

1-2014

GEO 225.01: Earth Materials

Liane M. Stevens

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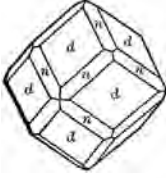
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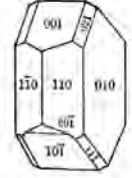
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GEO 225 – **Earth Materials** – Spring 2014



Instructor: Liane Stevens

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Office Hours: T 1:00-2:00 p.m.; W 3:00-4:00 p.m.,
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Teaching Assistant: Drew Cramer

Office: CHCB 105

Email: martin.cramer@umontana.edu

Office Hours: T/R 1:00-2:00 p.m.

Lecture Meetings: MWF, 11:10 a.m. – 12:00 p.m., CHCB 304

Lab Meetings: You must attend the lab section for which you are registered:

Tuesday, 11:10 a.m. – 1:00 p.m. (section 01), CHCB 348/CHCB 110

Thursday, 11:10 a.m. – 1:00 p.m. (section 02), CHCB 348/CHCB 110

Course Overview: This course will introduce you to Earth materials and their composition, structure, classification, and formation. Minerals are the building blocks of rocks; their study helps geologists interpret how Earth formed and evolved through time. Thus, the study of minerals is central to all disciplines in geology. A major course goal is to provide you with the necessary framework to understand and evaluate the information minerals and rocks can provide about Earth's history and processes. Of course, Earth materials are also significant in their many practical uses in our society.

Course Objectives:

- 1) Introduce the tools and techniques that are used to identify and characterize minerals.
- 2) Identify minerals in hand sample and thin section, with the aid of various analytical techniques.
- 3) Introduce crystal chemistry and structure, and how they relate to minerals' physical properties.
- 4) Learn how minerals form, what factors affect their stability, and why certain minerals form in association with other minerals in greater (or lesser) abundances.
- 5) Describe mineral occurrences in relation to the rock cycle. Learn the common minerals in igneous, sedimentary, and metamorphic rocks, as well as in economic ore deposits, and be able to name the rocks that these minerals occur in.

Course Prerequisites: C- or better in GEO 101N (or other acceptable 100-level GEO course), and C- or better in CHMY 141 (or other acceptable 100-level CHMY course)

Required Textbook & Materials:

- Earth Materials, 1st ed., Klein & Philpotts; ISBN: 978-0-521-14521-3
- i>clicker Plus, W.H. Freeman; ISBN: 978-1-4641-2015-2
- Index cards (pack of 100)
- Bring to every class: i>clicker (for lecture), notebook, 3-ring binder, pencil, colored pencils, straight-edge ruler, calculator, hand lens (for lab)

Course Website: We will use Moodle for this course (umonline.umt.edu). Please check the site regularly for course announcements, lecture notes, handouts, and lab assignments.

i>clickers: You are required to purchase an i>clicker remote for in-class participation. i>clicker is a classroom response system that allows you to respond to questions posed during class.

- i>clickers will be used during every lecture. You are responsible for bringing your remote daily – handwritten responses will not be accepted. You will receive credit for each question answered; the number of questions posed may vary from day to day. Six i>clicker questions will be dropped at the end of the semester.
- In order to receive credit, you will need to register your i>clicker remote online before the start of class on **Feb. 3**. To register your i>clicker, go to www1.iclicker.com/register-an-iclicker. Complete the fields with your first and last names (use your official university name), **NetID** (for Student ID box), and remote ID (see registration page for location).
- If you own a web-enabled device (laptop, iOS or Android device), you may choose to use i>clicker GO. The app is free, but you must purchase a subscription after a 14-day trial. I recommend you test the app before purchasing the subscription (\$15.99 for 1 year), as it relies on the stability of our classroom's WiFi. Use of i>clicker GO will be the only acceptable reason for accessing your phone or tablet during class. Please keep devices silent during class.

Lab: You are required to attend lab each week. You must attend the lab section for which you are registered. Expect lab assignments to require 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. 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 i>clicker average to replace your lowest midterm grade IF your i>clicker 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 Mastery: 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 57 minerals. You will identify and describe each of these minerals before taking a quiz on their identification and mineral formulas/general compositions.
- Scores on the Mineral Mastery quiz below 85% will not receive credit. You may have up to five attempts to complete the quiz.
- This task will primarily be completed outside of formal lecture/lab periods.
- You will receive detailed instructions on completing the Mineral Mastery component of this course during the second week of the semester.

Field Trip: There will be a required, day-long field trip to the Butte area on Saturday, May 3. Please make scheduling arrangements accordingly. Field trip details will be provided closer to the trip date.

Late Work: If you are having trouble completing an assignment on time, please talk to me or to the TA before the due date. Otherwise, a penalty of 20% per day will apply to late assignments. No lab assignments will be accepted for credit after the assignment has been graded and returned.

