EPS 101-502 Fall 2018 - How the Earth Works: An Introduction to Geology

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Office hours: M&W 8:00-9:00; M 1:30-4:30; T 9:00-10:30 & 3:00-4:30
Class time and location: Monday & Wednesday 9:00-10:15 in VAAS-131
Textbook: *Earth: Portrait of a Planet* by Stephen Marshak; Norton Publishing
Supplies needed: Notebook or binder with lined paper, pencils; some students prefer different colors of pens/pencils for note-taking and diagrams

Schedule

Week	Date	Topic	Reading
1	8-20	Introductions, inquiry, science lexicon	Prelude
	8-22	Introduction to plate tectonics	Prelude; Ch. 3
2	8-27	Plate tectonic theory	Ch. 4
	8-29	Earth composition	Ch. 2
3	9-3	**Labor Day; no class**	
	9-5	Minerals	Ch. 5
4	9-10	Intro to rocks; igneous rocks	Ch. 6
	9-12	Magma; lava; igneous rocks	Ch. 6
5	9-17	Sedimentary rocks	Ch. 7
	9-19	Sedimentary rocks	Ch. 7; Interlude B
6	9-24	Rock cycle	TBD
	9-26	**EXAM 1**	
7	10-1	Geologic time	Ch. 12, online resources
	10-3	Dating	Ch. 12
8	10-8	Dating	Ch. 12
	10-10	Structural geology	Ch. 11
9	10-15	Structural geology	Ch. 11, online resources
	10-17	Orogeny	Ch. 11; Ch. 8
10	10-22	Seismology; geomechanics	Ch. 10
	10-24	Seismology, continued	Ch. 10
11	10-29	Volcanoes	Ch. 9
	10-31	**EXAM 2**	
12	11-5	Volcanoes of New Mexico	Online resources
	11-7	Hydrocarbons and energy resources	Ch. 14
13	11-12	Energy resources	Ch. 14
	11-14	Groundwater	Ch. 19
14	11-19	Groundwater	Ch. 19, online resources
	11-21	Karst	Ch. 19; online resources
15	11-26	Mass movements	Ch. 17
	11-28	Glaciers	Ch. 22
16	12-3	Paleoclimate	Ch. 20; Ch. 23
	12-5	Global change through geologic time	Ch. 23
17	12-12	**FINAL EXAM, 9:00 A.M.**	

A note on class schedule: The schedule included above will serve as a general outline for the semester. Dates and topics might change as needs arise. Changes will be posted ASAP.

Course Goals:

1. *To introduce the principles and processes of science using Earth science as a guide.*
   Familiarity with the scientific method benefits individuals, communities, and societies.

2. *To present Earth science and the methods by which it is studied and practiced.*
   Understanding of Earth's composition, history, and processes lead to more informed consideration other sciences as well as arts, cultures, and human histories.

3. *To introduce students to the importance of Earth science on individuals and societies at the local, regional, and global scale*
   Each of us plays a role in our environment, and we have impacts on it in addition to being impacted by it. As Earth scientists, we seek to understand better these impacts and to be able to make reasoned considerations of the geological issues facing us and our society.

Student Learning Objectives (SLOs):

1. By evaluating a set of data, the student will define a problem, pose a hypothesis, and describe how the hypothesis can be tested. (Relates to UNM/HED Area 3, Competencies 1, 2, 4)
2. Students will be able to state the age of the Earth and describe how geologists measure absolute rock ages by radioactive decay. (Relates to UNM/HED Area 3, Competencies 1, 3)
3. Students will be able to determine the relative order in which a series of geologic events occurred by applying the concepts of relative dating. (Relates to UNM/HED Area 3, Competencies 1, 3)
4. Students will be able to describe the compositional (crust, mantle, core) and mechanical (lithosphere, asthenosphere, outer core, inner core) layers that exist in the Earth. (Relates to UNM/HED Area 3, Competency 3)
5. Students will be able to name and describe fluvial, karst, glacial, coastal and Aeolian landforms (e.g. meanders, moraines, dunes, etc.) and be able to explain the specific geologic processes involved in their formation. (Relates to UNM/HED Area 3, Competencies 3, 5)
6. Students will be able to describe the three main rock types (igneous, sedimentary, and metamorphic) and how they form in the context of the rock cycle. (Relates to UNM/HED Area 3, Competency 3)
7. Students will be able to explain the evidence for the plate tectonic processes that occur at each of the three types of plate boundaries. (Relates to UNM/HED Area 3, Competencies 2, 3)
8. Students will be able to describe the geologic processes involved in formation and concentration of a significant geologic resource (examples include fossil fuels and metals). (Relates to UNM/HED Area 3, Competencies 3, 5)
9. Students will describe the processes that are responsible for specific geologic hazards (e.g., earthquakes, volcanic eruptions, mass movement, flooding, etc.). Page 3 of 3 (Relates to UNM/HED Area 3, Competencies 3, 5)

Attendance:

Attendance is required at each class meeting. *Attendance is taken before the start of each class. To be late is to be absent.* Students with 3 consecutive absences or 4 absences overall may be dropped from the course. Students with 2 absences in the first three weeks of class will be dropped from the course. There are no excused absences. If you are forced to miss a class due to an emergency, you are encouraged to get notes and materials you missed from a classmate and read the assignment for that day.

Grading:

Tests: 3 tests worth ~17 percent each	50%
In-class and homework assignments	30%
Reading quizzes	20%
TOTAL	100%

Grade scale:	98+ = A+	92-97 = A	90-91 = A-	
	88-89 = B+	82-87 = B	80-81 = B-	
	78-79 = C+	72-77 = C	70-71 = C-	
	68-69 = D+	62-67 = D	60-61 = D-	0-59 = F

Exams:
Exams cover all materials covered since the last exam. Each exam is worth 17% of the total grade for the class. Exams will contain multiple choice, short answer, and interpretive questions.

In-class and homework assignments:
A total of 30% of the final grade will be based on 8 in-class and homework assignments. Some of these will require discussion and/or collaboration with your classmates. Due dates for homework assignments will be posted when the assignment is given.

Reading quizzes:
There will be an in-class or online reading quiz most weeks. These quizzes will be based upon the assigned readings from the textbook and other sources. Online quizzes must be completed before class.

Reading:
This course covers a broad range of topics from many fields of Earth science. It would be impossible to give fair treatment to all topics with lectures alone. Therefore, successful students must read from the textbook and other sources in preparation for class meetings. To encourage you to read *before* class meetings, most online quizzes will be taken from the reading materials that will be discussed in class on the due date of the online quiz. I encourage you to take notes while reading, including writing down questions that arise during reading that you would like to discuss in class. Re-reading after the class meeting has been shown to improve comprehension and success.

Office hours:
While my "official" office hours are listed at the top of this syllabus, you are welcome to stop by my office at any time. My door is always open, and I am here to help you in any way that I can. If you are having trouble catching me in my office, email or phone me so that we can arrange a meeting.

Plagiarism and cheating:
Discussion of ideas is a crucial skill in science, and I encourage you to talk with one another about the topics and assignments in this class. However, all work that you submit must be your own. If you use information from outside resources, such as the textbook, newspapers, the internet, or journals, you must cite it. Plagiarism will result in a "0" on the assignment. If you are concerned about what

does or does not constitute plagiarism, I'm happy to help – just ask me after class, via email, or in office hours.

Electronic devices:
Do not use cell phones during class, even for checking texts. Mute or turn off anything that can provide any distraction before class begins.

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered "responsible employees" by the Department of Education (see pg 15 - http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see:https://policy.unm.edu/university-policies/2000/2740.html