

EART 11: Earthquakes

Winter Quarter 2015

Course Goals

- To explain why earthquakes happen, when we can expect them and what we can do.
- To introduce geology and the Earth sciences.
- To teach quantitative problem solving skills applicable to real world data.

Time & Place

Lecture: MWF 3:30-4:40 pm Thimann Lecture 1

Discussion (mandatory):

01A	Earth & Marine Sciences D226	Monday	5:00-6:00 pm
01B	Earth & Marine Sciences D226	Monday	6:00-7:00 am
01C	Earth & Marine Sciences D226	Tuesday	6:30-7:30 pm
01D	Earth & Marine Sciences D226	Wednesday	2:00-3:00 pm

Field Trip (mandatory): Saturday, January 31 OR Sunday, February 1

Final Exam: Wednesday, March 18: 7:30-10:30 pm

Instructor Information

Instructor	Email	Office Location & Hours
Eli Morris	ermorris@ucsc.edu	Earth and Marine Sciences A216 Office Hours: Tuesday, 1 PM – 3 PM

TA	Email	Office Location & Hours
Esteban Chaves Sibaja	echavess@ucsc.edu	Earth and Marine Sciences C332 Office Hours: TBD
David Santaniello	dsantani@ucsc.edu	Earth and Marine Sciences A170 Office Hours: Thurs from 4 PM – 6 PM

Course Requirements

- Weekly problem sets distributed during your discussion section and due 1 week later at the beginning of the next section. Problem sets will be a combination of word problems and labs.
- Field trip: Saturday, January 31 or Sunday, February 1. **Sign-up in class no later than Friday, January 16.**
- Exams: 2 Midterms and 1 final.

Field Trip Note: The field trip is required for this class (15% of final grade). If you have unavoidable conflicts with both days, we will provide a field trip guide and you can do the

field trip on your own. However, *this is NOT at all recommended*. On the regular days, transportation and instruction will be provided.

Math Requirements

This course satisfies a MF/Q distribution requirement.

- We will be using algebra and logarithms vigorously.
- Metric units will be used for all measurements.
- Exams will require manipulation of exponents without the aid of a calculator (Scientific Notation).
- We will do data analysis and lots of word problems.
- **If your math is rusty, now is an excellent time to brush up.**
- Look for math review videos/practice problems online. Here are *some* examples:
 - Scientific Notation: <http://www.youtube.com/watch?v=i6lfVUp5RW8>
 - Multiplying and Dividing in Scientific Notation: <http://www.youtube.com/watch?v=497oljqRPco>
 - Exponent and Logarithm Properties: https://www.khanacademy.org/math/algebra2/logarithms-tutorial/logarithm_basics/v/logarithms
 - Metric System Units: <http://lamar.colostate.edu/~hillger/common.html>

Grading

25% Problem sets

15% Field trip report

15% Midterm 1

15% Midterm 2

30% Final

At the end of the quarter, the final grades will be determined on a curve. There is no extra credit in this class.

Academic Integrity

- We expect the highest levels of academic integrity in this class. Any cheating of any kind will be referred to the university for disciplinary action.
- Problem sets may be collaboratively done, but the work that you hand in must be your own. A simple way to figure out if the work is your own is to ask whether or not you can reproduce it in entirety without the aid of any other people or your problem sets.

Resources

- Your discussion section is a time for you to start your problem set and ask any initial questions you may have.
- We will be available during our office hours to answer questions. Office hours will be most useful when you have done as much of the problem set as you can and *come prepared with specific questions*.
- We will use the e-commons class website vigorously. PowerPoint slides will be posted there as well as the TA's own notes on each lecture.
- Useful references for supplementary reading include:
 - Earthquakes
 - Hough, S.E. *Earthshaking Science*, Princeton Univ. Press, 2002.

- Bolt, B.A., *Earthquakes*, W.H. Freeman, 2006.
- General Earth science
 - Davidson, J.P. et al., *Exploring Earth: Introduction to Physical Geology*, Prentice Hall, 2002

Lecture	Day	Date	Topic	Assignments
1	M	5 – Jan	Introduction	1. Plate Tectonics Read & complete problem solving exercises on eCommons (due 1/14)
2	W	7 – Jan	Plate Tectonics	
3	F	9 – Jan	Plate Boundaries & Faults	
4	M	12 – Jan	Faults, Stress & Strain	2. Forces & Friction
5	W	14 – Jan	Forces & Friction	
6	F	16 – Jan	Rupture and Magnitude	
	M	19 – Jan	NO CLASS – MLK Jr. Day	Sections Cancelled
7	W	21 – Jan	Measuring Earthquake Size	PS #2 due by 5 pm 3. Rupture, Magnitude, & Moments
8	F	23 – Jan	Seismic Moment	
9	M	26 – Jan	Review	Read & complete field trip report tips on eCommons before your field trip day
	W	28 – Jan	MIDTERM 1	
10	F	30 – Jan	Finding Faults & Writing Scientific Reports	PS #3 due by 5 pm
Field Trip	Sat OR Sun	31 – Jan OR 1 – Feb	Meet at Science Hill bus stop at 9:00 am. We'll be back to campus by 5:00pm	
11	M	2 – Feb	Waves & Elasticity	Field Trip Report Discussion 4. Waves & Earthquake Location
12	W	4 – Feb	Early Warning	
13	F	6 – Feb	Foreshocks, Mainshocks & Aftershocks	
14	M	9 – Feb	Probability & Hazard Mapping	5. Probability and Earthquake Statistics
15	W	11 – Feb	Ground Shaking & Liquefaction	
16	F	13 – Feb	Building for Earthquakes	Field Trip Report due by 5 pm
	M	16 – Feb	NO CLASS – President's Day	Sections Cancelled
17	W	18 – Feb	Paleoseismology	PS #5 due by 5 pm
18	F	20 – Feb	Review	
	M	23 – Feb	MIDTERM 2	Sections Optional
19	W	25 – Feb	Western US Tectonics	
20	F	27 – Feb	Volcanoes I	
21	M	2 – Mar	Volcanoes II & Landslides	6. Volcanoes & Landslides
22	W	4 – Mar	Tsunamis I	
23	F	6 – Mar	Tsunamis II	
24	M	9 – Mar	Induced Seismicity	7. Tsunamis
25	W	11 – Mar	Earthquake Prediction	
26	F	13 – Mar	Notable Earthquakes & Earthquake Safety	
27	M	16 – Mar	Review	Review
Final	W	18 – Mar	7:30 – 10:30 pm	

