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GEO 101N.80: Introduction to Physical Geology/Honors

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**UNIVERSITY OF MONTANA—DEPARTMENT OF GEOSCIENCES
GEO101N HONORS COURSE SYLLABUS
SPRING 2017**

1. BASIC COURSE SCHEDULE INFORMATION

Lecture Schedule: MWF 9:00-9:50AM, CHCB 304

2. INSTRUCTOR INFORMATION

Instructor:	Dr. Julie Baldwin	Office Hours
Office Location:	CHCB 307	Wed: 2:00-4:00 pm
Phone:	243-5778	Or by appointment
Email:	julie.baldwin@umontana.edu	
TA:	Sam Box	Wed: 12:00-2:00 pm
Office Location:	CHCB 338	Or by appointment
Email:	samuel.box@umontana.edu	

3. LEARNING OBJECTIVES

There are a lot of exciting and interesting topics in the geosciences! Objectives for this course are for students to learn the foundational concepts (Big Ideas) in Geoscience, problem-solving skills and critical thinking skills. The learning objectives for this course are summarized in the table below.

Big Idea	Learning Goal (Students will understand that....)	Essential Questions
Plate Tectonics	a) The theory of plate tectonics explains the large-scale motion of the Earth's lithosphere. b) Observable geologic phenomena are the result of tectonic processes. c) The theory of plate tectonics is used to interpret the Earth's rock record. d) Plate boundaries have changed throughout Earth history. e) Plate tectonics provides a framework from which future geological events can be predicted	How do plate boundaries form? How do they 'die'? How can plate tectonic processes help explain the rock record? How does plate tectonics explain geologic processes? How are plate boundaries identified? How can plate tectonics be used to model and predict geologic processes? How does understanding plate tectonics help society?
The Rock Cycle	a) A record of past geologic processes is preserved in the rock record. b) Rocks form, change and re-form through geologic processes. c) Active rock cycle processes are used to explain the rock record: "The Present is the Key to the Past"	What is a rock? How do rocks (igneous, sedimentary, metamorphic) form? How can the rock record be used to understand geologic processes? How do the three groups of rocks relate to each other through the rock cycle? How do geoscientists classify rocks? What is the value of studying the rock record?

<p>Geologic Time</p>	<p>a) The Earth is 4.6 billion years old.</p> <p>b) Many geologic processes take place over millions and billions of years.</p> <p>b) The rock record preserves billions of years of Earth history.</p> <p>c) Geologists can determine the timing of geologic events using numerical age dating techniques.</p>	<p>Why is the geologic time scale important to the geosciences?</p> <p>How can rates and timing of geologic processes be determined from the rock record?</p> <p>Why are there gaps in the geologic record?</p> <p>Why do the time intervals on the time scale change?</p>
<p>Human Impacts on Planet Earth</p>	<p>a) Humans depend on Earth for resources that are formed by geologic processes</p> <p>b) Natural hazards pose risks to humans and must be understood in order to minimize and mitigate risks</p> <p>c) Geologic processes have impacted the development of human civilization and the actions of humans can significantly impact the Earth</p>	<p>What are the challenges that society faces as to the sustainability of energy and mineral resources in the future?</p> <p>What are the nature and causes of natural hazards and what steps can people take to protect themselves from these hazards?</p> <p>How is Earth's climate changing and what role do greenhouse gases serve in regulating climate?</p>
<p>Geoscience Research (Methods and Process)</p>	<p>a) Geoscientists use repeatable observations and testable ideas to understand and explain Earth processes.</p> <p>b) Geoscientists assess uncertainty in observations and interpretations and use this to generate new questions and hypotheses to test.</p> <p>c) Scientific research is a messy, complicated and non-linear process</p> <p>d) Seeking evidence to support or disprove multiple plausible explanations of a geologic phenomenon is used to develop models of Earth processes.</p>	<p>How is scientific knowledge generated and validated?</p> <p>How do geoscientists deal with uncertainty in scientific data?</p> <p>How do scientists report and communicate data and hypotheses?</p> <p>How can multiple working hypotheses be used to inform the direction of research?</p> <p>How are working hypotheses developed? How are they discounted?</p>
<p>Scientific Thinking: Observation and interpretation</p>	<p>a) Interpretations of geologic processes in the rock record are determined through assessing and relating observations.</p> <p>b) Interpretations may be revised with additional observations.</p>	<p>What are the differences between and observation and interpretation?</p> <p>How are multiple observations used to develop interpretations of geologic processes?</p>

4. RESOURCE MATERIALS

Required Text: *Essentials of Geology* by Stephen Marshak (5th Ed), ISBN: 978-0393601107, including online access to Norton Smartwork website

Textbook: Both the textbook and access to the Norton SmartWork website are required for this course. There is an e-book option. For registration info, see Online Assignments below. Paper copies of *Essentials of Geology* are also **on reserve at Mansfield Library**. It is most effective for your learning to read chapters of the text prior to the class in which they will be discussed.

