

GEOLOGY 11 - PRINCIPLES OF GEOLOGY – SPRING 2008 – SECOND EDITION VERSION

LECTURES: MWF 12:00 noon

LAB: W 2-4 pm OR Th 8-10 am OR Th 2-4 pm

FACULTY: Tekla A. Harms
Jack T. Cheney

320 ESMNH, x2711
302 ESMNH, x2311

Office Hours: Th 4:30-5:30 for homework / everything else is open door

TEXT: *Earth: Portrait of a Planet*, S. Marshak, ISBN 0-393-93036-X, W.W. Norton and Company – THIRD Edition (1st or 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 11 includes two weekend field trips. The field trips are an integral part of the course and attendance is required.

FIELD TRIP I: SUNDAY, APRIL 13

(5% of final grade)

FIELD TRIP II: SUNDAY, MAY 4

(5% of final grade)

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

EXAM I: WEDNESDAY, MARCH 5

Covers lectures, reading, and labs from Jan 28-Feb 28.

(10% of final grade)

EXAM II: FRIDAY, APRIL 11

Covers lectures, reading, and labs from Feb 29-April 7.

(10% of final grade)

EXAM III: WEDNESDAY, MAY 9

Covers lectures, reading, and labs from April 9–May 7.

(10% 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. Project materials are available from April 30 to May 16 and the project is due at 12:00 noon on Friday, May 16.

(40% 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>			
M-Jan 28	1	Course introduction: Gross Earth Structure	Chapter 2
W-Jan 30	2	Geologic Fundamentals: Silicate Minerals and Rocks	Chapter 5; Interlude A
F-Feb 1	3	Geologic Fundamentals: Melting, Partial Melting and Crystallization	Section 6.3
M-Feb 4	4	Geologic Fundamentals: Rock Rheology & Flow in the Solid State	Section 11.3
W-Feb 6	5	Geologic Fundamentals: Plate Tectonics and the Dynamic Earth	Sections 4.1-4.5; Sections 4.8-4.10
F-Feb 8	6	Geologic Fundamentals: Isostasy	Section 4.2; Box 4.1; Section 11.9
M-Feb 11	7	Geologic Fundamentals: The Rock Cycle & Geologic Time	Interludes A&B; Section 12.8; Fig 12.24
<u>EARTH SEISMICITY</u>			
W-Feb 13	8	Seismicity I: Earthquakes and the Earth's Interior	Chapter 10; Interlude C
F-Feb 15	9	Seismicity II: Earthquake analyses; Plate boundaries	Chapter 10; Figure 4.5
M-Feb 18	10	Earthquakes as Geohazards: Predictions and Predictability	Chapter 10
<u>IGNEOUS ROCKS AND PROCESSES</u>			
W-Feb 20	11	Igneous Rocks I: Magmas, Volcanoes, and Plutons	Chapter 6; Chapter 9
F-Feb 22	12	Igneous Rocks II: Igneous Rock Types	Chapter 6
M-Feb 25	13	Igneous Rocks III: Crystallization (and Melting)	Chapter 6
W-Feb 27	14	Igneous Rocks IV: Magma Evolution in the Laboratory and the Earth	Chapter 6
<u>THE SEDIMENTARY ROCK RECORD AND GEOLOGIC TIME</u>			
F-Feb 29	15	Weathering, Erosion & Detrital Particles; Sediment Transport & Sorting	Chapter 7; Section 11.4
M-Mar 3	16	Sedimentary Rocks	Chapter 7
W-Mar 5	17	<i>EXAM I</i> <i>Covers Lectures # 1 - 14</i>	
F-Mar 7	18	Depositional Systems, Sedimentary Rock Units	Chapter 17
M-Mar 10	19	Interpreting Sedimentary Rocks	Chapter 12; Interlude D; Section 7.10
W-Mar 12	20	Absolute Time	Section 12.9-12.10
F-Mar 14	21	Stratigraphy and Relative Geologic Ages	Chapter 12; Interlude D; Section 7.10

March 17-21

SPRING BREAK

DATE	LECTURE	TOPIC	READING
<u>ROCK DEFORMATION AND ROCK STRUCTURES</u>			
M-Mar 24	22	Rock Deformation, Faults and Folds, Strike and Dip	Chapter 11
W-Mar 26	23	More Structures	Chapter 11
F-Mar 28	24	Still More Structures	Chapter 11
<u>METAMORPHIC ROCKS AND PROCESSES</u>			
M-Mar 31	25	Metamorphism I: Metamorphic Changes	Chapter 8
W-Apr 2	26	Metamorphism II: Metamorphic Realms	Chapter 8
F-Apr 4	27	Metamorphism III: Protoliths and their Metamorphic Equivalents	Chapter 8
M-Apr 7	28	Metamorphism IV: Metamorphism and Mountain Belts	Chapter 8
<u>EARTH'S MAGNETIC FIELD AND ROCK MAGNETISM</u>			
W-Apr 9	29	Magnetism I: The Earth's Magnetic Field	Chapter 3
F-Apr 11	30	<i>EXAM II</i> <i>Covers Lectures #15 – 28</i>	
<i>SUN. APRIL 13 - FIELD TRIP: APPALACHIAN OROGENESIS</i>			
M-Apr 14	31	Magnetism II: Field Reversals, Magnetic Anomalies, and APW paths	Chapter 3
<u>PLATE MOTION AND PLATE BOUNDARY PROCESSES</u>			
W-Apr 16	32	Divergent Boundaries I: MOR's and Ophiolites	Chapter 4
F-Apr 18	33	Transforms	Chapter 4
M-Apr 21	34	Hot Spots; Plate Kinematics	Chapter 4
W-Apr 23	35	Divergent Boundaries II: Continental Rifting	Chapter 4
F-Apr 25	36	Continental Extension and the Continental Margin	Chapter 4; Section 18.2; Figure 4.4
M-Apr 28	37	<i>Introduction to the Final Project</i>	
W-Apr 30	38	Convergent Boundaries I: Island Arcs and Andean Arcs	Chapter 4
F-May 2	39	Convergent Boundaries II: Trenches and Accretionary Wedges	Chapter 4
<i>SUN. MAY 4 - FIELD TRIP: CONTINENTAL RIFTING AND THE CONNECTICUT VALLEY</i>			
M-May 5	40	Continental Collision and Orogeny	Chapter 4
W-May 7	41	Course Synthesis	
F-May 9	42	<i>EXAM III</i> <i>Covers Lectures #29 - 41</i>	