

GEO 101: PLANET EARTH

ACADEMIC SYLLABUS

Faculty: Francis Sousa

Contact Info: francis.sousa@oregonstate.edu ***FOR ALL COURSE RELATED EMAILS, YOU MUST INCLUDE GEO 101 IN THE EMAIL SUBJECT LINE***

Lecture TR 14:00-15:20, Milam Hall Auditorium Room 026, CRN 12726

Laboratory 1:50 per week per lab section, various times, various CRN

Office Hours: W 13:00-14:00 in Wilkinson Hall 258, or by appointment

Catalog Course Description:

Explores our planet. Discovers Earth's natural wonders, from the deepest oceans trenches to the highest mountain peaks; examine processes that mold the natural environment; experience the relevance of earth science concepts to daily life including volcanoes, earthquakes, the formation and use of earth resources, and global environmental change.

No Prerequisites

Core Education Scientific Inquiry and Analysis Course

This is a Core Education course that fulfills the requirements for the Scientific Inquiry and Analysis category. In addition, this course also fulfills the Baccalaureate Core requirements for the Perspectives category under Physical Sciences with Lab. It does this by motivating topics through a student relevance perspective and leveraging this to develop an understanding of fundamental concepts and theories, apply scientific methodology, and highlight connections with other subject areas.

Core Education Category Learning Outcomes:

- Utilize scientific language, concepts, hypotheses, theories, and laws of basic natural sciences. Plate tectonics is a scientific theory that provides our conceptual framework for how the Earth works. Students in GEO 101 learn how plate tectonics operates and why it explains the occurrence of earthquakes, volcanoes, and related geologic phenomena. GEO 101 also emphasizes the study of mineral and rocks and how observations of their chemical (composition) and physical (texture) characteristics provides insight into the geologic processes that formed them, thereby providing a record of earth processes and change over time. A third focus of GEO 101 is the study of geologic time, emphasizing the relative and numerical techniques used to determine the age of rocks and the fossils they contain and the evidence that leads to the conclusion that the Earth has a very long history. This outcome is primarily assessed through quiz and exam questions that require students to use scientific language, theoretical concepts, and theories and laws of earth science to explain geologic phenomena.
- Apply the cyclical process of science and think critically by constructing consistent explanations and drawing conclusions based on empirical evidence and current scientific understanding. Geology is grounded in the scientific method, emphasizing the methods we use to gain knowledge by making observations, evaluate and analyze that evidence, hypothesize or develop explanations, identify assumptions, distinguish verifiable facts from speculation, and recognize inconsistencies in evidence and reasoning. In geology the need for evidence is made more acute by the fact that earth processes often operate too slowly for direct observation or operate in Earth's interior where they are not directly accessible to us. These limitations require us to be more creative and deductive in how we gather our evidence. Throughout this course not only what we know about how we know is emphasized because in science if one cannot explain how we know something, then we don't really know it. The skills needed to make observations about the natural world are stressed in lecture and lab. Laboratory exercises emphasize a weekly iterative scientific process of making observations or measurements and using those test hypothesis and make interpretations or draw conclusions. Students are asked on quizzes and

exams to synthesize these observations as evidence of how Earth processes operate using the clues these processes leave behind. This learning outcome is primarily assessed through the weekly laboratory video response exercise, where students are asked to engage with the scientific method, make interpretations of their observations and draw conclusions about the analysis they just completed. Additional assessment occurs through quiz and exam questions that require students to explain the conceptual framework that underpins the conclusions we can draw from geological observations.

- Articulate the consequences and implications of science for society, daily life, and decision-making. Throughout the course, we also emphasize the application of geologic knowledge to living with potentially hazardous geologic processes of societal interest in the Pacific Northwest, such as earthquakes on the Cascadia Subduction Zone and eruptions of Cascade volcanoes such as Mount Hood and Mount Rainier. Students will also develop an understanding of the occurrence and distribution of earth resources through geology, and how we use geologic knowledge to meet society's need for resources and the limitations that exist in these resources. Student achievement is measured primarily through written peer review reflections that require them to articulate the consequences of their peers scientific inquiries by responding to guiding questions about the implications of science for society, daily life, and decision making. For example, during the week on geohazards, questions focus students on the societal risk and decision making implications of Cascadia subduction zone earthquakes. During the week on mineral resources, questions ask students to consider the justice implications of resource extraction and weigh the pros and cons for society.

Course Specific Measurable Student Learning Outcomes

After completing this course, students will be able to:

- Analyze and interpret concepts and theories of basic physical sciences. This will be assessed through weekly online quizzes, two midterm exams and one final exam.
- Utilize the scientific method and demonstrate the ability to draw conclusions based on observation, analysis, and synthesis. This will be assessed through weekly online quizzes and laboratory video responses.
- Evaluate and communicate results of the scientific method. This will be assessed through weekly laboratory video responses and peer review reflection.

Evaluation of Student Performance

Learning outcomes will be measured using the following metrics:

- Quizzes → 100 points total: on Canvas will evaluate student ability to recognize and apply key concepts, apply scientific methodologies, and draw conclusions, and demonstrate the connections with other subject areas
- Laboratory → 250 points total: will focus on documenting and reflecting on the experiential practice of each lab, applying the scientific method each week, and communicating results in video and written format.
- Exams will evaluate student utilization and application of key concepts, application of scientific methodology and demonstration of ability to draw conclusions.
 - Midterm Exam 1 → 200 points: Limited to Lecture topics covered to date (OCT. 22)
 - Midterm Exam 2 → 200 points: Limited to Lecture topics covered to date (NOV. 19)
 - Final Exam → 250 points: Cumulative including all Lecture topics (TBD Registrar)
- Total – 1000 points

Learning Resources

Supplemental readings are optional for this course using the resources at this central clearinghouse:

<https://geo.libretexts.org/Bookshelves/Geology>

Course Content

Topic 1: How Planets Form & Inside the Earth

Topic 2: Plate Tectonics

Topic 3 Mineral & Rocks

Topic 4: Volcanoes

Topic 5: Earthquakes

Topic 6: Energy Resources: The Age of Oil

Topic 7: Sedimentation; Deep Time; Age-dating

Topic 8: Mineral Resources & Climate Change

Laboratory Schedule:

Week	Topic
Week 0	No labs during Week 0.
Week 1	Lab 1: Sense of Place in the Universe
Week 2	Lab 2: Learning Google Earth Pro
Week 3	Lab 3: Exploring the Seafloor
Week 4	Lab 4: Oregon State Rocks
Week 5	Lab 5: Concept sketches
Week 6	Lab 6: Geohazards
Week 7	Lab 7: Missoula Floods
Week 8	Lab 8: Depths of Time
Week 9	Lab 9: Landscape appreciation
Week 10	Lab 10: Mineral Resources

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations."

Student Conduct Expectations link: <https://beav.es/codeofconduct>

Student Bill of Rights

OSU has twelve established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the course syllabus:

<https://asosu.oregonstate.edu/advocacy/rights>

Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at <https://oregonstate.edu/ReachOut>. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)