

SIO 160: Syllabus
Intro to Global Tectonics; Spring 2024
Instructors: Dave Stegman and Margo Odlum

Times and locations

Lectures	Tu, Th	2-3:30pm IGPP 4301
Midterm	Thur May 2	
Final	Tues June 11	3:00-5:59pm
Odlum Office Hours	Th. 12:30-1:30pm	SVH 3123
Stegman Office Hours	Th. 3:30-4:30pm	IGPP

Instructors

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SIO Undergraduate Office Contacts

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Purpose of Class

This course is an introduction to tectonics and deformation of the lithosphere. We will consider the history of the theory of plate tectonics, evidence of plate tectonics, plate margin types and the resultant geologic features, and other tectonic phenomena on Earth.

Learning Outcomes

This course aims to provide students with the material and opportunity to learn the theory of plate tectonics which explain how forces within the Earth give rise to continents, ocean basins, mountain ranges, earthquake belts, and most volcanoes. After successfully completing this course, students will have knowledge of: deformation in the crust and mantle, internal structure of the earth, earthquakes, concepts of sea-floor spreading, paleomagnetism, and continental drift, basic types of plate boundaries and their surface/subsurface expressions, mountain building, plate kinematics, and implications of global plate tectonics and the supercontinent cycle.

Required Course Materials

- You must use Canvas to access course materials. All required materials will be posted online. You also should have a scientific calculator with log and y^x keys.
- Textbooks (provided on canvas):
 - Global Tectonics*, Keary, Klepeis and Vine (3rd Ed.), Blackwell, 2009.
 - Plate Tectonics* Cox and Hart, Allen & Unwin, Boston, MA, 1986.

Grading

Class participation	10%
Homework assignments	50%
Midterm	20%
Final	20%

Attendance

Attendance is not required, but there will be in-class activities that count for your participation grade. Lectures will be in-person. Certain lectures might be delivered via Zoom depending on various conditions, but advanced notice will be provided. If/when there are zoom lectures, they will be recorded. Slides decks from lectures available on Canvas before or after the lecture.

Class participation

We will have in-class activities that will be turned in for class participation portion of your grade. These can include things like making sketches, answering short questions, multiple choice quizzes, etc. You can have two unexcused absences/missing activities over the quarter. ***If you are sick, please do not come to class.***

Exams

There will be a midterm and a final examination; the final exam will NOT be cumulative. All the exam questions are based on the material from both the lectures and the course notes. All exams are closed book and closed notes.

Make-Up Exams

If there are extenuating circumstances that make you unable to take the exam during the specified time, please communicate to me as soon as you know this. We will make every reasonable attempt to accommodate your ability to take the exam.

Homework

There will be 5 homework assignments which will comprise 50% of your grade. These are **due ONE week after being assigned** and no late work will be accepted.

Working Together on Homework

Studies have shown that students often learn best when they consult with each other. You can ask other students questions about the homework. *However, each student must turn in his or her own assignments, written using his or her own words.* Do not write up the assignments together. Do not cut and paste material from the web or share text with your classmates. In previous years we have had to file cases of plagiarism with the UCSD Academic Dishonesty Office. This is an unpleasant experience for everyone. *Always write your own assignments from scratch.* It's the right thing to do and the only safe way to avoid plagiarism. Do not loan your completed assignment to anyone else—you are equally responsible for the infraction if they copy it.

UCSD Policy on Integrity of Scholarship

UCSD has an established policy on academic honesty that we will follow in this class.

Please see: <http://academicintegrity.ucsd.edu/>

In plain English: don't cheat, don't plagiarize.

Accessibility and Inclusion

Our goal is to provide students with effective accommodation based on law and current best practices and to promote individual growth and self-determination. We encourage full participation of all students within the university community. If there are particular things you need to help your learning in this course, we'd like to discuss it with you as soon as we can so we can talk about arrangements and support. We are committed to aspiring to maintain an environment that values our diversity. We support understanding and appreciation of all members of its community, regardless of race, sex, age, color, national origin, ethnicity, creed, religion, disability, sexual orientation, gender, gender identity, marital status, pregnancy, genetic information, veteran status, or political affiliation. Accordingly, we ask that students be willing to listen to one another's points of view, acknowledging that there may be disagreements, keep discussion and comments on topic and respectful, and use first person, positive language when expressing their perspectives.

Class Schedule (subject to change as necessary)

<u>Date</u>	<u>Topic</u>	<u>Reading</u>	<u>Homework</u>
Week 1			
2-Apr	Intro; Internal Structure of the Earth	KK&V Ch. 2.3, 2.4, 2.8, 2.9, 2.12	
4-Apr	Historical Perspective	KK&V Ch. 1, 3	
Week 2			
9-Apr	Earthquakes and focal mechanisms	KK&V Ch. 2.1, 2.10.1-2.10.3	HW#1 Assigned "EQ location"
11-Apr	Deformation in the Crust and Mantle	KK&V Ch. 2.10	
Week 3			
16-Apr	Mid Ocean Ridges	KK&V Ch. 6	Study Guide #1 Assigned
18-Apr	Rifting	KK&V Ch. 7.1-7.3; 7.7, 7.9	
Week 4			
23-Apr	Transform faults	KK&V Ch. 4.2, 8	HW#2 Assigned:
25-Apr	Seismo-Tectonics	KK&V Ch. 5.2	

Week 5

30-Apr Midterm Review Q&A Session

2-May MIDTERM EXAM

Study Guide
due**Week 6**

7-May Tectonic geodesy

KK&V Ch. 5.8

HW#3
Assigned

9-May

Mantle Convection and Plate Driving
ForcesKK&V Ch. 2.13, 12.4-
12.8**Week 7**14-May Hotspot volcanism, plumes, hotspot
reference framesKK&V Ch. 5.5, 5.7; 7.4;
12.9-12.10HW#4
Assigned
"Plate
kinematics"16-May Dynamics of subducting plates and
Back-arc BasinsKK&V Ch. 9.1-9.5;
9.10**Week 8**21-May Dynamics of overriding plates, flat
slab subduction, and the AndesKK&V Ch. 9.6-9.7;
10.1-10.2Final Exam
Study Guide
Assigned23-May Cenozoic Tectonics and magmatism
of Western North America

KK&V Ch. 7.3

Week 9

28-May Gravity, Isostasy, and Flexure

KK&V, Ch. 2.11

HW#5
Assigned:
"Isostasy"

30-May Orogenic Belts and Himalayas

KK&V Ch. 10.4-10.4

Week 10

4-Jun India's transit towards Asia

Pusok & Stegman
Science Adv. 2020Final Exam
Study Guide
Due

6-Jun Final Review Q&A Session

FINALS**WEEK** Final Exam: Tues 11 June 3-6pm