California is earthquake country. From the long-term evolution of the landscape to the damage brought on by a few short seconds of strong shaking, living in California means having your life shaped by seismic activity in some way or another. Over the course of the semester, we will come to terms with our faults, and build a foundation of general earthquake knowledge. We will begin with the science of how earthquakes work, why California has so many, and how seismologists have come to understand this hazard. But getting a handle on the science is only part of living with earthquakes; we will also address the topics of earthquake-resistant engineering, mitigation and preparedness from the individual to the government scale, how science affects policy, the much-misunderstood issue of earthquake prediction, and how hazard and risk are conveyed to everyday people and communities. My hope is that, by the end of the semester, you will feel more informed about and prepared for that inevitable earthquake, and that you will all be able to be earthquake awareness advocates to your families and communities.

This course fulfills a General Education Lifelong Learning requirement for a bachelor’s degree at CSUN. This course addresses the Lifelong Learning objectives via: (1) integration of knowledge about the process of earthquake formation and recognition from the geologic record (science); (2) how technologies such as monitoring of Earth deformation using seismometers, GPS, tsunami warning systems, and other sensors are used to characterize earthquake hazard (technology); and (3) how those data are used to inform the insurance industry, engineers, local, state and national hazard mitigation organizations, and individuals as they implement change to limit impacts from earthquake-related hazards (society).

By the end of this course, you should be able to:

- Recognize that scientific data caused a paradigm shift in society’s perception of natural hazards in California.
- Describe the earthquake cycle.
- Identify major faults and physiographic provinces of California on a map.
- Analyze evidence for past earthquakes from geologic data and strain accumulation leading up to earthquakes.
- Describe factors that contribute to earthquake ground motion.
- Describe secondary hazards that may be induced by earthquakes.
- Assess earthquake hazard at a site based on geologic maps, fault maps, and past earthquake history.
- Differentiate between earthquake forecasting and prediction.
• Compare and contrast how Local, State, and National emergency response organizations have shaped policy related to earthquake hazards.
• Justify societal concerns about hazards using historical analysis of news reports and other sources.
• Evaluate the validity of a mainstream media story about earthquakes.
• Summarize the main historical, economic, scientific and technological information used to create earthquake coverage by the insurance industry.
• List the major earthquake-related variables used by engineers to address societal needs for safe dwellings, workspaces, and transportation corridors.
• Interpret available data for earthquake hazards to develop a mitigation plan.
• Summarize case studies where individuals and communities have developed and participated in hazard mitigation strategies.
• Describe the linkage between societal impacts arising from earthquake disasters and response by the Federal Government in the form of earthquake preparedness, mitigation, and legislation.
• Synthesize concepts developed in the course to write a term paper that includes critical evaluation of information related to earthquake awareness.

There are three required texts for this class:
• Living with Earthquakes in California: A Survivor’s Guide, by Robert Yeats
• Predicting the Unpredictable: the Tumultuous Science of Earthquake Prediction, by Susan Hough
• Putting Down Roots in Earthquake Country
The Yates and Hough books are available in the campus bookstore, and are on reserve in Oviatt Library.
Putting Down Roots is available as a PDF on Moodle.
There will be a few additional articles and readings, which will be posted as links or PDFs on Moodle.

Your Responsibilities
1. Come to class prepared. This generally means doing the readings on time. Time will be devoted in each class period to discussing these readings, and you will find it hard to participate if you have not read the material.
2. Respect your classmates and professor. There will be a lot of discussion in this class, and a group project as well, so please treat everyone as you wish to be treated in a learning environment. Respect includes being on time, paying attention to each other, and putting social media away during class.
3. Please let me know as soon as possible if you will be absent or unable to turn in an assignment as listed in this syllabus. You may not always be able to make up for the work, but the later I find out that you may miss something, the harder it will be for me to make accommodations for you.
4. If you need any special physical or learning accommodations, please let me know as soon as possible. I can’t account for things that I don’t know about.
My Responsibilities
I am here to help you learn. I certainly hope that I can also instill some enthusiasm about this topic in you, but at the very least, I am here to help you learn this material. I cannot do the learning for you, but I’ll do what I can to facilitate. You can expect me to be available for class and office hours, and readily reachable by email.