Moodle: Moodle is the online site to view your course grades and access course documents. Access the Moodle course supplement by going to <http://moodle.umt.edu>. Log in with your netID and password. For

Tech Support, call the UOnline Techs at 406.243.4999 or 866.225.1641 (toll-free) or email them at umonline-help@umontana.edu. They are available from 8 AM to 5 PM, Monday through Friday.

Online Assignments (SmartWork): Access to the website for online assignments is included with purchase of new textbooks or can be purchased online separately at <http://books.wwnorton.com/books/webad.aspx?id=4294992569>. To access the online assignments, log in to Moodle and click on the appropriate SmartWork assignment from within Moodle. That should open a new window, which will prompt you to log in to your SmartWork account if you aren't already logged in (the first time you will get a prompt to create your account). You should always access the SmartWork site this way so that your grades automatically transfer to the Moodle gradebook.

5. CLASSROOM CONDUCT

To make our time together as valuable as possible, we all have to work hard at it. It is important that the learning environment is one of mutual respect. We will do everything we can to create that environment. Please note the following basic statements below for our expectations of student conduct.

1. Everyone has the right to learn as well as the responsibility not to deprive others of their right to learn. Talking during instruction/lecturing, watching movies on laptop computers, coming and going during lectures can be very distracting and affect others' learning. Please monitor your own behavior when you attend class to ensure you do not distract others.
2. Please arrive on time. Late arrivals and early departures can be disruptive and can result in you missing important information. We understand if there are special circumstances when you may have to arrive late or leave early. If this happens please make your arrivals and departures as subtle as possible.
3. If you miss a learning assessment or lecture it is your responsibility to catch up with the material.
4. Please let us know immediately if you have a problem that is preventing you from performing at the level you want to be at in this class.
5. Please treat your classmates, teaching assistant and instructor with respect. There may be times when you are frustrated with something that is going on in the course and it is challenging to be patient, however in order for this to be mutually respectful and constructive environment we ask that you are respectful of others in your words and actions.

Below is what you can expect of us (instructor and teaching assistant) this semester.

1. We will treat you with respect and try to make our expectations about how to succeed in this class clear.
2. We will do our best to help facilitate your learning by designing assignments and assessments that provide you timely feedback.
3. We will aim to start and end classes on time.
4. We will be available to you for help outside of classroom times (through office hours, appointments and / or email) should you want to review concepts that you do not understand, discuss study strategies or learn material beyond the course content.
5. We will manage the class environment to the best of our ability so that you have a safe and distraction free learning environment.

6. ASSESSMENTS AND GRADING

Tests and Assignments	Weight	Dates
SmartWork Assignments	20%	Weekly. Refer to assignment deadlines on Moodle.
Learning Assessments ¹	25%	In class (see schedule)
Reading Assignments ¹	10%	In class (see schedule)
Midterm Test	20%	March 13
Case Study Report	5%	Due May 5 (last day of classes)
Lecture Final	20%	May 12

¹Learning assessments and Research assignments will happen throughout the term **IN CLASS**. These must be completed in class so please note in the lecture schedule when they take place and ensure you are in class on those days. Missed learning assessments are treated like missed tests and opportunities to make up a missed assessment will depend on the reason the assessment was missed.

Any student who is absent from a test or exam for legitimate reasons will be allowed to make up the test. Please note that vacation travel, car trouble, sleeping in, and misreading the test schedule are not considered legitimate reasons for missing an exam and *do not* allow a student to qualify for a make-up. For missed lecture tests, contact must be made with the lecture instructor (Julie Baldwin) within 48 hours by phone or email.

Letter Grade	Percent	Letter Grade	Percent
A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	59 or below

This course must be taken for a traditional letter grade to meet the Natural Sciences General Education requirement. A minimum final grade of C- is required to meet a Gen Ed requirement.

7. FIELD TRIP

A one-day weekend field trip will be scheduled in coordination with the other 101 sections. More info on this opportunity will be forthcoming.

