

Syllabus

EART 11: Earthquakes (Online)

Summer Quarter, 2020

Instruction dates: 07/27/20–08/28/20 (5 weeks)

About

What is the probability of experiencing a big earthquake? Where will it occur and what can we do to be prepared?

This class will investigate the causes and effects of earthquakes. It will address why and where they occur, how they are measured, mitigated, and predicted. The course explores tectonic plate motion, frictional faulting, earthquake triggering, wave propagation, earthquake damage, earthquake-related hazards, human-induced earthquakes and much more. We will look at practical hazard mitigation strategies related to building designs, earthquake forecasting and earthquake early warning. Advanced algebra and high school geometry are required. We will build on these skills to solve quantitative problems that use real earthquake data. (General Education Code: MF)

Course Goals and Learning Objectives

- Determine why, where and when earthquakes happen

- Learn how earthquake effects can be mitigated
- Understand Plate Tectonics and fundamental Earth Sciences concepts
- Learn quantitative problem solving skills

After completing this class students will be able to:

1. Access, plot and evaluate earthquake data from public websites (USGS, etc.)
2. Analyze and interpret seismograms to obtain earthquake locations and size
3. Compare and contrast the probability of earthquake occurrence in different regions
4. Construct and interpret graphs with linear and logarithmic scales
5. Understand the role humans play in inducing earthquakes
6. Best practices and preparedness for future earthquakes

Instructor Information- Online office hours and tutorial sessions can be accessed from the Zoom link

Instructor	Email	Online Office Hours
Susan Schwartz	syschwar@ucsc.edu	Tuesday 1-2 PM Friday 2-3 PM By appointment

TA**Email****Online Office Hours**

Kellen Martin knmartin@ucsc.edu

Monday 11-12 AM

By Appointment

Textbook

Earthquakes, 5th Edition, 2003, Author: Bruce Bolt, ISBN:
9780716756187

Course Requirements

The class consists of 8 work modules (modules 2-9) covering various topics. Each module consists of ~3 lectures and many additional resources that will help you understand the material. Make sure you take notes as you would during an in-class lecture. Reading assignments for each module are posted below. Each module will have an activity to complete that applies concepts covered in the lecture, and a short content quiz for you to test your knowledge. Five of the modules also have a math quiz. To further support the course content there will be online tutorial sessions to both review course content and help you

complete the module activity and to review some fundamental math required for the course.

Session

Leader/Tutorial Type

Online Tutorial Times

	Wednesday 2:30-4 PM
Kellen Martin/Content	(Modules 3,5,7,9)
Review and Introduction to the Module Activity	Thursday 10:30-12
	(Modules 2,4,6,8)
Math Tutorials	Tuesday 3-4 PM
	Friday 10-11 AM

Module Workflow

Read & Watch (~7 hours per module)

- Watch mini-lectures – take notes as you would in a face-to-face class
- Read assigned text – take notes that relate to the material in the mini-lectures, you may find it beneficial to alternate reading and watching
- Synthesize material and formulate questions to post on Piazza or bring to tutorials or office hours

Practice (~3 hours per module)

- Review mathematical concepts covered in the module by watching suggested videos
- Attend a 1 hour tutorial to practice mathematical skills required to complete the weekly assignment.
- Complete the short math quizzes specific to some sessions.
- Attend 1.5 hour tutorial session to review module material in preparation for module activity and quiz

Apply (~4 hours per module)

- Complete the module activity and submit

Connect (~1 hour per module)

- Interact with your classmates and instructors through Piazza

The final will be a 2 hour timed exam administered online by ProctorU. **The final exam will be on Friday August 28** and you will be able to schedule the 2 hours between 8 AM and 10 PM. Register for your exam (**at least 72 hours in advance**) through the ProctorU link in the menu on the left side of this page or at <https://www.proctoru.com> (Links to an external site.).

