

CORE 103g, Fall 2021, syllabus

Professor John Vidale, TA Brianna Brickel

Class is 80 minutes, **not** 110 as marked on the web page!

Course Description

We will examine the power and limitations of science to improve our lives through the example of geophysical natural hazards. The Prof and TA's specialty, earthquakes, will be emphasized, and hurricanes, tornados, heat waves, and volcanoes also have national relevance. Seismology is a particular strength of the Earth Sciences department at USC, and Los Angeles is the epicenter of the ~\$6B average annual earthquake risk in the US, as well as prone to landslides, flooding, and fires.

We'll discuss practical hazard mitigation, including discovery, denial, alarmism, and agitating for state and federal manpower and funds. Earthquake and volcano prophecies offer many examples of social media false proclamations of "breakthroughs" and conspiracies involving the deep state. Short-term earthquake prediction does not yet work, but still there is hope at the cutting edge of current research. The more general issue of clarifying contentious science, sometimes against entrenched interests, also is a recurrent theme.

Seismology has enabled assessment of long-term risk from earthquakes, recovery of oil from deep in the ground (starting in LA), fairly good prediction of volcanic eruptions, minutes of warning of incoming tsunami, arbitrated treaties to limit nuclear weapon development, and enables submarine tracking. We will, for example, learn about the history and usefulness of the ShakeAlert smartphone app ex-Mayor Garcetti recently rolled out. We will also similarly address other geophysical disasters; landslides, flooding, hurricanes, and wildfires.

The intended audience is those who wish to more deeply understand the process of mitigating hazards through research, activism, legislation, and enforcement of improvements.

Half the course content is lecture-style learning of the background geophysics - the science and history of earthquakes, volcanoes, tsunamis, landslides, flooding, hurricanes, wildfires, exploration for oil, and nuclear test treaty monitoring. The other half will be discussion of case studies of individual disasters and actions to avert disasters across these topics.

The objective is a greater understanding of geophysics and case-history knowledge of how we fight natural disasters.

Prerequisite: none

Co-Requisite: none

Concurrent Enrollment: none

Recommended Preparation: perusing the two required books would be helpful, but is not necessary.

Course Notes

Standard letter grades. Copies of lecture slides and assignments will be posted on Blackboard.

Technological Proficiency Required

We will use only the standard features of Blackboard and Poll Everywhere. The students will also create a 3-minute final report in video form, easiest with Zoom or Powerpoint.

Required Readings and Supplementary Materials

The Big Ones by Lucy Jones, 255 pages

- Sold by: Random House LLC, on Amazon
- Kindle - \$12
- Hardback - \$10
- Paperback - \$14
- ISBN 0385542704

Natural Hazards and Disaster by Donald Hyndman and David Hyndman

- Either the 4th (2013) or 5th edition (2016) is fine.
- New, used, electronic, paper, buying, renting – all would work
- Choices range from ~\$20 to ~\$300 on Amazon
- Just needed for reading and reference – fancy extras unnecessary.
- ISBN-13: 978-1305581692, ISBN-10: 1305581695

The rest of the readings will be freely available on the web.

Description and Assessment of Assignments

There are four kinds of assignments, plus a short final exam:

1. Weekly very short quizzes.
2. Each week, students will write a one-page exploration, summaries and commentaries on the case studies presented in the week's lecture, as specified by TA.
3. Record a 3-minute Zoom on their case-study term project at the end of the quarter.
4. Hand in a 10-page written report on the presented case study at the end of the quarter.

The term project, presented at the end, will concentrate on the mitigation process and lessons learned from the disasters.

Learning Objective

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

1. Understand the qualitative physical process responsible for a range of natural hazards and other societal problems that can be ameliorated through geophysical methods.
2. Remember cases studies of these disasters, their history, and the actions taken to mitigate them.
3. Extend the case history to interpret additional, similar cases not addressed in class.
4. Analyze the outcomes in case studies to judge their societal impact.
5. Evaluate whether the measures taken have been sensible.
6. Create ideas for how additional problems can be assessed and blunted.

Assignment/Assessment

This learning objective skill is measured by:

- Midterm, final exam, in-class quizzes and polls
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- Weekly 1-page explorations done for discussion section
- Essays on final exam, class term projects
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- Class term projects

Grading Breakdown

- 30% weekly writing assignments
- 15% final exam
- 15% Thursday 5-question quizzes
- 10% Participation in in-class polling questions
- 10% final report in a Zoom recording
- 20% written report (5% based on mid-semester progress report)

Grading Scale

A curve will be applied.

Assignment Submission Policy

Weekly reading assignments will be given in class on Thursday and writing assignments will be given in discussion Fridays and both posted on Blackboard. They will be due by corresponding class time the following week.

Grading Timeline

Grades and feedback will generally be within a week.

Additional Policies

Late assignments lose 10% of the score each week, no more than 2 missed classes and 2 missed discussions without notifying us ahead of time.

Date	Topics (Now updated for Fall 2021.)
Aug 23	Introduction
Aug 25	Earthquakes and plate tectonics
Aug 30	World earthquake history
Sept 1	California earthquakes
Sept 6	Labor Day
Sept 8	California earthquake mitigation
Sept 13	Earthquake Early Warning
Sept 15	Volcanoes
Sept 20	More volcanoes across solar system
Sept 22	Mount St Helens and current plans
Sept 27	Landslides
Sept 29	More landslides
Oct 4	Midterm
Oct 6	Midterm recap, landslide case studies
Oct 11	Tsunamis (term paper progress reports due)
Oct 13	Tsunami case studies
Oct 18	Nuclear testing
Oct 20	rest of nuclear testing
Oct 25	Earthquake prediction and hazard estimation
Oct 27	Prediction case studies
Nov 1	Hurricanes
Nov 3	more hurricanes
Nov 8	Tornadoes
Nov 10	rest of tornadoes, flooding
Nov 15	Groundwater contamination
Nov 17	Soil settlement problems
Nov 22	Wildfire
Nov 24	Thanksgiving
Nov 29	Flooding
Dec 1	Extinction events
Dec 4-7	Study days
Dec 10 11am-1pm	Final exam

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu