Fall 9-1-2018

GEO 225.01: Earth Materials

Julia A. Baldwin
University of Montana - Missoula, julie.baldwin@umontana.edu

GEO 225: Earth Materials
Fall 2018

Instructor: Julie Baldwin
Office: CHCB 307, Phone: 243-5778
E-mail: julie.baldwin@umontana.edu
Office Hours: MW11am-12pm, or by appt

TA: Brianna Crenshaw
Office: CHCB 344
E-mail: brianna.crenshaw@umontana.edu
Office Hours: T 1-3pm or by appt

Lecture Meetings: MWF 10:00-10:50 am in CHCB 304

Lab Meetings: Thurs. 11:00 am-12:50 pm in CHCB 348 and/or CHCB 110

Course prerequisites: C- or better in GEO101/102 and C- or better in CHMY141 or CHMY121.

Course Website: We will use Moodle for this course (https://moodle.umt.edu). Please check site for course announcements, lecture notes, and handouts.

Course Overview: This course will introduce you to Earth materials, including their composition, structure, classification, and formation. Minerals are the building blocks of rocks and therefore help geologists interpret how the Earth formed and has evolved through time, making the study of minerals central to all disciplines in geology. A major goal of this course is to provide you with the necessary framework to understand and evaluate the information that minerals can provide about Earth processes and Earth history. Minerals are, of course, also important for understanding present-day Earth processes and have many practical uses in our society.

Learning Outcomes:

- Describe crystal chemistry and crystal structure and how these relate to a mineral's physical properties.
- Identify important rock-forming minerals in hand sample and thin section and explain where they are found and why.
- Explain what tools are used to identify and characterize minerals.
- Explain how minerals form, what factors affect their stability, and why certain minerals form in association with other minerals in greater (or lesser) abundances.
- Describe mineral occurrences in relation to the rock cycle. Know the common minerals in igneous, sedimentary, and metamorphic rocks, as well as in economic ore deposits.

Textbook & Materials:

- *Earth Materials*, 2nd ed., Klein & Philpotts; ISBN: 978-1316608852
- Subscription to Top Hat classroom response system
- Index cards (pack of 100)
- Bring to every class/lab: device for Top Hat, notebook, 3-ring binder, pencil, colored pencils, straight-edge ruler, calculator, hand lens (for lab)

Top Hat Classroom Response System

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using smartphones and tablets, laptops, or through text message.

You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide), which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.
An email invitation should have been sent to you by email, but if didn't receive this email, you can register by simply visiting our course website: https://app.tophat.com/e/508589
Note: our Course Join Code is **508589**

Lab: You are required to attend lab each week. Expect lab assignments to require significantly more time for completion than is available during the formal lab period. Lab assignments will be due at the beginning of the following lab period. ***A penalty of 20% PER DAY an assignment is late will apply***. No lab assignments will be accepted for credit after the assignment has been graded and returned. There will be a lab midterm and a comprehensive lab final. Your TA will provide you with detailed information regarding lab assignments and expectations.

Exams: There will be three midterms and a final exam in lecture. You may use your Top Hat average to replace your lowest midterm grade IF your Top Hat average is equal to or greater than 85%. You may not replace the grade of a midterm exam not taken. This is your incentive to come to class and participate, since midterm averages are typically in the 60s for this course.

Mineral Quizzes: You must have the appropriate skills and knowledge to think intelligently about the rocks you come across. Thus, it is to your benefit to be able to identify common minerals (using appropriate diagnostic tools) and to know the mineral formulas or general chemical compositions of these minerals.

- You will be provided with a list of minerals. You will identify and describe each of these minerals before taking quizzes on their identification and compositions.
- Quizzes will be given each week at the beginning of the lab period. We will let you know each week what minerals you are responsible for learning the next week.
- For the lab final exam, you will be tested over all of the minerals you have learned over the course of the semester.

Field Trip: There will be a required field trip for this class. Details will be forthcoming.

Grading: Your final grade will be based on the following grading scheme:

Midterm Exams	20%
Final Exam	15%
Top Hat participation	10%
Lab Assignments	25%
Lab Midterm	5%
Lab Final	10%
Mineral Quizzes	10%
Field Trip	5%

Communication: Please note that I will only use your official UM email to communicate with you. This is required to comply with FERPA (the Federal Educational Rights and Privacy Act). Email is the preferred way to contact me – voicemail will take longer to reach me. It is your responsibility to make sure you read messages sent to your UM email address in a timely manner. We will use Remind (remind.com) for text messaging. Text @geo225e to 81010 to sign up for text messages.

Success: Your academic achievement naturally depends on your engagement in this course. You will improve your chances of success if you: complete readings and assignments; actively attend (and be engaged in) lectures and labs; take advantage of office hours and review sessions; participate in activities and discussions; make use of available resources; and ask questions. Do not hesitate to ask for help. I am always happy to assist you, but it is your responsibility to seek help from me (or your TA) when you need it.

Policy for late work:
If you are having trouble completing an assignment on time, please come talk to me or the TA AHEAD of the due date. Otherwise, ***a penalty of 20% per day an assignment is late will apply***.

Disabilities:
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Academic Integrity:
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/student-affairs/dean-of-students/default.php.

FALL 2018 SCHEDULE

Week	Date		Lecture Topic	Reading (2nd ed.)	Lab Topic
1	Aug.	27	Introduction	Ch. 1	
		29	Definition of a Mineral	Ch. 1	Lab 1: Physical Properties
		31	Chemistry Review	Ch. 2/4	
2	Sept.	3	**LABOR DAY**		
		5	Chemistry Review	Ch. 2/4	Lab 2: Mineral Identification
		7	Mineral Identification	Ch. 3	
3		10	Mineral Identification	Ch. 3	
		12	Crystal Structures	Ch. 4	Lab 3: Mineral Classification
		14	Crystal Structures	Ch. 4	
4		17	Crystal Structures	Ch. 4	
		19	X-ray Diffraction	Ch. 3	Lab 4: CrystalMaker
		21	**EXAM 1 (Ch. 1-4)**		
5		24	Crystallography	Ch. 5	
		26	Crystallography	Ch. 5	Lab 5: XRD
		28	Crystallography	Ch. 5	
6	Oct.	1	Crystallography	Ch. 5	
		3	Optical Mineralogy	Ch. 6	Lab 6: Optical Properties
		5	Optical Mineralogy	Ch. 6	
7		8	Optical Mineralogy	Ch. 6	
		10	Optical Mineralogy	Ch. 6	**Lab Midterm**
		12	Igneous Minerals	Ch. 7	
8		15	Igneous Minerals	Ch. 7	
		17	Igneous Minerals	Ch. 7	Lab 7: SEM
		19	**EXAM 2 (Ch. 5-7)**		
9		22	Mineral Formulas	Ch. 7	
		24	Igneous Processes	Ch. 9	Lab 8: Igneous Minerals
		26	Igneous Processes	Ch. 9	
10		29	Igneous Rocks	Ch. 10	
		31	Igneous Rocks	Ch. 10	Mineral Display Project Intro
	Nov.	2	Sedimentary Minerals	Ch. 11	
11		5	Sedimentary Rocks	Ch. 13	
		7	Sedimentary Rocks	Ch. 13	Lab 9: Sedimentary Minerals
		9	Metamorphic Minerals	Ch. 14	
12		12	**VETERANS DAY**		
		14	Metamorphic Minerals	Ch. 14	Lab 10: Metamorphic Minerals
		16	**EXAM 3(Ch. 9-11,13,14)**		
13		19	Metamorphic Rocks	Ch. 15	**NO LAB THIS WEEK**
		21-23	**THANKSGIVING BREAK**		
14		26	Metamorphic Rocks	Ch. 15	
		28	Economic Minerals	Ch. 16	Lab 11: Economic Minerals
		30	Economic Minerals	Ch. 16	
15	Dec.	3	Earth Resources	Ch. 17	
		5	Earth Resources	Ch. 17	Project presentations/review
		7	Minerals and Human Health	Ch. 18	
		13	**Final Exam 8:00-10:00 AM**		**12/14 Lab Final 10:10-12:10**