Class Information: SIOG 240 Marine Geology
Fall 2024

Instructors:
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The purpose of this class is to give an overview of marine geology from the perspective of geochemistry, paleoceanography and plate tectonics.

Meeting Times and Location: Mon/Wed 1:00pm–2:20pm (Spiess 330)

Format: 2 lectures per week; 4-units, letter or S/U grade.
Grades based on essay and homework assignments (40%), mid-term (30%) and final (30%).

Website on Canvas: https://canvas.ucsd.edu/courses/59938
Here you will find class information, lectures and readings, and homeworks.

Learning Outcomes

1. Summarize fundamental concepts in plate tectonic theory and how they relate to ocean basins
2. Access and appraise marine geological observations such multibeam bathymetric and geochemical data
3. Interpret seafloor spreading histories using marine magnetic anomaly data
4. Explain origins and effects of seafloor features such as hotspots, seamounts, and atolls
5. Describe the processes of sea level change, ocean circulation, and sedimentation in a variety of settings
6. Discuss how time scales are developed and applied in ocean basins
7. Evaluate scientific papers and develop skills in writing.

Suggested textbooks

The bulk of the material discussed will be derived from the primary literature (i.e. journal articles), which we will post in Canvas along with the lecture slides. The following texts provide useful background:
Cox, A., and Hart, R. B. (1986). *Plate Tectonics, How it Works*. Blackwell.
Fowler, C. M. R (2005). *The Solid Earth*. Cambridge University Press.
Kearey, P., Klepseis, K. A., and Vine, F. J. (2009). *Global Tectonics*. Wiley-Blackwell.

Computing

Computer-based homeworks will require the program GeoMapApp, which will run on Mac, Linux or Windows machines.

Essay assignment

You will write a review essay, in the style of a *Nature* 'News and Views' article, on a recently published peer-reviewed scientific paper, published since 2015 on a topic relevant to marine geology. The objective is to improve your writing and critical skills.

Key Dates

1. Choice of peer-reviewed paper: Wednesday October 9th

2. First draft due: Wednesday October 30th

3. Final draft due: Monday December 2nd

Format

Essays should be up to 800 words long (including figure captions, but not including title or references), and include one figure. They should be typed in 12 pt size font, with citations using the author-date format, and submitted in pdf format. Grades will be assigned with the aid of the rubric, which can be found on the course website.

Class Schedule

Week	Date	Day	L	Theme	Topic	Homework due	Instructor
1	30-Sep	Mon	L1	Seafloor Morphology & Processes	Marine observational tools: GeoMapApp, QGIS		RPT/CC
	2-Oct	Wed	L2		Mid-ocean ridges - spreading rate variations, age vs. depth		RPT
2	7-Oct	Mon	L3	Seafloor Morphology & Processes	Mid-ocean ridges - melting, lava compositions		RPT
	9-Oct	Wed	L4		Transforms & plate motions	Essay title	RPT
3	14-Oct	Mon	L5	Seafloor Morphology & Processes	Marine magnetic anomalies - dating the seafloor		RPT
	16-Oct	Wed	L6		Hotspots and intraplate features	Homework 1	RPT
4	21-Oct	Mon	L7	Sediment Cover	Passive and convergent margins		RPT
	23-Oct	Wed	L8		Seamounts, atolls and carbonate banks	Homework 2	CC
5	28-Oct	Mon	L9	Sediment Cover	Sea level		CC
	30-Oct	Wed	L10		Sediment blanket	Essay first draft	CC
6	4-Nov	Mon	L11	Dynamics of the Seafloor	Sediments at margins		CC
	6-Nov	Wed			Midterm Exam: take home, no class		-
7	11-Nov	Mon		~~~~~~~ Veterans Day: No Class ~~~~~~~			-
	13-Nov	Wed	L12	Dynamics of the Seafloor	Plate motions and reconstructions	Homework 3	RPT
8	18-Nov	Mon	L13	Ocean Basins	Gateways and ocean circulation		CC
	20-Nov	Wed	L14		Time scale development		CC
9	25-Nov	Mon	L15	Cenozoic Trends	Basic evidence		CC
	27-Nov	Wed	L16		Biogenic production		CC
10	2-Dec	Mon	L17	California Margin; Carbon/Climate/Tectonic Interactions	Field trip: beach walk, La Jolla Shores	Essay final draft	CC/RPT
	4-Dec	Wed	L18		California - tectonics and coastal sedimentation		RPT/CC
11				Final exam (take home), 8am-4pm Monday December 9th			

Academic Integrity

Academic Integrity is expected of everyone at UC San Diego. This means that you must be honest, fair, responsible, respectful, and trustworthy in all of your actions. Lying, cheating or any other forms of dishonesty will not be tolerated because they undermine learning and the University's ability to certify students' knowledge and abilities. Thus, any attempt to get, or help another get, a grade by cheating, lying or dishonesty will be reported to the Academic Integrity Office and will result sanctions. Sanctions can include an F in this class and suspension or dismissal from the University. So, think carefully before you act by asking yourself: a) is what I'm about to do or submit for credit an honest, fair, respectful, responsible and

trustworthy representation of my knowledge and abilities at this time and, b) would my instructor approve of my action? You are ultimately the only person responsible for your behavior. So, if you are unsure, don't ask a friend; ask your instructor, instructional assistant, or the Academic Integrity Office. You can learn more about academic integrity at academicintegrity.ucsd.edu (source: Academic Integrity Office, 2018).

Generative Artificial Intelligence Policy

Generative artificial intelligence (GenAI) tools like Chat GPT or GitHub CoPilot that generate output may be used in this course in limited ways with proper documentation, citation, and acknowledgement. Like any other tool, the use of GenAI should be acknowledged. At the end of your assignment, write a short paragraph to explain which GenAI tool you used and how you used it, if applicable. Include the prompts you used to get the results.

In accordance with our course learning outcomes, here are some examples of you may use the following GenAI tools:

1. Generating topic ideas for your essay
2. Rephrasing sentences or paragraphs you have written yourself (but not a full draft)
3. Asking questions about course concepts you don't fully understand

NOTE: GenAI is known to fabricate sources, facts, and give false information. It also perpetuates bias. You should also be aware that there are copyright and privacy concerns with these tools. You should exercise caution when using large portions of content from AI sources for these reasons. Also, you are accountable for the content and accuracy of all work you submit in this class, including any supported by generative AI.

For more guidance on using GenAI, check out this Guide from the UCSD Library. This Policy modified from UC San Diego Academic Integrity Office, 2023.

Open Book / Take-Home Exam Policy

'Open books/notes' does not mean that you can get other people, whether those people are friends, family or some 'tutor' or 'freelancer' on a website, or artificial intelligence to answer the exam questions for you. Do not use websites and tools (e.g., Chegg, Coursehero, ChatGPT, CoPilot) that will do your work for you. Such actions will undermine honesty and fairness, violate the my trust and that of your peers, and may result in an academic integrity violation and a report to the Academic Integrity Office. Remember, we care about what you know and can do, if you're learning; we don't care what someone else or something knows or can do. If you're not sure about which tools are appropriate for you to use, please ask.