8. OTHER IMPORTANT INFORMATION

- (a) **ACADEMIC MISCONDUCT:** *All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/vpsa/policies/student_conduct.php*
- (b) **ACADEMIC ACCOMMODATION POLICY:** *Whenever possible, and in accordance with civil rights laws, the University of Montana will attempt to provide reasonable modifications to students with disabilities who request and require them. Please feel free to set up a time to meet with me to discuss any modifications that may be necessary for this course. For more information, visit the Disability Services for Students website at www.umt.edu/dss/*
- (c) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information:** *Use of cell phones, laptops, and other electronic devices for purposes other than participating in class is distracting and disrespectful and is not acceptable in the classroom.*
- (d) **COMMUNICATION:** *Please note that I will only use your official UM email. This is required to comply with FERPA (the Federal Educational Rights and Privacy Act). It is your responsibility to make sure you read messages sent to your UM email address in a timely manner.*
- (e) **STUDYING & TIME EXPECTATIONS:** *A standard benchmark for studying for a college science class is 2-3 hours of work outside of class for each hour in class. This means that for our 3-hour class, you should plan to spend 6-9 hours per week outside of class on reading the textbook chapter, doing SmartWork assignments and other forms of studying in ways that are most effective for you.*

Week	Date	Topic	Resources
1	Jan. 23	Introduction to Geology	Syllabus and Prelude (p. 1-9)
	Jan. 25	The Earth in Context	Chapter 1 (p. 11-41)
	Jan. 27	The Earth in Context	
2	Jan. 30	Plate Tectonics	Chapter 2 (p. 43-81)
	Feb. 1	Plate Tectonics	
	Feb. 3	Learning Assessment #1 Plate Tectonics	
3	Feb. 6	Minerals	Chapter 3 (p. 83-101)
	Feb. 8	Minerals	
	Feb. 10	Learning Assessment #1 Review	
4	Feb. 13	Rock Groups	Interlude A (p. 102-111)
	Feb. 15	Magma & Igneous Rocks	Chapter 4 (p. 113-135)
	Feb. 17	Magma & Igneous Rocks	
5	Feb. 20	PRESIDENT'S DAY	
	Feb. 22	Learning Assessment #2 Rock Cycle Part 1	
	Feb. 24	Sediments & Soils	Interlude B (p. 170-185) Chapter 6 (p. 187-213)
6	Feb. 27	Sedimentary Rocks	Learning Assessment #3 Rock Cycle Part 2
	Mar. 1		
	Mar. 3	Metamorphic Rocks	Chapter 7 (p. 215-235)
7	Mar. 6	Learning Assessment #2&3 Review	
	Mar. 8	Metamorphic Rocks & The Rock Cycle	Chapter 7 (p. 215-235) & Interlude C (p. 237-243)
	Mar. 10	Volcanoes	Chapter 5 (p. 137-169)
8	Mar. 13	MIDTERM TEST	
	Mar. 15	Geologic Time	Chapter 10 (p. 339-363)
	Mar. 17	Geologic Time	
SPRING BREAK WEEK (MAR. 20-24)			
9	Mar. 27	Learning Assessment #4 Geologic Time	
	Mar. 29	Scientific Reading Research Assignment: Snowball Earth Glaciation	
	Mar. 31	Learning Assessment #4 Review	
10	Apr. 3	Geologic Structures & Mountain Building	Chapter 9 (p. 297-325)
	Apr. 5	Geologic Structures & Mountain Building	Chapter 9 (p. 297-325)
	Apr. 7	Learning Assessment #5 Maps & Structures	
11	Apr. 10	Earthquakes	Chapter 8 (p. 245-281)
	Apr. 12	Earthquakes	Chapter 8 (p. 245-281) & Interlude D (p. 282-295)
	Apr. 14	Learning Assessment #5 Review	
12	Apr. 17	Popular Science Reading Assignment: The Really Big One	
	Apr. 19	Energy & Mineral Resources	Chapter 12 (p. 391-427)
	Apr. 21	Energy & Mineral Resources	
13	Apr. 24	Streams & Floods	Chapter 14 (p. 463-491)
	Apr. 26	Case Study: Environmental Impacts of Gold Mining on Tribal Lands (Introduction)	
	Apr. 28	Streams & Floods	Chapter 14 (p. 463-491)
14	May 1	Groundwater	Chapter 16 (p. 523-547)
	May 3	Case Study: Environmental Impacts of Gold Mining on Tribal Lands (Town Hall)	
	May 5	Glaciers & Climate Change	Chapter 18 (p. 569-601) & Chapter 19 (p. 603-629)
15	May 12	FINAL EXAM (10:10-12:10)	