

GEOLOGY 111 - PRINCIPLES OF GEOLOGY - FALL 2011

LECTURES: MWF 12:00 am **LAB:** W 2-4 pm OR Th 8-10 am OR Th 2-4 pm

FACULTY: Peter Crowley 310 ESMNH, x2715 Office Hours: open door (and for homework Th 1-2 pm)
Dave Jones 312 ESMNH, x2714

TEXT: *Earth: Portrait of a Planet*, S. Marshak, ISBN 0-393-97423-5, W.W. Norton and Company – THIRD Edition (2nd ed may be used)

COURSE REQUIREMENTS:

LABS: Labs, including write-ups, can be completed within the lab period. Lab write-ups are informal but will be handed in and checked. The lab sequence will include 4 rock and mineral identification quizzes. Some of our regular labs will be field trips, weather permitting. You should routinely bring adequately warm outer clothing and heavy footwear to lab, as some of these trips may be spontaneous. (10% of final grade)

FIELD TRIPS: Geology 111 includes one all-day field trip, tentatively scheduled for Sunday, October 23. The field trip is an integral part of the course and attendance is required. (5% of final grade)

EXAMS: There will be 3 one-hour exams in this course.

EXAM I:	FRIDAY, OCT 7	Covers lectures, reading, and labs from Sept 7-Oct 5.	(15% of final grade)
EXAM II:	MONDAY, NOV 14	Covers lectures, reading, and labs from Oct 12-Nov 9.	(15% of final grade)
EXAM III:	WEDNESDAY, DEC 14	Covers lectures, reading, and labs from Nov 11-Dec 12.	(15% of final grade)

HOMEWORK: Each week there will be a homework exercise designed to help you consolidate new material and integrate new ideas into your growing knowledge base. Plan for 1-2 hours per week for homework. Exercises will be given out on Fridays and due the following Friday. (10% of final grade)

FINAL PROJECT: The course culminates in an integrated geologic analysis that synthesizes all you have learned. The project is done in teams of 2 or 3. Project materials are available from Nov 30 to Dec 21 and the project is due at 10:00 AM on Thursday Dec 22. (30% of final grade)

COURSE EXPECTATIONS:

ATTENDANCE: Class, Lab, and Field Trip attendance is required. Absences must be discussed with the professor.
On-time arrival for lectures and labs is an important courtesy.

READING: Whether reading assignments are completed immediately before or immediately after the related lecture is a personal choice. Do what seems to serve you best. Whether or not to do the reading, however, is not a choice. Reading assignments are required. Failure to do so will adversely affect your performance in the class.

WRITTEN ASSIGNMENTS: Lab write-ups are due at the end of lab. Homework must be completed on time. Labs, homework exercises, and the final project are intended to be collaborative but all write-ups must be your own, individual work.

