

General Geology, GEOL 109 (CRN 25135) Spring 2016

*This course satisfies 4 units of the GE requirement for AREA B: Science (Physical Universe)

LECTURES: Tuesdays and Thursdays 11-12:20pm in Founders Hall 25
INSTRUCTOR: Jasper Oshun
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OFFICE: Founders Hall 162

OFFICE HOURS: Tuesday 2:30-4:00, Wednesday 12-1:30 pm, or email me to make an appointment
LABS: Wednesday or Thursday: 2-4:50pm in Van Matre Hall 107
Wed Lab instructor: Jasper Oshun
Th Lab Instructor: Jay Patton: Jason.Patton@humboldt.edu

CATALOG DESCRIPTION

Origin and constitution of the earth, internal and external processes that determine crustal and surficial features, and methods in investigating and interpreting Earth history. [Prereq: ELM score of 42 or higher. Weekly: 3 hours lecture, 3 hours lab. GE]. You should expect to spend 4-6 hours a week outside of class and lab to keep up with this class.

INTRODUCTION

Welcome to GEOL 109! Geology is the study of the Earth, its composition, structures, and the processes that act both on the surface and at depth. In this class, you will gain an understanding of deep geologic time. We will explore the rock record, the processes that build mountains and the processes that tear those mountains down, and shape the land forms that we see. Through lab and field experience, you will learn to “think” like a geologist. Like a detective, you will be able to interpret clues in the natural world that allow you to construct a story of what happened, and why. I hope that you also leave this class with a greater appreciation of our natural world. You will then gain a responsibility to be community leaders who promote sustainability, and communicate your understanding of natural hazards.

The material covered in this course is very broad. The unifying themes are geologic time and the “Dynamic Earth”. Over its 4.5 billion year old history, the one constant on this Earth has been change. Humboldt County is an ideal setting to explore this dynamism due to our location at the borderline between two massive tectonic plates of the Earth’s crust known as the Gorda Plate and the North American Plate. These plates, one thousands of miles wide and tens of miles thick and the other considerably smaller, are in a state of lasting collision shifting past one another at a rate of about an inch per year. The consequences of this collision and shifting includes earthquakes, tsunamis, mountain building, magma generation, volcanic eruptions, landslides, and even the formation of valuable natural resources like gold and chromium. We will take advantage of this natural laboratory through **four** field trips.

REQUIRED TEXTBOOK

Marshak, “Essentials of Geology” 4th Edition (3rd edition may also be used). It will be your responsibility to stay current with reading if you chose to purchase an earlier edition.

OTHER REQUIRED MATERIAL

You will need the following items for the laboratory component of this class: A pencil, eraser, ruler (with both inches and cm), colored pencils (at least 5 different colors), protractor, and calculator. A [hand lens](#) and small pocket knife will also be useful.

I will use Moodle to post announcements, lecture notes, required reading, changes to the schedule, supplementary reading assignments, and online quizzes. You can also find a copy of the syllabus on Moodle.

STUDENT LEARNING OBJECTIVES

This course meets the requirements of Lower Division Science GE Outcomes for Life Forms and the Physical Universe (Area B). The learning objectives for this GE requirement are:

1. Apply scientific concepts and theories to develop scientific explanations of natural phenomena.
2. Critically evaluate conclusions drawn from a particular set of observations or experiments.
3. Demonstrate their understanding of the science field under study through proper use of the technical/scientific language, and the development, interpretation, and application of concepts.

