

PHYSICAL GEOLOGY

Geology 110

Fall Semester, 2011

Syllabus

Instructor: Dr. L. Scott Eaton
Office: Memorial Hall 7100C
E-mail: eatonls@jmu.edu
Office Hours: M W: 11:00-13:15; Th 10:00-11:30; or by arrangement

Class Time: M W F: 13:25–14:15
Room: Memorial Hall 7370

Lab Time: M 14:30 - 16:20 (section 7)
W 14:30 - 16:20 (section 8)

Lab Room: Memorial Hall 7335

Textbook: *Essentials of Geology (3rd Edition)*
Get the book in electronic format for half the price!
<http://www.wwnorton.com/college/>

Lab Manual: *GEOS-Physical Geology Laboratory Manual*

Test Dates (tentative) Test 1: **Friday, September 30**
Test 2: **Friday, November 4**
Final Exam* **Wednesday, December 14, 10:30 a.m.**

***The Final Exam is Cumulative**

Grading: **Test 1: 30%**
Test 2: 35%
Final Exam: 35%

Expectations:

You are expected to abide by the JMU Honor Code for all graded material. This Honor Code belongs to you, the James Madison University Student. Respect it!

You are expected to attend class, pay attention, take notes, and complete reading assignments in a timely manner, and to take exams at the scheduled time.

Mannerly behavior is required. Being attentive and respectful of our colleagues is the least we will expect of each other.

You are expected to pay attention and participate in class discussions, questions, and answers. Sleeping, reading *The Breeze*, randomly wandering in and out of the classroom during lecture, and talking incessantly with the people seated around you is not conducive to your education or the people around you, and will not be tolerated.

“Texting” or general use of cell phones is prohibited in class. You will be given one warning for the first violation; repeated violations will result in removal from class.

You are expected to learn the material, and decide for yourself what is important and what is not. This is a college class, and I will not tell you what to study or provide review sheets for tests.

Suggestions:

1. Read the text BEFORE coming to class. This textbook was chosen primarily because it is "student friendly". You will be amazed in how much easier you will absorb the material during the lecture.
2. Sit in the front rows of the classroom.
3. Review the material within 24 hours after the lecture. Studies have shown an “exponential decay” in what your brain retains if you don’t review immediately.
4. Form a study group with the other members of your class. Try explaining the information to other members of your group. There is no better way to learn the material than to teach someone else.
5. Keep up with the readings and homework assignments.
6. Ask questions. You (or someone you know well) are paying good money to be here. Make the most of it!
7. Keep a positive attitude. Believe it or not, science can be fun and interesting.

LECTURE TOPICS AND READINGS
Fall, 2011

TEXTBOOK: *Essentials of Geology (3rd edition)*, by Stephen Marshak

<u>TOPIC</u>	<u>READING IN TEXT</u>
Introduction	Chapter 1
Minerals	Chapter 3
Igneous Rocks	Chapter 4
Volcanism	Chapter 5
Weathering and Soils	Interlude B
Sedimentary Rocks	Chapter 6
Metamorphic Rocks	Chapter 7, Interlude C
Geologic Time	Chapter 10 12 & 13
Geology of Virginia	TBA
Interior of the Earth and Plate Tectonics	Chapter 2, Interlude D
Earthquakes	Chapter 8
Crustal Deformation	Chapter 9
River Systems	Chapter 14, Interlude F
Ground Water & Water Quality	Chapter 16
Glaciers	Chapter 18
Shorelines & Shoreline Processes	Chapter 15
Mass Movement of Surface Materials	Chapter 13
Virginia Geology and History	TBA
Mineral and Energy Resources	Chapter 12

COURSE GOALS AND OBJECTIVES

Geology 110 is intended to be a rigorous introduction to Physical Geology, one of the two major branches of geology. It is specifically designed to serve geology majors as the first course in a sequence of courses leading to a degree in geology. It also serves other students who seek an introductory course in geology that is comprehensive. A summary of the goals and objectives for the course are shown below:

GOAL 1: Introduce students to the "scientific method" and how "science" is done.

Objective 1: Interweave the methods of science into the fabric of the various topics covered during the course.

Objective 2: Develop the concept that there are no absolute truths in science. Science is constantly striving toward better explanations, greater truth.

Objective 3: Promote the importance of quantitative methods (math and statistics) in scientific experimentation and interpretation.

Objective 4: Strive to have the students understand that a strict code of ethics and ethical conduct are absolutely essential in all aspects of science.

GOAL 2: Provide a solid foundation in earth materials (minerals, igneous rocks, metamorphic rocks, and sedimentary rocks) that can be built on in later courses.

Objective 1: Fully discuss the nature of minerals and rocks, their important properties, the major environments where they occur, and the major processes that produce them.

Objective 2: Introduce students to classification systems that are commonly used for rocks and minerals.

Objective 3: Provide students with practical experience in recognizing and learning to test for major physical properties that are used for identifying rocks and minerals in hand specimen.

Objective 4: Relate the different categories of rocks to the rock cycle and the plate tectonic cycle.

GOAL 3: Help students understand the various internal earth processes that are important in deforming rocks, producing mountains, and causing continental drift.

Objective 1: Introduce students to results obtained from stress-strain experiments and how these results help geologists understand joints, faults, and folds.

Objective 2: Discuss the most essential nomenclature used to describe faults and folds and the most important types of faults and folds.

Objective 3: Provide the students with practical experience in the basics of interpreting geologic maps, drawing structural cross sections, and using geologic maps to determine important information concerning deformed rocks.

Objective 4: Cover the development of plate tectonic theory including its immediate predecessors, continental drift and sea floor spreading, and show that geomagnetic, gravitational, and heat flow data were important pieces of the puzzle leading to plate theory.

Objective 5: Discuss in detail the most important basic tenants of plate tectonics including the various types of mountains, associated basins, suites of sedimentary rock, subduction, rifting and earthquakes.

GOAL 4: Introduce students to the fact that the earth has a history that is extremely rich and varied, almost infinitely long compared to the span of human history, and that this history can be determined from the rocks by discovering and applying appropriate geological principles and techniques.

Objective 1: Study the most important basic principles of geology and stratigraphy which geologists use to determine earth history.

Objective 2: Introduce students to the vastness of geologic time and how determining time in a relative sense differs from an absolute determination.

Objective 3: Show students that absolute dating using natural radioactivity is successful because there is a sound scientific basis for accepting the assumptions inherent in radiometric dating. The same assumptions utilized in earlier age dating techniques have been found to contain serious flaws.

GOAL 5: Introduce students to important earth processes operating at or near the surface which shape the landscape, decompose rocks, produce soil, affect climate, and in the end, make life on the earth possible.

Objective 1: Explore the difference between weathering and erosion and how each relates to the rock cycle and the production of soil and landforms.

Objective 2: Study some of the dynamics of stream flow and the importance of streams in shaping the landscape and transporting sediment.

Objective 3: Investigate the role glaciers and ice ages have played in producing landforms. Help students understand that climate has changed in the past and is likely to change in the future.

Objective 4: Explore the importance of ground water, both as a source of water and as an agent of erosion in shaping the landscape.

Objective 5: Provide the students with practical experience in the basics of topographic map reading and in applying these skills gain an understanding of earth surface processes.