

Syllabus
PHY 1060/GEO 1060, Earth Science/Physical Geography
Section 10879/10880
Winter 2021
MWF 9:20 – 10:27 am
Classroom: online

Instructor Steffan Puwal, PhD
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Office Hours by appointment

Required Text: Earth: Portrait of a Planet (6th edition)
 Stephen Marshak

Course (Catalog) Description:

The Earth: its structure, history, and the geography of its surface. Topics include: Minerals and Rocks, the Rock Cycle; Geologic Time; Plate Tectonics, Earthquakes and Earth's Interior, Volcanoes, Mountains; Atmosphere, Oceans, Rivers, Glaciers, Deserts; Energy Resources; the Solar System; Geology of the other Planets and their Moons.

Prerequisites: None (Although some basic algebra skills and high school science would be helpful.)

Attendance Lectures will be pre-recorded, so there will be a small amount of flexibility for when you watch them. However, it will be expected that you watch the lectures on the assigned day. Note: Exams, however, MUST be completed during our assigned class time on the day listed on the schedule.

Behavior It is expected that students know proper classroom behavior. Cheating will not be tolerated, an immediate failing grade will be given, and the instructor will move to expel the student from the university. The Oakland University policy on academic conduct will be strictly followed, with no exceptions. Please refrain from rude behavior such as side conversations, texting, ignoring the class to use your phone, or frequently arriving late. I reserve the right to lower your grade as I see fit in response.

Exams

Three exams will be given over the course of the semester. These exams cover specific chapters and labs; the exams are not cumulative.

Each exam consists of multiple choice, matching, and true/false questions. An answer sheet will be provided so that it is not necessary to purchase a scantron.

Labs

Four lab activities will be completed over the course of the semester. Labs will be uploaded to the Moodle course sharing system under the “Announcements” section for our class. A formal lab report will be required for each lab.

Lab Reports

- (1) You will write a 1 page (typed) summary of the principles being discussed in the lab activity; this will serve as your introduction to your lab report.
- (2) You must print off the lab uploaded to Moodle, which includes the data sheets, and complete it.

Due dates for each lab are listed on the tentative schedule below.

A calculator and ruler will be required for some lab activities.

A compass is required for Lab 2. As I understand it, you can borrow a compass from the Library rather than purchasing it.

Quizzes

After each chapter we will have a short quiz with a few multiple choice/true-false questions. This is designed to help you study and give you an idea of what exam questions will be like. We are discussing 14 chapters, so there will be 14 short quizzes. You only have to do 6 of these.

Grading

3 Exams	Each exam is worth 22% of your grade	3 x 22% =	66%
4 lab reports	Each report is worth 6% of your grade	4 x 6% =	24%
Quizzes	Six quiz scores will be averaged.	<u> </u>	<u>10%</u>
			100%

Attendance Lectures will be pre-recorded, so there is a small amount of flexibility for the time that you watch them. It will be expected that you watch the lectures on the assigned days. Exams, however, **MUST** be completed during our class time on the days listed on the schedule.

Grading Scale This is a tentative scale that may be revised.

Overall Percent Grade	Letter Grade	Numeric GPA Equivalent
≥95%	A	4.0
90%	A-	3.7
85%	B+	3.3
80%	B	3.0
77%	B-	2.7
73%	C+	2.3
70%	C	2.0
67%	C-	1.7
63%	D+	1.3
60%	D	1.0
<60%	F	0.0

Power Points

The lectures are power point based. These power points are available on my lab page at

<https://sites.google.com/oakland.edu/puwalnotes/home>

Tentative Schedule

<u>Date</u>	<u>Chapter & Topic</u>
1/6	- Introduction/Syllabus
1/8	1 Cosmology & the Birth of Earth
1/11	1 Cosmology & the Birth of Earth
1/13 *	1 Cosmology & the Birth of Earth
1/15	- Lab 1: Measuring the mass of a planet (Due via moodle 1/29)
1/18	Martin Luther King, Jr. Day, No class meeting
1/20	2 Journey to the Center of the Earth
1/22 *	2 Journey to the Center of the Earth