The course learning objectives for this class include:

1. Develop an understanding of 4 dimensional time.
2. Gain an ability to apply classroom geologic principles to field understanding. Students will be able to “read” the landscape and understand the processes responsible for the observed form.
3. Develop and practice your own critical thinking skills, including understanding a geological question and why it is important to solve, utilizing language and terminology appropriate for the geology discipline, making observations and collecting data, interpreting and evaluating data, and drawing relevant conclusions.
4. Describe how geological phenomena (e.g., plate tectonics, earthquakes, volcanic eruptions, mass wasting) occur and assess the risk they pose to society.
5. Evaluate how commonly observed rocks and minerals (e.g., granite, basalt, quartz) form as well as how geologists use stratigraphic and isotopic information to determine the relative and absolute ages, respectively, of geologic units.
6. Describe the origins and occurrences of natural resources (e.g., fossil fuels, geothermal resources, water resources, metal/mineral resources).
7. Learn the processes that shape and maintain the natural world. Become a responsible steward of the environment.

COURSE EXPECTATIONS

You will achieve the learning goals listed above so long as you and I agree to do the following:

1. I will present material as clearly as I can, respond to questions and concerns sincerely and quickly, develop quizzes and exams that assess your understanding of that material from lecture and reading, and grade your work fairly and promptly.
2. You will **come to class** every day, take notes, share your ideas, and ask questions. If you would like to revisit concepts in a one-on-one setting, visit me during office hours.
3. You will **read the assigned material before class**, as class lectures will focus on specific topics from assigned reading in greater depth. Assigned reading will serve as the foundation on which we will base in-class discussions.
4. You will **complete assignments in a timely manner**, as you will get the most out of this class if you turn your work in on time.
5. You will utilize the **Canvas class page** for this course and your **HSU email address**. Although all announcements I make in class trump Canvas posts, course information, supplementary reading,

homework information, and lectures will be posted on Canvas throughout the semester. And, your email address is the most convenient and time efficient form of communication that I use to make important announcements. I expect you to check your HSU email regularly.

ASSIGNMENTS AND GRADING

Class Engagement (10%)

We will have in-class activities, in class problems, and clicker quizzes during the course as a means of evaluating your understanding of the material covered in the textbook, and lecture. Some of these will be individual activities and some will require you to work in small groups. *You must attend class in order to complete these assignments.*

Exams (45%)

You will take 3 exams during the course (2 mid-terms and 1 final exam). The mid-term exams – each worth 14% of your grade – are not cumulative in nature in that they will test your knowledge of the material presented since the start of class or since the last exam. The final exam –worth 17% of your grade – will be weighted on the last few weeks of the semester, but will include material from the first two mid-terms. All exams will be closed-note and closed-book. Exams will be composed mostly of short answer, short essay, and problem solving questions that may require mathematical calculations, interpretation of graphs, conceptual/schematic drawings. Some multiple-choice and matching questions may be used too. No restroom breaks are allowed during exams – please take care of business beforehand.

Laboratory (45%)

Geology is a hand-on and field-based science, which means geologists commonly make their observations and develop hypotheses to test while examining rocks and minerals, geologic maps, and real-world outcrops as opposed to while listening to a lecture! You too will make observations and gather data as a means of understanding a variety of geological topics during your laboratory portion of the class. FOUR required field trips will also be a part of your laboratory schedule. Field trips will occur during the scheduled lab time. No make-ups for missed field trips. No exceptions.

CLASSROOM ETIQUETTE

Classroom etiquette will be considered during the grading process. Students are expected to participate in this class (e.g., attend every class and contribute to discussions either in class or during office hours) in a respectful manner. This means that everyone should respect those around you as well as the embodiment of the class itself. Disruptive behavior, such as talking, texting, ringing cell phones, arriving late to class, or whatever detracts from the learning experience of you and your classmates and will not be tolerated. Folded and incomplete assignments are a poor reflection of you as a student and are often lost – so all multi-paged exercises need to be stapled by the student prior to coming to class – there is not a stapler in the lecture hall.

ACADEMIC INTEGRITY & STUDENT NEEDS

Academic dishonesty includes such things as cheating and plagiarism. Students found guilty of committing academic dishonesty on a quiz, homework, field trip, or exam will be reported to the HSU Office of Student Rights and Responsibilities. It is your responsibility to become familiar with the academic integrity guidelines described in HSU's [Academic Honesty Policy](#). Information about students' right to accommodations for documented special needs is available through the [HSU Student Disability Resource Center](#). Students seeking accommodations must document their needs with the HSU Student Disability Resource Center office before submitting requests to me.

