

Instructor: Professor Heidi Houston

Office: ZHS 101

Office Hours: Tue 11:00AM -12 PM, Thurs 2:00-4:00 PM

Contact Info: If you have in-depth questions related to class content, you will probably find it most effective to ask me in person, either immediately after lecture or lab or during office hours held by me or one of our TAs. If you are systematically unavailable during office hours due to a scheduling conflict, I am also available by appointment. If these approaches don't work, my e-mail is houstonh@usc.edu; please include GEOL105 in the subject.

TAs:

Name	TBA
E-mail (@usc.edu)	xx

Course Description

(Note individual e-textbook purchase is required, see below)

Welcome to GEOL105, "Planet Earth." This course provides an introduction for non-geologists and non-scientists to the inner workings, origin, and history of our dynamic planet. We will learn how the Earth's internal heat drives the engine that builds mountains, moves the continents, creates the ocean basins, and produces earthquakes and volcanoes. We examine the way the circulation of the atmosphere and hydrosphere are driven by solar energy, and interact with the solid Earth to produce landscapes, erode and deposit sediment, and create environments for life and evolution. We investigate the techniques by which we can image the Earth's interior, track plate motion, and infer how the planet has evolved through time. Each step of the way we ask ourselves how we know what we know, what we don't know, and how we use the scientific method to test and validate hypotheses. This syllabus outlines the contacts, requirements, and schedule for the course. Additional information will be posted on Blackboard as needed.

Learning Objectives

After taking this course a student will be able to:

- appreciate the operation of the scientific process from observations to theories
- describe a variety of different geological processes and structures related to plate tectonics
- discuss how the major Earth systems interact
- describe the vast timeline of the Earth and many geologic processes
- understand the diverse natural hazards that occur
- evaluate the nature and limits to natural resources and how they relate to sustainability

Grading

Student grades are based on the cumulative score across five grade elements: lab section work, quizzes from the Achieve platform, participation via polls during lecture and a few assignments in Blackboard, a mid-term exam, and a final exam. The breakdown of the five grade elements is shown in the table to the right. The exam questions will be similar in style to the questions from the chapter quizzes, which are intended to help prepare you for the mid-term and final exams. Field trip not offered Spr 2022.

Grade element	Percent
Lab section work	35%
Chapter Quizzes in ebook platform	20%
Participation in lecture - polls, quizzes	5%
Midterm exam	15%
Final exam	25%
Total	100%

Required e-Textbook

Course will follow the material in *Understanding Earth* by John Grotzinger and Tom Jordan (W.H. Freeman and Company). Because we will be using new adaptive quizzing technology from Macmillan, only a current e-textbook is acceptable (see next section). They are listed at the USC Bookstore and can be purchased from them. They can also be purchased directly from Macmillan (**use your official USC name and email**). The chapters in *Understanding Earth* that cover the material presented during each lecture are listed in the weekly schedule.

Achieve Read and Learn Platform

This is a new web platform from Macmillan Learning that provides an ebook version of our textbook and also administers adaptive quizzes. **Individual purchase is required. Please do not sign up for the course if you do not wish to purchase the ebook (note returns are allowed within 14 days). Only the two options which include the ebook and the Achieve Read and Practice quiz platform (\$63 or \$76 to add a looseleaf book as well) are acceptable.** This can be purchased at USC Bookstore or directly from Macmillan online. Any financial aid that covers regular textbooks also covers Achieve Read and Practice. To purchase it with financial aid, buy it from the USC Bookstore.

For each chapter assigned, students will receive either full credit for completing the chapter quiz by the assigned due dates or no credit. I estimate that this may take 2 - 2.5 hours for each chapter. The quiz gives hints, and adapts to your previous answers and is thus different for each student.

Should you require assistance with Achieve Read and Practice, due to the fact that they may require specific user information to troubleshoot your issue, please contact their Support Team directly via this form: <https://macmillan.force.com/macmillanlearning/s/contactsupport>, or by calling (800) 936-6899.

Attendance Policies

Attendance at lecture is strongly encouraged, but not required. Questions are encouraged. Lectures will be recorded on Zoom. Participation credit will be assessed based on your response to PollEverywhere questions, and can only be earned during class periods. Attendance at Lab section is required (see below).

Lab Sections

Lab sections will start the second week of class. Your TA will provide you the lab syllabus on your first day of lab. Attendance at lab section is required. More than two lab absences will result in an automatic No Pass. To discuss the possibility of changing your lab section, please contact your TA. Note that the Field Trip will not be offered in Spring 2022.

Exams

The two examinations will evaluate student comprehension of material covered in the lectures and textbook. It will be valuable for students to be very familiar with our course materials. The questions that will be asked on the exams will be multiple choice and similar in style to the Achieve quizzes, which should help students prepare for the exams. The exam dates and the material covered are:

- **Midterm exam** will be given in class on Wednesday March 2nd; it will cover the material presented in lectures and associated textbook chapters from the start of the class through February.
- **Final exam** is scheduled for Wednesday May 9th 11:00AM-1:00PM; the exam will focus on the second half of the course, but concepts draw on your knowledge from the whole course as USC final exams are expected to be summative assessments.

Doing well in the course

To do well in the course, you are advised to attend class and lab regularly, take notes in class, read the text, complete the Achieve Read and Practice quizzes, and review. Lectures will be recorded and .pdf versions of the lecture slides posted on Blackboard. This survey course is based on an excellent textbook, which students are advised to read and consult. The exams will be multiple choice questions.

The lab section work and the chapter quizzes in Achieve Read and Practice constitute large parts of your grade, so completion of these activities is key to achieving a good grade.

