

**GEO 302J, Crisis of Our Planet | Spring 2022 | Unique Number: 27255**

**Instructors:**

**David Mohrig** [mohrig@jsg.utexas.edu](mailto:mohrig@jsg.utexas.edu) | JGB 6.128 | Office hours: T 2:30–3:30 PM and by appointment/ZOOM.

**James Gardner** [gardner@jsg.utexas.edu](mailto:gardner@jsg.utexas.edu) | JGB 4.108 | Office hours: MWF 1–2 PM, or online and/or appointment

**Thorsten Becker** [twb@ig.utexas.edu](mailto:twb@ig.utexas.edu) | JGB 4.220AA | Office hours: TTh 2-3 PM and by appointment/Zoom

**Course Overview:** We will explore the interactions between humans and the Earth system by investigating the different time and spatial scales of the natural hazards that the planet presents, and exploring the societal and economic implications of civilizations co-existing with an evolving planet. Discussion of both long-term and punctuated catastrophic hazards, focusing on those from volcanoes, hurricanes, and earthquakes, using a combination of systems level exploration of the driving mechanisms as well as case histories. Discussion of issues related to risk, mitigation, and resilience for humans facing the vast array of natural hazards.

**Learning Outcomes:**

Students will be able to name each major type of natural hazard and describe the key characteristics of each of these hazards.

Students will be able to identify the physical processes and chemical reactions that generate natural hazards and describe the Earth surface and/or subsurface properties that control the magnitudes of each style of natural hazard.

Students will be able to explain the connections between natural hazards and natural disasters, and will be able to explain the advantages versus disadvantages of federal, state, and local responses to natural disasters.

Lectures for the course will be TTh 9:30 a.m.–11:00 a.m.

Lectures on January 18, 20, 25, and 27 will be online (ZOOM via Canvas), though Dr. Mohrig will be delivering these lectures in person if students want to attend.

Remaining lectures will be held in person. **Classroom: GSB 2.214**

Day / Date		Lecture #	Instructor	Lecture Topic	Canvas Discussion Topic	Reading
T	18 Jan	1	All, DM	Introduction, Hazards vs. Disasters	Are natural disasters getting worse?	
Th	20 Jan	2	DM	Wildfires: fuel, air temperature & wind		Abbott, Prologue, Ch. 14
T	25 Jan	3	DM	Precipitation and runoff, tornadoes	Flash-Flood Alley	Abbott, Ch. 9, 10
Th	27 Jan	4	DM	Landslides & debris flows		Abbott, Ch. 15
T	1 Feb	5	DM	River flooding, flood styles & flood frequency	Flood Insurance and Risk	Abbott, Ch. 13
Th	3 Feb	6	DM	Urbanization & flood management		Abbott, Ch. 13
T	8 Feb	7	DM	Tropical storms & cyclones	Hurricanes	Abbott, Ch. 11
Th	10 Feb	8	DM	Storm-surge inundation & coastal erosion		Abbott, Ch. 11
T	15 Feb	9	DM	Coastal hazard management & response		
Th	17 Feb	10	DM	Class-wide discussion 1	Class-wide discussion	
T	22 Feb		DM	<b>EXAM 1</b>		
Th	24 Feb	11	TB	Plate tectonics and mantle convection		Abbott, Ch. 2

T	1 Mar	12	TB	Earth structure and wave propagation	How variable are plate motions, and why?	Abbott, Ch. 2
Th	3 Mar	13	TB	Earthquake physics I		Abbott, Ch. 3
T	8 Mar	14	TB	Earthquake physics II	What is the largest earthquake size?	Abbott, Ch. 3, 4
Th	10 Mar	15	TB	Tsunamis		Abbott, Ch. 5
T	15 Mar			<b>SPRING BREAK</b>		
Th	17 Mar			<b>SPRING BREAK</b>		
T	22 Mar	16	TB	Seismic hazard assessment	How would you determine earthquake insurance rates?	Abbott, Ch. 5
Th	24 Mar	17	TB	Earthquake engineering		Abbott, Ch. 5
T	29 Mar	18	TB	Class-wide discussion 2	Class-wide discussion	
Th	31 Mar		TB	<b>EXAM 2</b>		
T	5 Apr	19	JG	What are volcanoes?	What Volcanoes exist in the USA and why?	
Th	7 Apr	20	JG	How frequent are volcanic eruptions?		Abbott, Ch. 6
T	12 Apr	21	JG	Eruptive Styles	How does eruption style vary between USA volcanic regions?	Abbott, Ch. 6
Th	14 Apr	22	JG	Volcanic hazards directly from eruptions		Abbott, Ch. 6

