (Mon)	Introduction, Discussion of the Course
10 (Wed)	Weathering Reactions and Soils Lab: Microscope Assignments and Introduction
12 (Fri)	Weathering Reactions and Soils
15 (Mon)	HOLIDAY - MARTIN LUTHER KING JR. DAY
17 (Wed)	Sedimentary Textures Lab: Sedimentary Textures
19 (Fri)	Particle Transport and Bedforms (Sed. Structures 1)
22 (Mon)	Primary Sedimentary Structures (Sed. Structures 2)
24 (Wed)	Primary Sedimentary Structures (Sed. Structures 3) LAB: Sedimentary Structures
26 (Fri)	Alluvial Fans
29 (Mon)	Braided & Meandering Streams; Stream Terraces; Entrenchment
31 (Wed)	Marginal Marine Environments – Deltas/Estuaries LAB: REVIEW SESSION FOR MIDTERM EXAM 1
<hr/>	
FEB 2 (Fri)	MIDTERM EXAM 1
<hr/>	
5 (Mon)	Beaches and Shelf Environments
7 (Wed)	Shelf Environments Lab: Siliciclastic Shelves Exercise
9 (Fri)	Shelf/Deep Marine Environments
12 (Mon)	Deep Marine Environments: Clastics
14 (Wed)	Deep Marine Environments: Clastics Lab: Continental Shelves Exercise
16 (Fri)	Deep Marine Environments: Carbonate, Siliceous, and Red Clays
19 (Mon)	HOLIDAY - PRESIDENTS DAY
21 (Wed)	Deep Marine Environments: Carbonate, Siliceous, and Red Clays Lab: REVIEW SESSION FOR MIDTERM EXAM 2
<hr/>	
23 (Fri)	MIDTERM EXAM 2
<hr/>	
FEB 26 (Mon)	Introduction to Sand and Sandstone:
28 (Wed)	Siliciclastic Rocks Provenance Studies Lab: Sand and Sandstones Lab
MARCH 1 (Fri)	Siliciclastic Rocks
4 (Mon)	Introduction to Carbonate Reef Systems
6 (Wed)	Carbonate Minerals & Carbonate Rock Classifications Lab: Carbonates Lab
8 (Fri)	Carbonate Reef Systems
11 (Mon)	Carbonate Diagenesis
13 (Wed)	Carbonate Diagenesis Lab: Carbonates Lab continued
15 (Fri)	Evaporites and Evaporite Environments
<hr/>	
MARCH 18-22	 Spring Break (ERTH 305 Field Trip) 

ERTH 309 - SEDIMENTARY PROCESSES & ENVIRONMENTS - SPRING 2024

Lecture: MWF 11:30-12:20 Primarily Online-Synchronous

[Occasional In-Person Sync Lectures, POST 703, TBD]

Lab: W 1:30-4:20 In-person, POST 703

<u>DATE</u>	<u>TOPIC</u>
MARCH 25 (Mon)	Evaporites/Sabkha Dolomites (Required Movie)
27 (Wed)	Oahu Carbonates and Sea Level History Field Trip: 10:30 – 5:00 PM
29 (Fri)	Holiday – Good Friday
APRIL 1 (Mon)	Sabkha Dolomites
3 (Wed)	Dolomites
	Lab: Wild Cat Lab – Sed. Rock Synthesis and Interpretation
5 (Fri)	Coastal Upwelling Sediments
8 (Mon)	Coastal Upwelling Sediments
10 (Wed)	Oxic/Suboxic/Anoxic Diagenesis
	Lab: Lab catch up and REVIEW SESSION FOR MIDTERM EXAM 3
12 (Fri)	MIDTERM EXAM 3
15 (Mon)	Introduction to Stratigraphy Lithostratigraphy
17 (Wed)	Lithostratigraphy
	Lab: Exercises in Physical Stratigraphy & Correlation
19 (Fri)	Lithostratigraphy and Wireline Logging
22 (Mon)	Biostratigraphy
24 (Wed)	Biostrat & Sequence Stratigraphy and Sea Level Change
	Lab: Exercises in Physical Stratigraphy & Correlation (Continued)
26 (Fri)	Sequence Stratigraphy & Sea Level Change: How to Build a Continental Margin
29 (Mon)	Sequence Stratigraphy & Sea Level Change continued
MAY 1 (Wed)	Oxygen Isotopes, Milankovitch Cycles and Sr isotopes
	Lab: MIDTERM 4 REVIEW SESSION
MAY 6 (Mon)	12:00-2:00 FINAL EXAM (= MIDTERM EXAM 4) https://manoa.hawaii.edu/undergrad/schedule/final-exams/spring/

ERTH 309 - SEDIMENTARY PROCESSES & ENVIRONMENTS - SPRING 2024

Lecture: MWF 11:30-12:20 Primarily Online-Synchronous

[Occasional In-Person Sync Lectures, POST 703, TBD]

Lab: W 1:30-4:20 In-person, POST 703

LEARNING OBJECTIVES:

The **Department of Earth Sciences** has five overall Student Learning Objectives (SLOs) related to the BA and BS degrees. This course's objectives encompass three levels of maturity in all five of these categories:

- 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.
- Students can apply technical knowledge of relevant computer applications, laboratory methods, field methods, and the supporting disciplines (math, physics, chemistry, biology) to solve real-world problems in geology and geophysics.
- Students use the scientific method to define, critically analyze, and solve a problem in earth science.
- Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.
- 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.

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 “Kokua”) located on the ground floor (Room 013) of the Queen Lili'uokalani Center for Student Services: KOKUA Program; 2600 Campus Road; Honolulu, Hawaii 96822 Voice: 956-7511; Email: kokua@hawaii.edu; URL: www.hawaii.edu/kokua

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://manoa.hawaii.edu/titleix/resources/#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) 956-2299 t9uhm@hawaii.edu.

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 is experiencing basic needs insecurity, please see the UHM Student Basic Needs website: <https://www.hawaii.edu/student-basic-needs/resources/manoa/>.