

EPS 164: Seismology

SPRING 2026

UC DAVIS

GENERAL INFORMATION

Preamble

Read this syllabus closely, noting the dates of both the activities and when these items are due. If you have questions about our expectations, please contact the professor.

Course

Seismology

Time

TR 9-10:20

Location

Earth and Physical Sciences 1316

Professor

Amanda M. Thomas

Contact Information

amthom@ucdavis.edu

Office Hours and Location

Tuesday and Thursday 11-12 in EPS 3120

Course Description

This course explores how seismologists use ground motion to understand fault physics and Earth structure. We develop the theory of elastic wave propagation and earthquake source mechanics and apply these tools to interpret real seismic data. The course emphasizes quantitative reasoning, physical insight, and modern applications in earthquake science

Textbook

Introduction to Seismology, 3rd edition, by Peter Shearer which is available via Bookshelf

Learning Outcomes

By the end of the quarter, you will be able to:

- Explain the physical principles of seismic wave propagation, including the differences between P, S, and surface waves and how material properties control wave speeds.
- Apply ray theory to interpret seismic travel times and relate seismic observations to Earth structure.
- Describe and analyze earthquake sources, including seismic moment, moment magnitude, and basic radiation patterns.
- Interpret seismic records, accounting for geometrical spreading, attenuation, and instrument response.
- Use seismic observations to make quantitative inferences about Earth structure, tectonic, volcanic, and surface processes.

COURSE SCHEDULE

Week	Topic	Reading	Dates
Week 1	Intro and Foundations	N/A	3/31 and 4/1
Week 2	Stress and Strain	Chapter 2	4/7 and 4/9
Week 3	The Wave Equation	Chapter 3	4/14
Week 4	Ray Theory and Travel Times	Chapter 4	4/21 and 4/23
Week 5	Earth Structure from Travel Times	Chapter 5	4/28 and 4/30
Week 6	Amplitudes and Attenuation	Chapter 6	5/5 and 5/7

Week 7	Surface Waves	Chapter 8	5/12 and 5/14
Week 8	Earthquake Sources	Chapter 9	5/19 and 5/21
Week 9	Sources (cont.) and Seismotectonics	Chapter 9 (cont.)	5/26 and 5/28
Week 10	Seismology Frontiers	TBD	6/2 and 6/4

ASSESSMENT AND GRADING

Grading

Grades in this course are assigned with the following weights:

1. In class notebooks - 20%
2. Problem Sets - 30%
3. Midterm and Final - 30%
4. Attendance and Participation - 20%

We maintain a record of your grades in this course using Canvas. Please check Canvas often to ensure that the grade recorded is the one you received (mistakes happen!).

In-class Notebooks

In-class Jupyter Notebooks provide guided, hands-on exercises that reinforce lecture concepts through exploration and visualization. These activities emphasize building physical intuition, connecting theory to observations, and working with simple analysis tools. Notebooks are intended to be interactive rather than formal assignments and will be assessed based on completion. Notebooks should be uploaded to Canvas no later than one week after the material has been presented in class. For example, if we cover material in a notebook on Tuesday and Thursday, your completed notebook should be uploaded to Canvas no later than the start of class on Thursday of the following week.

Problem Sets

Five written problem sets will be assigned approximately every two weeks. These assignments are designed to develop quantitative understanding of seismic wave propagation, earthquake source processes, and the interpretation of seismic observations. Problems will include a mix of analytical exercises, conceptual questions, and applied calculations. Students are encouraged to discuss approaches with classmates, but all submitted work must be their own. Problem sets emphasize clear reasoning and physical interpretation in addition to correct mathematical results. Problem sets will be submitted in PDF format on Canvas.

Midterm and Final Exam

The midterm and final assessments will be take-home assignments designed to evaluate students' understanding of key concepts and their ability to apply them in quantitative and interpretive contexts. The midterm exam will be distributed the Thursday of Week 5 and will be due one week later. The final will be distributed the Thursday of Week 10 and will be due one week later.

Attendance and Participation

This course covers many topics, and regular attendance is required for learning. At the start of each class, a slide will display a QR code linking to a one-question Canvas check-in plus a daily access code I'll say aloud. The check-in is open for 15 minutes after the scheduled start.

- No-phone option: If you don't have a device or need an alternative, let me know and I'll record it manually.
- Drops: Lowest two attendance scores are dropped. No late submissions.
- Integrity & fairness: Checking in for someone else (or asking someone to check in for you) is an academic-integrity violation.

COURSE POLICIES AND STUDENT SUPPORT

Academic Integrity

You are expected to uphold the [UC Davis Code of Academic Conduct](#). Suspected violations are reported through the official process. Use of generative AI is not permitted on any assignments in this course. Suspected misconduct in this realm will be reported.

Electronic Etiquette

If you email me, I expect your messages to conform to standards of professional correspondence. Emails should be courteous and respectful in tone; do not send emails that are curt or demanding. Please do not expect an immediate response via email (normally, a response will be sent within one business day). If your email question is sent at the last minute, it may not be possible to send you a response before a deadline. Please do not send more than one email per week. If you find that you have more questions than that, come to office hours.

Laptops/tablets are welcome for learning tasks. Please avoid unrelated browsing. Put cell phones away unless we're using them for quizzes at the beginning and end of class.

Classroom Climate

Our class follows the UC Davis [Principles of Community](#). Expect a respectful, inclusive environment—questions and engagement are encouraged!

Accessibility and Accommodation

UC Davis is committed to equal access. If you have, or think you may have, a disability that affects learning or participation, please contact the Student Disability Center to obtain a Letter of Accommodation. This letter will be shared with me and allows me to implement accommodations.

Title IX / Responsible Employee Disclosure

I am a Responsible Employee. This means if you share information about sexual violence, sexual harassment, or related misconduct, I must report it to the campus HDAPP/Title IX office, which will reach out to offer resources and options. If you want confidential support, please consider [CARE](#) or [Student Health and Counseling Services](#).

Wellness and Basic Needs

College is demanding. If you are experiencing food, housing, or financial insecurity, or other basic-needs barriers, please connect with the [Aggie Compass Basic Needs Center](#). For mental health support, [Student Health and Counseling Services](#) offers crisis support and short-term counseling.

Syllabus Changes

The syllabus is a live document; I may make updates as the quarter progresses. I will announce any changes on Canvas.