There are hard deadlines for submitting assignments and taking the exam. These deadlines are intended to keep you on pace to finish the course. **LATE ASSIGNMENTS WILL BE PENALIZED BY 50% (i.e. if you get 100% of the questions correct, you will receive a grade of 50%) AND NOT ACCEPTED AFTER 48**

HOURS PAST THE DEADLINE. SO START THE WORK EARLY AND GIVE YOURSELF PLENTY OF TIME TO WORK ON THE MATERIAL AND ASK QUESTIONS.

Math Requirements

This course satisfies a MF general education distribution requirement.

- We will be using algebra and logarithms
- Metric units will be used for all
- Exams will require manipulation of exponents without the aid of a calculator (scientific notation)
- We will do data analysis and lots of problems
- Math tutorials will be offered several times per week. Some tutorials will review that current week's math content, and some will cover the previous week's material.
- Scoring less than 80% on a math quiz will require attendance at both types of math tutorial sessions (i.e. one focusing on the previous week and one focusing on the current week). Attendance at both sessions in this case will result in extra credit points.

Grading (400 Total Points)

50% 8 Interactive exercises, 25 points each, 200 total

10% 5 Math Quizzes, 8 points each, 40 total

10% 8 Lecture-Quizzes, 5 points each, 40 total

30% Final exam, 120 points

Schedule

Drop deadline: Monday, August 3

Request for “W”: Friday, August 14

Summer is unique. **You will not be dropped for non-attendance or non-payment.** You

must drop yourself. Dropping before the deadline results in a full-tuition reversal/refund. Withdraw posts a W for the grade and full tuition is charged (no refund).

For all dates and deadlines, including ‘change of grade option’ (P/NP) and grades due, here is the summer academic calendar:

<https://summer.ucsc.edu/studentlife/index.html>

[\(https://summer.ucsc.edu/studentlife/index.html\)](https://summer.ucsc.edu/studentlife/index.html)

For questions about dropping, requesting a W grade for a course, or withdrawing from the summer quarter, email

[summer@ucsc.edu \(mailto:summer@ucsc.edu\)](mailto:summer@ucsc.edu).

DRC Remote Accommodations:

The Disability Resources Center reduces barriers to inclusion and full participation for students with disabilities by providing support to individually determine reasonable academic accommodations. Operations continue via remote appointments. If you have questions or concerns about exam accommodations or any other disability-related matter, email the DRC Schedulers at drc@ucsc.edu (<mailto:drc@ucsc.edu>) for an appointment.

Small Group Tutoring

Small Group Tutoring (SGT) supports students academically to advance educational equity by designing inclusive learning environments outside of the classroom. In SGT, you can expect the Tutor to facilitate cooperative group activities designed to have students work together on the course content and develop study skills for the course. SGT is offered at least three times each week for the entire quarter. The Tutor is an undergraduate student who took the class, did well, and is trained to facilitate group sessions to focus on students' needs to succeed in the course. SGT is open to all students enrolled in the class and they must sign up on our online system: TutorTrac. When students sign up for SGT, they are committing to attend every week. For Summer 2020, students can begin signing up for tutoring on **Monday, June 22nd** and tutoring will begin **Wednesday, June 24th**. Students only have to sign up once for tutoring and their appointments will repeat weekly. Sign-ups will close on **Friday, August 14th** for all

Summer Session Sign-Ups. This means that after **August 14th**, no new students can sign up for tutoring.

Want SGT to be successful for you? Bring your books, lecture notes, questions, and be open to working collaboratively with your peers. You can sign up using this link: [https://ucsc-go-redrock.com/tracweb40/NoAccess.4sp?errText=insufficient%20credentials%20to%20view%20content_\(https://ucsc-go-redrock.com/tracweb40/NoAccess.4sp?errText=insufficient%20credentials%20to%20view%20content\)](https://ucsc-go-redrock.com/tracweb40/NoAccess.4sp?errText=insufficient%20credentials%20to%20view%20content_(https://ucsc-go-redrock.com/tracweb40/NoAccess.4sp?errText=insufficient%20credentials%20to%20view%20content))

You can also find the link on our website:

<https://lss.ucsc.edu/index.html>
(<https://lss.ucsc.edu/index.html>)

Academic Dishonesty

Academic integrity is the cornerstone of a university education. Academic dishonesty diminishes the university as an institution and all members of the university community. It tarnishes the value of a UCSC degree. All members of the UCSC community have an explicit responsibility to foster an environment of trust, honesty, fairness, respect, and responsibility. All members of the

university community are expected to present as their original work only that which is truly their own. All members of the community are expected to report observed instances of cheating, plagiarism, and other forms of academic dishonesty in order to ensure that the integrity of scholarship is valued and preserved at UCSC.

