

Course Syllabus

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Geology 211 Physical Geology Fall 2016

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Syllabus

There is a Canvas website for this course which you can access through MyWestern. This website will contain class notes and announcements. It will also have the syllabus and reading assignments for the textbook. All information will be under "Files".

Course Goals:

Geology is not just about rocks. Earth is a dynamic planet and its processes influence our culture in ways you never dreamed of. In this course you will learn how geology affects where you build your home, how likely you are to be killed in an earthquake (and how you can survive one), what happens when a volcano erupts, why the Grand Canyon is so deep and whether we are doomed by the melting of the ice caps. You will learn about the interior and surficial processes that form mountains and canyons. You will learn about volcanoes, earthquakes and mountain ranges and how plate tectonics is an explanatory framework for these and many other geological phenomena. You will also learn how air, water and gravity have shaped the landscape.

Intended Learning Objectives (*and Skills Developed*):

1. Recognize examples of the three major rock types (igneous, sedimentary and metamorphic) based on visible physical characteristics and explain how these rocks formed. (*Look at a rock on the beach, or a photo of a rock, and formulate a brief geological history of it based on visible physical characters.*)

2. Understand the origin, distribution, and classification of volcanoes. (*Analyze a map of a volcano and predict the regional risks of blast, mudflow, lava flow and ash fall in the event of an eruption, e.g. will the town of Glacier survive if Mt. Baker erupts?*)

3. Understand the physics, distribution, origin of and damage caused by earthquakes. (*Assess the earthquake risk of a building based on type of bedrock, type of construction, and the nature of frequency of earthquakes in the region, e.g., what is the most earthquake-dangerous building in Bellingham?*)

4. Understand the role of plate tectonics as a general explanatory hypothesis for a variety of geological phenomena. (*Predict the distribution of mountains, earthquakes, volcanoes and islands that you would find in an area based on the nature of the plate tectonic boundaries, e.g., why do we have earthquakes and volcanoes but New York does not?*)

5. Understand how air, water and gravity have shaped Earth's surface. (*Describe the landscape out of the window of a car or airplane and construct a brief geological history of the area, e.g., how did the Grand Canyon form?*)

6. Understand and assess the impacts of interactions among the individual, society, and the environment. (*How do humans influence geologic processes such as coastal erosion, river dynamics and hill-slope stability?*)

Logistics:

Top Hat: We will be using an in-class app called Top Hat. You should all have received an invitation to download this free app and join the class (the **class code is 148000**). You should bring a smart phone, tablet, or laptop to class each day and sign in to the class account. I will use this app to take attendance and to

ask in-class questions. If you do not have any of these gadgets, you can submit a 3x5 index card with your name, date, and the daily attendance code.

Attendance: I will take attendance each day using Top Hat. You will be allowed 3 unexcused absences. Each additional absence will take 1% off your total class score.

Grading:

Lab is 25% of your grade, and **you must pass the lab to pass the course**. Three lecture exams (two midterms and one final, not cumulative, all of equal weight) will comprise 75% of your grade.

Taking Exams:

You will take your exams on the Canvas website. From the Home page go to “Quizzes” and there you will find a “Prequiz”, Exam 1, Exam 2 and the Final Exam. The Prequiz is a short quiz to give you an idea of the kind of questions I will ask and it also serves as a trial run if you have never taken a test on Canvas. The Prequiz can be taken at any time and does not count towards your grade. On the exam days listed in the syllabus (October 10, October 28 , and December 9) you will take the appropriate exam online at any computer with internet access. The exam will be open from 8 AM to 9 PM on that day. Once you start an exam you will have 60 minutes to complete it. At the end of 60 minutes the exam will close, whether or not you are finished. Note that the exams have a hard deadline of 9 PM, so be sure to start your exam no later than 8:00 PM on the test day. If you need more time, send me a note from drs@wwu.edu before the exam day and I will increase your time.

Daily In-Class Questions:

Each day I will write a question on the board that addresses a key part of the lecture. Many of these questions will be on the exams so make sure you know the answers to them.

Extra Credit:

You may get extra credit by writing a 500 word abstract of an article relevant to geology. Each satisfactory summary that you submit will add one percentage point to your final grade. The article can come from the technical scientific literature or from popular science magazines such as Discover, Natural History or Scientific American. The longer in-depth articles found in Science News and larger newspapers are also O.K. (check with me before hand if there is any doubt). Documents on the web are O.K. but in all cases (both print and web articles) **the original article must be at least 1500 words long. You can find out how many words in the article by copying and pasting the text into a Word document and doing a “word count” in the “Review” tab.** You are allowed a total of 6 extra credit reports. Each summary should have a copy of, or a link to, the original article. Please email the summaries to me as Word documents and in the subject line list them as “Geol 211 extra credit, number ___” . I will not accept reports after the Final Exam. This is the only extra credit opportunity available. **I do not accept extra credit after 8 AM on the day of the final exam.**

The Book:

The textbook for this course is *Essentials of Geology, 4th Edition*, by Marshak. You may buy an older edition which will be much cheaper. The textbook for this course serves as a source of background reading; to fill out what I discuss in lecture. My questions on the exams will come from my lectures and my lecture notes which will be posted on Canvas.

Canvas:

I use the Canvas website as a repository for class notes, PowerPoints, and study guides. All of these materials will be located in “Files”. I will also send emails through Canvas.

Advice:

Print out the class notes and/or PowerPoints (3-6 images per page) ahead of time and bring them to class. This way you can follow along and make notes on the sheets next to pictures that I show in class. My tests can be difficult and students often say they are more specific than they expect.