1/25		3	Drifting Continents & Spreading Seas
1/27	*	3/4	Drifting Continents & Spreading Seas
1/29	*	4	The Way the Earth Works: Plate Tectonics
2/1	-		Lab 2: Locating the Epicenter of an Earthquake (Due via moodle 2/19)
2/3	-		Movie—Nova: Japan’s Earthquake
2/5	-		Exam 1 (Chapters 1 – 4)
2/8		5	Patterns in Nature: Minerals
2/10	*	5	Patterns in Nature: Minerals
2/12		6	Up from the Inferno: Magma & Igneous Rocks
2/15	*	6	Up from the Inferno: Magma & Igneous Rocks
2/17		7	Pages of Earth’s Past: Sedimentary Rocks
2/19	*	7	Pages of Earth’s Past: Sedimentary Rocks
Winter Recess			
3/1	-		Lab 3: Rock Identification (Due via moodle 3/12)
3/3		9	The Wrath of Vulcan: Volcanic Eruptions
3/5	*	9	The Wrath of Vulcan: Volcanic Eruptions
3/8	-		Movie—Nova: Mt. St. Helens
3/10		12	Deep Time: How Old is Old?
3/12	*	12	Deep Time: How Old is Old?
3/15	-		Lab 4: Stratigraphy (Due via moodle 4/2)
3/17			Catchup Day
3/19	-		Exam 2 (Chapters 5 – 7, 9 and 12)
3/22		17	Streams & Floods: The Geology of Running Water
3/24	*	17	Streams & Floods: The Geology of Running Water
3/26	-		Movie—The Blue Planet: The Deep
3/29		18	Restless Realm: Oceans and Coasts
3/31	*	18	Restless Realm: Oceans and Coasts
4/2		19	A Hidden Reserve: Ground Water
4/5	*	19	A Hidden Reserve: Ground Water
4/7		22	Glaciers and Ice Ages
4/9	*	22	Glaciers and Ice Ages
4/12	-		Movie—Nova: Antarctica
4/14		23	Global Change in the Earth System
4/16	*	23	Global Change in the Earth System

4/19 - Climate Science Demonstration

* A short quiz will be given at the end of class on these days.

W	April 21	9:30 – 11:00 AM	Final Exam (Chs 17, 18, 19, 22 and 23 only)
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Note: The exam is not cumulative, so the exam time is only 9:30 – 11:00 AM.

Course Goals and Objectives:

This class satisfies the university general education requirement in the Natural Science and Technology (NST) Knowledge Exploration area. The learning outcomes for NST courses state that the student will demonstrate

1. knowledge of major concepts from natural science or technology, including developing and testing of hypotheses; drawing conclusions; and reporting of findings through some laboratory experience or an effective substitute (Laboratory experiences are met by either a limited number of interactive experiences, collecting and interpreting raw data, or other effective experiences such as a virtual laboratory). Requires at least 3 laboratory experiences during the course.

2. how to evaluate sources of information in science and technology.

In addition to the general-education learning outcomes, this course also includes the crosscutting capacity of Critical Thinking.

When you complete this class, you will be able to:

- identify the different regions inside the earth, and understand the scientific data that allows scientists to know the properties of each region.
- explain the origin of the earth's magnetic field, and understand the evidence in support of past magnetic reversals.
- become familiar with the main features and properties of the sea floor, including midocean ridges and oceanic trenches.
- realize that the earth's surface consists of moving plates, and that most interesting geological activity occurs at the boundaries between these plates.
- analyze the evidence supporting the hypothesis of continental drift and examine how scientists used the scientific method to test this hypotheses.
- identify the three main types of plate boundaries and explain how the role of each type of boundary in the theory of plate tectonics.
- relate the location and distribution of mountain belts, volcanos, earthquakes, and coastal features to plate boundaries.

- identify types of faults and explain under what conditions each originates.
- know the history of several of the earth's largest recent earthquakes, volcanic eruptions, mass wasting events, and floods.
- know the major eras during the history of the earth.
- determine the relative age of rock formations using the principles of superposition and cross-cutting relationships.
- calculate the absolute age of a rock using isotopic dating.
- analyze the evidence supporting the theory of evolution, and learn what types of plants and animals lived during the major eras of earth's history.
- examine the evidence supporting the hypothesis that a meteor impact caused the dinosaurs to go extinct.
- study the periodic table and how atoms bond to form molecules.
- learn the structure of several silicate minerals.
- state the rock cycle and the three main types of rocks.
- understand how volcanic gases can influence the earth's climate.
- appreciate the impact of dams on rivers.
- know the relative amount of water in the oceans, glaciers, ground, and lakes and rivers.
- understand how the worldwide air circulation influences the location of deserts.
- examine the evidence supporting the hypothesis that glaciers once covered much of the earth, and show how experiments tested this hypothesis.
- learn how the most recent ice age created the Great Lakes and other geological features in Michigan.
- learn how the burning of hydrocarbons may influence global warming.
- realize how limited is the supply of oil, and examine possible alternative sources of energy.