Your grade is based on total points earned out of 500:

1. **In-class discussions and exercises, out-of-class Moodle quizzes** (50 points)
2. **Exams** (200 points total)
   - Midterm: 17 March 2016, during class (100 points)
   - Final: 17 May 2016, 10:15 AM – 12:15 PM (100 points)
3. **Field trip** (50 points)
   - Saturday, 2 April 2016, 9 AM to approximately 5 PM
   - (rain contingency date: Saturday, 9 April 2016)
4. **Preparation for and presentation of group project** (100 points)
   - Presentation date: 29 April 2016, during class
   - For this project, you will be working in groups of ~3 to assess the earthquake hazard and risk at different sites across California. You will be making a poster with this information, and presenting as part of a poster session, (hopefully) outdoors next to Live Oak Hall.
5. **Final paper** (100 points)
   - Due date: 10 May 2016, at the beginning of class
   - You will each be writing a five-page (double-spaced) paper on an earthquake-related topic of your choice.
   - Possible topics include (but are not limited to):
     - How a particular historic earthquake affected our understanding of earthquake hazard and/or our building codes and disaster mitigation plans.
     - The hazard and risk posed by a particular fault in California.
     - Failures and successes of earthquake preparedness in a particular historic earthquake.
     - Pros and cons of earthquake insurance.
     - Pros and cons of spending more money on mitigation before an earthquake vs. saving money for recovery afterward.
     - An earthquake awareness and mitigation plan for your neighborhood or hometown.
     - How safe is safe enough for your home or workplace?

Late Assignment Policy
For papers and group projects, 20% will be deducted from your grade for each day the assignment is late, including weekends and holidays.

Assignments that are to be completed on Moodle are short, and will be open for at least a week each. Once these are closed, they’re closed.

If you absolutely cannot attend the mandatory field trip on the scheduled day, you will be given instructions on how to complete the trip on your own and provide proof that you did so.
Course Schedule
Please complete the listed reading assignments before the class day on which they are listed. We will be directly discussing at least a portion of each reading in class, and lectures will build off of the information presented in the readings.

Week of 24 January
25 January — Introduction
27 January — Earthquake common knowledge, myths, and misconceptions (Yeats 1-25; Hough 1-11)

Week of 1 February
2 February — Plate tectonics (Yeats 26-48)
4 February — How faults work (Yeats 49-58; Hough 12-38; Putting Down Roots, 26-29)

Week of 8 February
9 February — Seismic waves and ground motion (Yeats 58-74; Yeats 217-231; Putting Down Roots, 30-31)
11 February — Secondary effects of earthquakes (Yeats 232-259; Putting Down Roots, 8-9)

Week of 15 February
16 February — California tectonics and the San Andreas Fault (Yeats, 75-92)
18 February — The San Andreas Fault and friends (Yeats, 92-115; Yeats, 154-155; Hough 39-46)

Week of 22 February
23 February — Other faults of California (Yeats, 116-147; Yeats 159-175)
25 February — Group project introduction and planning

Week of 29 February
1 March — Risk, mitigation, and insurance (Yeats 260-278; Putting Down Roots, 10-14)
3 March — Engineering for earthquake resistance (Yeats 297-311; Yanev and Thompson chapters 5 and 6)

Week of 7 March
8 March — The role of government in earthquake mitigation (Yeats 312-347)
10 March — Walking tour of buildings on campus

Week of 14 March
15 March — Topics for final paper due; review for midterm
17 March — Midterm

Week of 21 March
No class (spring break)


**Week of 28 March**
29 March — Preparation for group projects
31 March — **No class (Cesar Chavez Day)**
2 April (*Saturday*) — **Mandatory field trip, 9 AM to approximately 5 PM**

**Week of 4 April**
5 April — Forecasts and predictions (Yeats 185-216; Putting Down Roots, 6-7; Hough 47-85)
7 April — In search of earthquake precursors (Hough, 86-140)

**Week of 11 April**
12 April — Predictions from the fringe (Hough 141-170; news articles on Moodle)
14 April — Earthquake science, prediction, and the media (Hough, 171-195; news articles on Moodle)

**Week of 18 April**
**No class (in exchange for the field trip)**
Watch the documentary “Shock Waves: 100 Years After the 1906 Earthquake” and answer the questions on Moodle

**Week of 25 April**
26 April — Preparation for group projects
28 April — **Presentation of group projects**

**Week of 2 May**
3 May — Personal earthquake preparedness (Yeats 279-296; Yeats 348-357; Putting Down Roots 14-25)
5 May — **No class (in exchange for the field trip)**

**Week of 9 May**
10 May — **Final paper due:** conclusions and take-home messages (Yeats, 358-360; Hough 196-229)
12 May — Review for final exam

**Week of 16 May**
17 May — **Final exam, 10:15 AM to 12:15 PM**