DATE	LECTURE	TOPIC	READING
<u>GEOLOGIC FUNDAMENTALS</u>			
W-Sept 7	1	Course introduction: Gross Earth Structure	Chapter 2
F-Sept 9	2	Geologic Fundamentals: Silicate Minerals and Rocks	Chapter 5; Interlude B; Appendix A
M-Sept 12	3	Geologic Fundamentals: Melting, Partial Melting and Crystallization	Sections 6.2-6.3
W-Sept 14	4	Geologic Fundamentals: Rock Rheology, Flow in the Solid State, and Isostasy	Section 4.2; Sections 11.3 & 11.7; Box 4.1
F-Sept 16	5	Geologic Fundamentals: Plate Tectonics and the Dynamic Earth	Chapter 4
M-Sept 19	6	Geologic Fundamentals: The Rock Cycle and Geologic Time	Interludes B&C, Section 12.7 Fig 12.24
<u>EARTH SEISMICITY</u>			
W-Sept 21	7	Seismicity I: Earthquakes and the Earth's Interior	Chapter 10; Interlude D
F-Sept 23	8	Seismicity II: Earthquake analyses; Plate boundaries	Chapter 10; Figure 4.5; Figure b.3
M-Sept 26	9	Earthquakes as Geohazards: Predictions and Predictability	Chapter 10
<u>IGNEOUS ROCKS AND PROCESSES</u>			
W-Sept 28	10	Igneous Rocks I: Magmas, Volcanoes, and Plutons	Chapter 6; Chapter 9
F-Sept 30	11	Igneous Rocks II: Igneous Rock Types	Chapter 6
M-Oct 3	12	Igneous Rocks III: Crystallization (and Melting)	Chapter 6
W-Oct 5	13	Igneous Rocks IV: Magma Evolution in the Laboratory and the Earth	Chapter 6
F-Oct 7		EXAM I <i>Covers Lectures # 1 - 13</i>	
M-Oct 10		<i>MIDSEMESTER BREAK</i>	
<u>THE SEDIMENTARY ROCK RECORD AND GEOLOGIC TIME</u>			
W-Oct 12	14	Weathering, Erosion & Detrital Particles; Sediment Transport & Sorting	Chapter 7
F-Oct 14	15	Sedimentary Rocks: Transportation and deposition	Chapter 7
M-Oct 17	16	Depositional Systems, Continental environments	Chapter 17; Sections 18.6-18.8
W-Oct 19	17	Depositional Systems, Marine environments	Chapter 12; Interlude E; Section 7.10
F-Oct 21	18	Stratigraphy and Relative Geologic Ages	Chapter 12; Interlude E; Section 7.10
<i>Sun-Oct 23</i>		<i>ALL DAY FIELD TRIP: ROCKS AND STRUCTURES IN THE APPALACHIAN CONTEXT</i>	
M-Oct 24	19	Absolute Time	Section 12.8-12.10

DATE	LECTURE	TOPIC	READING
<u>ROCK DEFORMATION AND ROCK STRUCTURES</u>			
W-Oct 26	20	Rock Deformation, Strike and Dip	Chapter 11
F-Oct 28	21	Folds and faults	Chapter 11
M- Oct 31	22	Folds and rock cleavage	Chapter 11
<u>METAMORPHIC ROCKS AND PROCESSES</u>			
W-Nov 2	23	Metamorphism I: Metamorphic Changes	Chapter 8
F- Nov 4	24	Metamorphism II: Metamorphic Realms	Chapter 8
M-Nov 6	25	Metamorphism III: Protoliths and their Metamorphic Equivalents	Chapter 8
W-Nov 9	26	Metamorphism IV: Metamorphism and Mountain Belts	Chapter 8
<u>EARTH'S MAGNETIC FIELD AND ROCK MAGNETISM</u>			
F-Nov 11	27	Magnetism I: The Earth's Magnetic Field	Section 3.5; Interlude A
M-Nov 14		EXAM II <i>Covers Lectures #14 – 26</i>	
W-Nov 16	28	Magnetism II: Field Reversals, Magnetic Anomalies, and APW paths	Chapter 3; Interlude A
<u>PLATE MOTION AND PLATE BOUNDARY PROCESSES</u>			
F-Nov 18	29	Divergent Boundaries I: MOR's and Ophiolites, Transforms	Chapter 4
<i>T H A N K S G I V I N G B R E A K</i>			
M-Nov 28	30	Transforms; Hot Spots; Plate Kinematics	Chapter 4
W- Nov 30	31	Introduction to the Final Project	
F-Dec 2	32	Divergent Boundaries II: Continental Rifting	Chapter 4
M-Dec 5	33	Continental Extension and the Continental Margin	Chapter 4; Section 18.1-18.2;
W-Dec 7	34	Convergent Boundaries I: Island Arcs and Andean Arcs	Chapter 4; Fig. b.4
F-Dec 9	35	Convergent Boundaries II: Trenches and accretionary margins	Chapter 4
M-Dec 12	36	Convergent Boundaries III: Continental collision and orogenesis	Chapter 4; Sections 11.6-11.11
W-Dec 14		EXAM III <i>Covers Lectures #27 - 36</i>	