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

• Midterm Exams	25%
• Final Exam	10%
• i>clicker Participation	10%
• Lab Assignments	25%
• Lab Exams	15%
• Mineral Mastery	10%
• Field Trip	5%

Success!: Your academic achievement naturally depends on your level of involvement in this course. You improve your chances of success if you: complete readings and assignments; attend 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. I guarantee my availability during office hours, but feel free to make an appointment or drop by.

Academic Integrity: I expect you to conduct yourself appropriately and professionally, to complete your work with integrity, and to treat members of our community with courtesy and respect. Students at the University of Montana are expected to practice academic honesty at all times. Academic misconduct is subject to academic penalty by the course instructor and/or university sanctions by the university. All students must be familiar with the Student Conduct Code, which is available online at life.umt.edu/vpsa/student_conduct.php.

Classroom Courtesy: This is a large class and the classroom and lab can be expected to be full. Please be considerate of your classmates. Do not engage in distracting behaviors, and keep electronic devices on silent. Use of electronic devices for purposes other than participating in class (notes, i>clicker GO) is distracting, disrespectful, and not acceptable in the classroom.

Course Schedule: This syllabus contains a detailed course schedule. You are responsible for keeping up with the schedule and completing assignments on time. I reserve the right to make changes in this schedule as necessary, and will notify you accordingly.

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.

Course Schedule – GEO 225 – Spring 2014

Week	Date	Lecture Topic	Assigned Reading	Lab Topic
1	M Jan. 27	Introduction	Ch. 1	Lab 1: Physical Properties
	W Jan. 29	Minerals, Rocks & Plate Tectonics	Ch. 2	
	F Jan. 31	Minerals, Rocks & Plate Tectonics	Ch. 2	
2	M Feb. 3	Mineral Identification	Ch. 3	Lab 2: Mineral Identification
	W Feb. 5	Mineral Identification	Ch. 3	
	F Feb. 7	Crystal Structures	Ch. 4	
3	M Feb. 10	Crystal Structures	Ch. 4	Lab 3: Instrumental Techniques – SEM
	W Feb. 12	Crystal Structures	Ch. 4	
	F Feb. 14	Crystallography	Ch. 5	
4	M Feb. 17	Presidents Day Holiday		Lab 4: Instrumental Techniques – XRD
	W Feb. 19	Crystallography	Ch. 5	
	F Feb. 21	Crystallography	Ch. 5	
5	M Feb. 24	Midterm 1		Lab 5: CrystalMaker
	W Feb. 26	Optical Mineralogy	Ch. 6	
	F Feb. 28	Optical Mineralogy	Ch. 6	
6	M Mar. 3	Optical Mineralogy	Ch. 6	Lab 6: Optical Properties
	W Mar. 5	Optical Mineralogy	Ch. 6	
	F Mar. 7	Igneous Minerals	Ch. 7	
7	M Mar. 10	Igneous Minerals	Ch. 7	Lab 7: Igneous Minerals
	W Mar. 12	Igneous Minerals	Ch. 7	
	F Mar. 14	Igneous Processes	Ch. 8	
8	M Mar. 17	Igneous Processes	Ch. 8	Lab Midterm
	W Mar. 19	Igneous Processes	Ch. 8	
	F Mar. 21	Midterm 2		
9	M Mar. 24	Igneous Rocks	Ch. 9	Lab 8: Igneous Rocks
	W Mar. 26	Igneous Rocks	Ch. 9	
	F Mar. 28	Igneous Rocks	Ch. 9	
10		Spring Break		
11	M Apr. 7	Sedimentary Minerals	Ch. 10	Lab 9: Sedimentary Minerals
	W Apr. 9	Sediment Formation & Transport	Ch. 11	
	F Apr. 11	Sediment Formation & Transport	Ch. 11	
12	M Apr. 14	Sedimentary Rocks	Ch. 12	Lab 10: Sedimentary Rocks
	W Apr. 16	Sedimentary Rocks	Ch. 12	
	F Apr. 18	Metamorphic Minerals	Ch. 13	
13	M Apr. 21	Metamorphic Minerals	Ch. 13	Lab 11: Metamorphic Minerals
	W Apr. 23	Metamorphic Minerals	Ch. 13	
	F Apr. 25	Midterm 3		
14	M Apr. 28	Metamorphic Rocks	Ch. 14	Lab 12: Metamorphic Rocks
	W Apr. 30	Metamorphic Rocks	Ch. 14	
	F May 2	Economic Minerals	Ch. 15	
	Sat. May 3	Field Trip – Butte		
15	M May 5	Economic Minerals	Ch. 15	Lab 13: Economic Minerals
	W May 7	Resources	Ch. 16	
	F May 9	Resources	Ch. 16	
16	M May 12			Lab Final, 8-10:00 AM, CHCB 348
	M May 12	Final Exam, 10:10-12:10, CHCB 304		