Syllabus

PHY 3070 Geophysics, 4 credits
CRN 45444
Winter 2020 MWF 2:40 – 3:47 PM
Classroom: 102 Hannah Hall

Instructor Steffan Puwal, PhD
186-D MSC
smpuwal2@oakland.edu
Office Hours: TBD

Texts

Required: *Fundamentals of Geophysics, 3rd Edition*
William Lowrie & Andreas Fichtner
ISBN 978-1-108-71697-0

Select sections will be provided, as needed, from the following texts…

General Geology: *Earth: Portrait of a Planet*
Steven Marshak

Planetary Geology: *Explorations: An Introduction to Astronomy*
Thomas T. Arny & Stephen E. Schneider

Historical Geology: *Historical Geology*
Reed Wicander & James S. Monroe

Course Description

The application of physics concepts to the study of Earth, gravity and its anomalies, geomagnetism, earth-sun energy, geochronology and seismic wave propagation.

Course Objective

To apply physics to planetary science.

Grading

Exams: 3 Exams (not cumulative)
25% of your grade, each

Labs: Three (3) in-class labs
6% of your grade, each

Term Paper: 5 page paper outlining recent advances in paleontology and how it relates to the movie *Jurassic Park*.
7% of your grade

Grading Scale:

96%	A	81%	B-	64%	D+
93%	A-	77%	C+	60%	D
89%	B+	72%	C		
85%	B	68%	C-		

Syllabus

Prerequisites
At least one semester of general science (physics, chemistry, or biology) and a semester of introductory calculus will be assumed. If you are familiar with the derivative, you should be fine.

Course Content
This semester, the course will primarily focus on petrology (rocks and minerals), earth as a planet (the dynamics of motion), seismology (elastic wave propagation and earthquakes), and physical methods in historical geology.

Attendance
Attendance is required for labs. No make-up grade will be permitted for labs, except for military or medical reasons. Repeated absences from lectures may result in a lowering of your grade, particularly if you are not doing the work required of you.

Tentative Schedule
This schedule is highly tentative and subject to change. If we progress through the material at a slower pace, we will omit sections; if we progress faster than anticipated, we may cover additional material.

Day	Date	Topic
F	9/2	Introduction; Syllabus
M	9/5	Labor Day; No class
W	9/7	1 The Solar System (Kepler's Laws)
F	9/9	1 The Solar System (Kepler's Laws)
M	**9/12**	**Lab: Measuring the Mass of a Planet**
W	9/14	A.6 Earth / 2 Plate Tectonics
F	9/16	A.6 Earth / 2 Plate Tectonics
M	9/19	M.5 Mineralogy
W	9/21	M.5 Mineralogy; M.6 Igneous Petrology
F	9/23	M.6 Igneous Petrology; M.7 Sedimentary Petrology
M	9/26	M.7 Sedimentary Petrology
W	9/28	M.8 Metamorphic Petrology
F	9/30	M.8 Metamorphic Petrology
M	**10/3**	**Exam 1**
W	10/5	3.2 – 3.3 Gravity, Centrifugal Force, Lunar & Solar Tides
F	10/7	IN Buoyancy; 4.3.2 Isostasy
M	10/10	Vector Calculus Review: Div, Grad, Curl, and Tensors
W	10/12	Vector Calculus Review: Div, Grad, Curl, and Tensors
F	10/14	5.1 Elastic Deformation
M	10/17	Appendix A, 6.1 – 6.2.2.2 Seismology and Elastic Waves

Syllabus

W	10/19	Appendix A, 6.1 – 6.2.2.2 Seismology and Elastic Waves
F	**10/21**	**Fall Break; No class**
M	10/24	M 10 A Violent Pulse: Earthquakes
W	**10/26**	**Lab: Locating the Epicenter of an Earthquake**
F	**10/28**	**Exam 2**
M	10/31	8 – 8.4.5 Geochronology
W	11/2	8 – 8.4.5 Geochronology
F	11/4	8 – 8.4.5 Geochronology
M	11/7	M.12 Deep Time: How Old is Old
W	11/9	M.12 Deep Time: How Old is Old
F	11/11	W.15 Life in the Mesozoic
M	**11/14**	**Lab: Isochron Plots and Geochronology**
W	11/16	10.2 Electrical Principles
F	11/18	10.3 Electrical Properties of Earth; 10.4 Natural Potentials and Currents
M	**11/21**	**Movie: Jurassic Park**
W	**11/23**	**Movie: Jurassic Park**
F	**11/25**	**Thanksgiving Break; No class**
M	11/28	11.1 Magnetism; 11.2 Geomagnetism; 11.3 Magnetic Fields of the Sun, Moon, and Planets; 12.1 Rock Magnetism
W	11/30	Magnetism (ctd)
F	12/2	Magnetism (ctd)
M	12/5	Review; Catch-up Day

Thursday December 8 3:30-5:00pm Final Exam

In the above tentative schedule, the text used is Lowrie's Geophysics unless otherwise noted as follows: A = Arny & Schneider's Explorations; IN = Instructor Notes; M = Marshak's Earth; W = Wicander & Monroe's Historical Geology
You do not need to purchase these additional texts.