T	19 Apr	23	JG	Volcanic hazards caused by eruptions (or by volcanoes)	What hazards are related to USA volcanoes?	Abbott, Ch. 7
Th	21 Apr	24	JG	Volcanic hazards on a global scale		Abbott, Ch. 7
T	26 Apr	25	JG	Responses to eruptions and their outcomes	What are the risks and “acceptable risks” related to USA volcanoes?	Abbott, Ch. 7
Th	28 Apr	26	JG	Monitoring for the next eruption		Abbott, Ch. 7
T	3 May	27	JG	Class-wide discussion 3	Class-wide discussion	
Th	5 May		JG	<b>EXAM 3</b>		

**Textbook:** The primary source for readings is:

Patrick Abbott, *Natural Disasters*, 10<sup>th</sup> or 11<sup>th</sup> edition, McGraw Hill, 2017 or 2020. Other readings may be assigned throughout the semester.

**Lecture notes:** Lecture notes can be found on Canvas (<http://canvas.utexas.edu/>)

**Grading:** Your course grade will be based on the results of three in-class exams and weekly on-line discussions.

**Class exams:** There will be three, full-period, in-class examinations. **Each exam is 29% of your grade, for a total of 87% of your grade.** Each exam is closed book and closed notes and will be administered via CANVAS during the class period. Attendance at each exam is required. A missed exam counts as a zero, unless a written doctor’s excuse is provided. If an acceptable excuse is provided, a make-up exam can be given. Anyone found cheating on an exam receives a zero.

**Weekly Discussions:** There will be thirteen weekly discussions. All thirteen will be online and use CANVAS. Specific instructions for each discussion will be provided weekly under ASSIGNMENTS on CANVAS. **Each discussion is worth 1% of your grade, for a total of 13% of your grade.**

Ten of the discussions will individual posts due on Saturdays at 11:59PM. No late posts will be accepted for credit. After you post your discussion you will be able to view the discussions of other classmates within randomly assigned small groups.

Three of the discussions will occur during lecture times on February 17, March 29, and May 3. These three class-time discussions will involve all students.

## Final grades will use the plus/minus system

**Lecture Protocol:** The use of laptops is allowed only to take notes (that use requires approval of instructors).

**Academic Integrity:** No form of academic dishonesty will be tolerated. Information on this issue can be found at: [http://deanofstudents.utexas.edu/sjs/acint\\_student.php](http://deanofstudents.utexas.edu/sjs/acint_student.php)

**University Honor Code:** "The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

**Special Needs:** The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. To determine if you qualify, please contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259 (link above). After your needs are certified, the instructor will work with you to make appropriate arrangements. Special needs requests must be submitted in writing at least a week prior to the affected event, e.g. a test or assignment.

**Religious Holidays:** Religious holy days sometimes conflict with class. If you miss a class due to the observance of a religious holy day you will be given an opportunity to complete the work missed within a reasonable time after the absence. It is the policy of The University of Texas at Austin that you must notify each of your instructors at least fourteen days prior to the classes scheduled on dates you will be absent to observe a religious holy day.

**Use of Canvas:** This course uses Canvas, a Web-based course management system, in which a password-protected site is created for each course. Canvas can be used to distribute course materials, to communicate and collaborate online, to post grades, to submit assignments, and to take online quizzes and surveys.

You will be responsible for checking the Canvas course site regularly for class work and announcements. As with all computer systems, there are occasional scheduled downtimes as well as unanticipated disruptions. Notifications of these disruptions will be posted on the Canvas login page. Scheduled downtimes are not an excuse for late work. However, if there is an unscheduled downtime for a significant period of time, we will make an adjustment if it occurs close to the due date.

Canvas is available at <http://canvas.utexas.edu>. Support is provided by the ITS Help Desk at 512-475-9400 Monday through Friday 8 a.m. to 6 p.m., so plan accordingly.

**University Electronic Mail Notification Policy:** (Use of E-mail for Official Correspondence to Students)

All students should become familiar with the University's official e-mail student notification policy. It is the student's responsibility to keep the University informed as to changes in his or her e-mail address. Students are expected to check e-mail on a frequent and regular basis in order to stay current with University-related communications, recognizing that certain communications may be time-critical. It is recommended that e-mail be checked daily. The complete text of this policy and instructions for updating your e-mail address are available at <http://www.utexas.edu/its/policies/emailnotify.html>.

In this course e-mail will be used as a means of communication with students. You will be responsible for checking your e-mail regularly for class work and announcements. Note: if you are an employee of the University, your e-mail address in Canvas is your employee address.