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Assignments Summary:

Date	Details
Wed Sep 21, 2016	<u>Introduction</u>
Fri Sep 23, 2016	<u>Minerals</u>
Mon Sep 26, 2016	<u>Igneous Rocks</u>
Wed Sep 28, 2016	<u>Volcanoes</u>
Fri Sep 30, 2016	<u>Volcanoes</u>
Mon Oct 3, 2016	<u>Water</u>
Wed Oct 5, 2016	<u>Weathering</u>
Fri Oct 7, 2016	<u>Sedimentary Rocks</u>
Mon Oct 10, 2016	<u>Exam 1- No class today. Take exam 1 on Canvas. Exam open from 8 AM to 9 PM.</u>
Wed Oct 12, 2016	<u>Metamorphic Rocks</u>
Fri Oct 14, 2016	<u>Geologic Time</u>
Mon Oct 17, 2016	<u>Earthquakes</u>
Wed Oct 19, 2016	<u>Earthquakes</u>
Fri Oct 21, 2016	<u>Plate Tectonics: Ocean Floor</u>
Mon Oct 24, 2016	<u>Plate Tectonics: Continental Drift</u>
Wed Oct 26, 2016	<u>Plate Tectonics: Mountains</u>

Date**Details**

Fri Oct 28, 2016	<u>Exam 2- No Class today. Take exam 2 on Canvas. Exam open from 8 AM to 9 PM.</u>
Mon Oct 31, 2016	<u>Mass Wasting</u>
Wed Nov 2, 2016	<u>Streams and Floods</u>
Fri Nov 4, 2016	<u>Groundwater</u>
Mon Nov 7, 2016	<u>Glaciers</u>
Wed Nov 9, 2016	<u>Deserts</u>
Fri Nov 11, 2016	<u>HOLIDAY</u>
Mon Nov 14, 2016	<u>Shores</u>
Wed Nov 16, 2016	<u>Planetary Geology</u>
Fri Nov 18, 2016	<u>Energy</u>
Mon Nov 21, 2016	<u>No Class</u>
Wed Nov 23, 2016	<u>Thanksgiving Holiday</u>
Fri Nov 25, 2016	<u>HOLIDAY</u>
Mon Nov 28, 2016	<u>Global Change</u>
Wed Nov 30, 2016	<u>End of the World</u>
Fri Dec 2, 2016	<u>Wrap Up</u>
Fri Dec 9, 2016	<u>Final Exam, open on Canvas from 8 AM to 9 PM.</u>

Outcomes Assessment for Geology 211

(Physical Geology)

Outcomes	Objectives (SWABAT)
1. Understand the mode of formation of the three major rock types (igneous, sedimentary and metamorphic).	1.1 Identify the major silicate minerals from hand samples. 1.2 Identify rocks in hand samples.
2. Understand the origin, distribution, and classification of volcanoes.	2.1 Describe the shape and structure of volcanoes. 2.2 Describe the eruptive styles of volcanoes.
3. Understand the physics, distribution, origin of and damage caused by earthquakes.	3.1 Predict the general likelihood of an earthquake in a geographic region. 3.2 Describe the conditions under which you can expect major earthquake damage to buildings.
4. Understand the role of plate tectonics as a general explanatory hypothesis for a variety of geological phenomena.	4.1 Describe the types of volcanoes found at different plate boundaries. 4.2 Explain the mode of origin of major mountain ranges.
5. Understand how air, water, gravity and life have shaped Earth's surface.	5.1 Describe the major parts of a river system. 5.2 Predict the nature of mass-wasting events in a given environment. 5.3 Predict the nature of weathering in a given environment.
6. Understand that the Earth is 4.5 billion years old, and that deep time is an essential aspect of the development of the planet.	6.1 Solve a radiometric dating problem.

Geology 211 (Physical Geology) provides information for the following degree/program outcomes:

	B.A. Geology	B.S. Geology	B.S. Geophysics	GUR
Outcomes	<p><i>1. Earth has a history of biological and physical change over billions of years.</i></p> <p><i>2. Earth's surface is affected by dynamic processes on a range of timescales.</i></p> <p><i>3. Earth's composition varies and these compositions provide the raw materials for the rock cycle.</i></p> <p><i>4. Earth's interior is dynamic and drives plate tectonics.</i></p> <p><i>5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.</i></p> <p><i>6. Geology and society are fundamentally inter-related.</i></p>	<p><i>1. Earth has a history of biological and physical change over billions of years.</i></p> <p><i>2. Earth's surface is affected by dynamic processes on a range of timescales.</i></p> <p><i>3. Earth's composition varies and these compositions provide the raw materials for the rock cycle.</i></p> <p><i>4. Earth's interior is dynamic and drives plate tectonics.</i></p> <p><i>5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.</i></p> <p><i>6. Geology and society are fundamentally inter-related.</i></p>	<p><i>1. Earth has a history of biological and physical change over billions of years.</i></p> <p><i>2. Earth's surface is affected by dynamic processes on a range of timescales.</i></p> <p><i>3. Earth's composition varies and these compositions provide the raw materials for the rock cycle.</i></p> <p><i>4. Earth's interior is dynamic and drives plate tectonics.</i></p> <p><i>5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet.</i></p> <p><i>6. Geology and society are fundamentally inter-related.</i></p>	<p><i>1. Analyze and communicate ideas effectively in oral, written, and visual forms.</i></p> <p><i>3. Use quantitative and scientific reasoning to frame and solve problems.</i></p>