In the event a student is found in violation of the UCSC Academic Integrity policy, he or she may face both academic sanctions imposed by the instructor of record and disciplinary sanctions imposed either by the provost of his or her college or the Academic Tribunal convened to hear the case. Violations of the Academic Integrity policy can result in dismissal from the university and a permanent notation on a student's transcript.

For the full policy and disciplinary procedures on academic dishonesty, students and instructors should refer to the [Academic Integrity page](https://www.ue.ucsc.edu/academic_misconduct) [_\(https://www.ue.ucsc.edu/academic_misconduct\)](https://www.ue.ucsc.edu/academic_misconduct) at the Division of Undergraduate Education.

Title IX:

The university cherishes the free and open exchange of ideas and enlargement of knowledge. To maintain this freedom and openness requires objectivity, mutual trust, and confidence; it requires the absence of coercion, intimidation, or exploitation. The

principal responsibility for maintaining these conditions must rest upon those members of the university community who exercise most authority and leadership: faculty, managers, and supervisors.

The university has therefore instituted a number of measures designed to protect its community from sex discrimination, sexual harassment, sexual violence, and other related prohibited conduct. [Information about the Title IX Office \(http://titleix.ucsc.edu\)](http://titleix.ucsc.edu), the [online reporting link \(https://ucsc-gme-advocate.symplicity.com/public_report/index.php/pid681212?\)](https://ucsc-gme-advocate.symplicity.com/public_report/index.php/pid681212?), applicable campus resources, reporting responsibilities, the [UC Policy on Sexual Violence and Sexual Harassment \(https://policy.ucop.edu/doc/4000385/SVSH\)](https://policy.ucop.edu/doc/4000385/SVSH), and the UC Santa Cruz Procedures for Reporting and Responding to Reports of Sexual Violence and Sexual Harassment can be found at [titleix.ucsc.edu \(http://titleix.ucsc.edu\)](http://titleix.ucsc.edu).

The Title IX Office is actively responding to reports and requests for consultation. If you are not currently working with someone in the office and want to make a report/request a consult, you can expect the fastest response by using our [online reporting link. \(https://ucsc-gme-advocate.symplicity.com/public_report/index.php/pid304388?\)](https://ucsc-gme-advocate.symplicity.com/public_report/index.php/pid304388?)

For more information please visit the [Title IX Operations under Covid-19](https://titleix.ucsc.edu/about/titleix-covid19.html) [_ \(https://titleix.ucsc.edu/about/titleix-covid19.html\)](https://titleix.ucsc.edu/about/titleix-covid19.html) page.

Module Topic	Interactive Exercise	Week & Reading
1	Course Orientation	Quiz on course requirements
2	Plate Tectonics and Faults	Investigating global and regional earthquake distributions using the IRIS Earthquake Browser (IEB)
3	Earthquakes, Forces and Friction	Understanding forces and friction
4	Seismic Waves & Earthquake Location	Earthquake location using Google Earth

5	Earthquake Parameters	Earthquake rupture, magnitude, and intensity	Week 3 Chapter
6	Earthquake Probability and Forecasting	Probability and earthquake statistics	Week 3 Chapter
7	The San Andreas Fault	San Andreas Fault geomorphology using Google Earth	Week 4 Ch. 3
8	Induced Seismicity	Did humans cause these earthquakes?	Week 4 Ch. 4: p 90 - 101
9	Earthquake preparedness, safety, and early warning	Living in earthquake country	Week 5 Chapter & 12
10	Review and Synthesis	Review sessions to prepare for final exam	Week 5

Proctor U