Assessment/Grading Policy

Each student will receive a final grade based on their scores out of the total number of points possible. The grading curve will have an approximate distribution of 30% A, 40% B, 25% C. The curve will be determined once all exams, quizzes, and lab work have been completed. At least 50% of the total possible points is required to pass the course with a C or better.

Pass/No Pass: the cut-off for Pass/No Pass is anything greater or equal to a C- letter grade. Additionally, more than three lab absences will result in an automatic No Pass.

Extra Credit

The only opportunity for extra credit is a 3-page essay. This opportunity will be made available to all students during the last third of the class (after the mid-term but before the final exam). The subject of the essay and its format will be announced in lecture and posted on Blackboard. The essay will be graded on a credit/no-credit basis. If the essay quality is sufficient, this will provide a one-third letter grade boost after the curve (i.e. from a B+ to an A-).

No other extra credit opportunities will be available.

Make-ups

If you have to miss an exam because of illness or an academic conflict, you must inform the instructor by email as soon as possible, and provide documentation. Make-ups of examinations will, in general, **not** be permitted except for extraordinary circumstances (e.g., documentable conflicts with other USC-related commitments).

Student Accessibility Services

Students requesting academic accommodations based on a disability are required to register with Office of Student Accessibility Services (OSAS) each semester. A letter of verification for approved accommodations can be obtained from OSAS. Please be sure the letter is delivered to me as early in the semester as possible. OSAS is located in Rm 120 Grace Ford Salvatori Hall, and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number is (213) 740-0776; email is ability@usc.edu. The website is osas.usc.edu

Meet Professor Houston

My research has focused on earthquakes and faults. In particular, I have studied subduction zones where one tectonic plate dives beneath another. These zones are the sites of the largest earthquakes and the most explosive volcanic eruptions, as well as landslides and tsunamis. I have also focused on determining the strength of and stress on faults by integrating different types of earthquake data, studying the San Andreas Fault and the fault responsible for the magnitude 9 2011 Japan quake.

In addition to promoting more understanding of geology and its implications for living sustainably on Planet Earth, I hope to instill a sense of the vast ranges of Earth processes and their timing, for example from a second of fault rupture to million or billions of years of geological evolution of a continent.

I am excited to share this knowledge with you. You can contact me at houstonh@usc.edu or through Blackboard.

Your TA is a graduate student geoscientist undertaking current research. Ask us about our research or about topics in the news or relevant to your future ambitions.

Course Schedule

Week/Date	Lecture Topic	Book Chapter
1 Jan 10	Intro to GEOL 105 and Earth Systems	1
1 Jan 12	Earth Systems: Layered Earth, Interacting Components	1
1 Jan 14	Plate Tectonics: Evidence for Drifting Plates	2
2 Jan 17	MARTIN LUTHER KING DAY	
2 Jan 19	Plate Tectonics: Subduction, Rifting, and Transforms	2
2 Jan 21	Earth Materials: Minerals and Rocks	3
3 Jan 24	Earth Materials: Classes of Minerals, Rock Cycle	3
3 Jan 26	Igneous Rocks: Cooled from Melts, Crystal Texture	4
3 Jan 28	Igneous Rocks: Magma and Intrusions, Plate Tectonics	4
4 Jan 31	Volcanoes: Lavas and Other Volcanic Deposits	5
4 Feb 2	Volcanoes: Eruptive Styles and Global Patterns	5
4 Feb 4	Sedimentary Rocks: Deposited by Flowing Water/Air	6
5 Feb 7	Sedimentary Diagenesis: How Does Sand Become a Rock?	6
5 Feb 9	Metamorphic Rocks: Altered by Heat and Pressure	7
5 Feb 11	Metamorphic Rocks: Textures, Grade, and Plate Tectonics	7
6 Feb 14	How Do Rocks Deform?	8
6 Feb 16	Deformation Structures and Styles	8
6 Feb 18	NO CLASS	
7 Feb 21	PRESIDENT'S DAY	
7 Feb 23	Geologic Time: Reconstructing Geologic History	9
7 Feb 25	Geologic Time Scale: Relative and Absolute Ages	9
8 Feb 28	Structure of North America	21*
8 Mar 2	MIDTERM EXAM	—
8 Mar 4	Earthquakes: Where, Why, and How	10
9 Mar 7	Earthquake Hazards	10
9 Mar 9	Exploring Earth's Interior Layers with Seismic Waves	11
9 Mar 11	Earth's Magnetic Field and the Geodynamo	11
	SRING BREAK	
10 Mar 21	The Formation of Earth's Layered Structure	20*
10 Mar 23	The Climate System: Components of the Climate	12
10 Mar 25	The Climate System: Greenhouse Effect	12
11 Mar 28	The Carbon Cycle	12
11 Mar 30	Weathering and Erosion	16
11 Apr 1	Landslides and Landscape	16
12 Apr 4	The Hydrologic Cycle: Humidity, Rainfall, and Landscape	17
12 Apr 6	Groundwater Table, Groundwater Flow, and H ₂ O Quality	17
12 Apr 8	Stream Forms and Drainage Networks	18
13 Apr 11	How Streams Transport Sediments, Floods	18
13 Apr 13	Coastal Processes and the Shaping of Shorelines	19*
13 Apr 15	Hurricanes and Storm Surges	19*

14 Apr 18	The Growth of Civilization	13
14 Apr 20	Energy Resources: Fossil Fuels and Alternatives	13
14 Apr 22	The Rise of CO ₂	14
15 Apr 25	Types of Anthropogenic Global Change	14
15 Apr 27	Climate Change, CO ₂ , and Ocean Acidification	14
15 Apr 29	Review	—
May 9	FINAL EXAM 11:00AM - 1:00PM	

We will cover parts of all chapters in *Understanding Earth, Ed 8* except Ch 15&22
 * means only part of chapter is assigned

Academic Misconduct:

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