GEOLOGY 109 CLASS SCHEDULE

DATE	LECTURE TOPIC	TEXT READING	LAB TOPIC
1/19	Course Outline: studying the Earth	Read Syllabus, P.1-P.3	<i>No Lab</i>
1/21	Earth's Interior, Isostasy, Plate Tectonics	Ch. 1 (26-31), Ch. 2 (35-52) & Ch. 4 (100-geotherm)	
1/26	Plate Boundaries, Hot Spots, and Spreading Centers	Ch. 2 (52-67)	Field Trip Mad River FZ (Field Geology, Plate Tect. Thrust Faults, River Migration)
1/28	Earth's Materials: Minerals and Rocks	Ch. 3 (71-82) & Ch. 4 (89-94)	
2/2	The Rock Cycle and Sedimentary Rocks	Interlude C (210-215), Ch. 6 (163-179)	Minerals
2/4	Stratigraphy: Deciphering the Rock Record, and Geologic Time	Ch. 10 (305-324)	
2/9	Earth's Internal Heat, Volcanism and Volcanoes	Box P.1 (4), Ch. 4 (97-105), & Ch. 5 (132-140)	Igneous Rocks
2/11	Melting Relations of Rocks and Minerals	Ch. 4 (105-115)	
2/16	Origin of Magma Types	Ch. 5 (119-132)	Sedimentary/Metamorphic Rocks
2/18	Brittle vs. Ductile Deformation	Ch. 9 (265-278)	
2/23	Metamorphism	Ch. 7 (189-207)	Field Trip Trinidad Beach (Rock and Mineral Identification, Geologic History Reconstruction)
2/25	EXAM #1		
3/1	Gravity Anomalies, and the Earth's Magnetic Field	Interlude D (253-263)	Topographic Maps
3/3	Earthquakes and Seismic Waves	Ch. 8 (217-236)	
3/8	Earthquake Hazards and Earthquake 'Prediction'	Ch. 8 (237-249)	Topographic Maps/Cross Sections
3/10	Tectonics at Plate Boundaries	<i>Review Ch 2 (52-67), Interlude C (210-215), & Ch. 9 (270-273)</i>	
3/15-3/17	<i>No class – Spring Break</i>		
3/22	Mountain Building Processes	Ch. 9 (279-289)	Geologic Maps/Cross Sections
3/24	Chemical & Physical Weathering, & Soils	Interlude B (150-161)	
3/29	Mass Extinction and the Fossil Record	Interlude E (293-303)	<i>No Lab</i>
3/31	<i>No Class – Cesar Chavez Holiday</i>		
4/5	Earth History, & Relative and Absolute Dating	<i>Review Ch. 10 (305-324), & Ch. 11 (328-348)</i>	Field Trip Elk Head (Faults and geologic contacts)
4/7	Glaciers, and Ice Ages	Ch. 18 (515-538)	
4/12	Causes of Climate Change, and the Anthropocene	Ch. 18 (538-541) & Ch. 19 (551-564)	Hydrology
4/14	EXAM #2		
4/19	The Hydrologic Cycle	Interlude F (390-394), & Ch. 14 (438-439)	Field Trip Mad River (Geomorphology)
4/21	Oceans and Ocean Continent Interactions	Ch. (445-465)	
4/26	Runoff Generation and Darcy's Law	Ch. 14 (417-422) & Ch. 16 (Box 16.1)	<i>No Lab – Study for Lab Final</i>
4/28	Groundwater Flow and Contamination	Ch. 16 (473-481 & 484-486)	
5/3	Landslides, Mass Wasting	Interlude F & Ch 13 (398-410)	Lab Final (Maps, structures, surface processes)
5/5	Water Resources and Eco-hydrology		
5/10	FINAL EXAM Tuesday, 5/10 10:20-12:10pm		