

GEOL 220/220L

Mineralogy
4 credits

Spring 2018

Lecture: Tues/Thurs 8:30-9:45AM; LFG 202

Lab Section: Fri 11:30AM-2:15PM; LFG 202

Course Instructor: Rodney V. Metcalf

Office: LFG 203; Phone: 895-4442; e-mail: metcalfr@unlv.nevada.edu

Office hours: Tues 10:30-11:30AM; Wed 1:30-2:30PM Thurs – 10:00-11:00AM; or by appointment

Note: I have an open door policy, as such you may stop by with a question or to ask for help anytime my door is open. I may ask that you make an appointment for another time if I am engaged in something, but I want students to feel that I am available.

Laboratory Teaching Assistant: Christopher DeFelice

Office: TEC 108; phone: 895-4700 e-mail: DEFELC1@unlv.nevada.edu

Office hours: Wednesday 1:00-3:00PM

Required Textbook: *Introduction to Mineralogy 2nd Edition* by William D. Nesse

Course Description: Minerals are the fundamental building blocks of the Earth. A basic understanding of mineral chemistry, mineral occurrence, and mineral identification is a fundamental skill required by all geoscience disciplines. This course focuses on the classification, chemistry, physical properties, and crystallography of minerals forming rocks, ore deposits and soils, and on mineral growth processes.

Major Learning Outcomes: Students will be capable of

1. defining a mineral and discuss the relationships among chemical composition, mineral structure and mineral properties;
2. describing the symmetry of the six crystal classes and basic crystal forms associated with them;
3. describing rock forming minerals (include ore minerals) covered in the course in terms of chemistry, mineral structure and physical properties;
4. identifying a set of major rock and ore forming minerals in hand sample and using the polarizing optical microscope;
5. describing mineral associations and genesis in igneous, metamorphic and sedimentary rocks;
6. discuss mineral growth processes in selected geologic settings.

Grades:

Pre-Labs	3%	Mineral Report	5%
Weekly Labs	10%	Exam I	10%
Lab Final Exam	12%	Exam II	20%
Exercises & quizzes	10%	Course Final Exam	30%

Attendance: Attendance to both lecture and lab are required. We understand that at times absences are necessary. We will make accommodations for reasonable absences (illness for example) but may request documentation. Please let us know as soon as possible that you will be missing a class and particularly a lab, preferably beforehand via email. **Three unexcused lab absences will result in a failing grade for the course.**

Cell Phones: Please refrain from using cell phones during lecture or lab unless absolutely necessary. Place your phone on silent ring (vibrate), if you must accept or make a call please leave the room. **Cell phones must be turned off and stored during exams.**

Makeup Labs and Exams, and Late Assignments: Makeup labs for an *excused absence* will need to be completed by a deadline set by the instructor. We will make the materials available but will not run a separate make up lab session (with TA present). When an *excused absence* is granted and a due date set, you may do your make up work during a scheduled lab time; we will set you up in the back of the room and provide help during the lab time.

Make up exams are not automatically given, and will only be granted for reasonable and documented excuses.

Other Lab Policies:

- (1) Pre-labs and labs must be submitted as a paper copies (no email electronic copies accepted).
- (2) Pre-labs are due in the first 5 minutes of lab, please place them in the space provided at the front of the lab as you arrive. Credit will not be given for pre-labs handed in late (except for excused absences).
- (3) Completed labs from the previous week are due in the first 5 minutes of lab, please place them in the space provided at the front of the lab as you arrive. Late labs will receive 75% of the score if turned in within 24 hours, a lab more than 24 hours late will receive 0% (except for excused absences).
- (4) **Labs must be completed in pencil** (no ink); labs handed-in in ink will not be graded.
- (5) Students are required to stay for the full 2 hours and 45 minutes of the lab. **If you leave lab early your lab will be considered late if you do not turn it in when you leave.**

Rationale for Absence, Makeup and Late Assignment Policies: Faculty and Graduate Teaching Assistants (TAs) have varied and significant workloads and schedules. Your TAs are paid for 20 hours per week for teaching related duties, including preparation, time spent in the classroom, office hours, and grading. Your TA is also a graduate student taking one to three graduate level classes during a semester, and they are conducting an independent research project that requires a written research proposal, significant time in the field and/or laboratory, time for data analysis, presentations at professional meetings, and the writing of a final thesis (reviewed by faculty committee, often with multiple revisions). Faculty workloads include teaching (~40% - preparation, meeting classes, grading, and meeting students outside of class), research (~40% - field/lab work, reading literature, writing proposals and papers) and service (~20% - university committees/administration, professional societies, community engagement, reviewers for journals and funding agencies). In short, there are a lot of time demands on faculty and TAs, so part of the rationale for these policies is allow us to efficiently manage our workloads.

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

A student found to be responsible for academic dishonesty (including but not limited to plagiarism) in this course will face disciplinary actions up to and including failure of the course (grade of F) and referral to the Office of Student Conduct.

Course Schedule

Week	Date	Lecture	Lab
Week 1	T 16 Jan	Introduction	<i>Physical Properties: How do we classify minerals?</i>
	Th 18 Jan	Basics of Symmetry: Six Crystal Classes	
Week 2	T 23 Jan	Mineral Identification and Analysis; Elements and Chemical Bonds;	<i>Symmetry, Six Crystal Classes and Miller Indices</i>
	Th 25 Jan	Crystal Structures & Systematic Mineralogy	
Week 3	T 30 Jan	Systematic Mineralogy	<i>Symmetry, Six Crystal Classes and Miller Indices</i>
	Th 1 Feb	Framework silicates	
Week 4	T 6 Feb	Framework silicates	<i>Framework silicates/sheet silicates</i>
	Th 8 Feb	Sheet Silicates	
Week 5	T 13 Feb	Sheet Silicates	<i>Chain Silicates</i>
	Th 15 Feb	EXAM I	
Week 6	T 20 Feb	Single chain silicates	<i>Disilicates, Ring Silicates & Orthosilicates</i>
	Th 22 Feb	Double chain silicates	
Week 7	T 27 Feb	Disilicates, Ring Silicates & Orthosilicates	<i>Carbonates, sulfates and phosphates</i>
	Th 1 Mar	Carbonates, sulfates, phosphates & borates	
Week 8	T 6 Mar	Oxides, hydroxides, halides	<i>Oxides, hydroxides, halides & borates</i>
	Th 8 Mar	Sulfides & Native Elements	
Week 9	T 13 Mar	Mineral Stability – Equilibrium	<i>Sulfides, tungstate and native elements</i>
	Th 15 Mar	Mineral Stability - Equilibrium	
Week 10	T 20 Mar	Mineral Stability - Equilibrium	PRACTICE MINERAL EXAM
	Th 22 Mar	EXAM II (cumulative)	
Spring Break	26-30 Mar	Spring Break	No Lab – Spring Break
Week 11	T 3 April	Optical Mineralogy	<i>Optical Microscope 1</i>
	Th 5 April	Optical Mineralogy	
Week 12	T 10 April	Nucleation and Growth – Kinetics	<i>Optical Microscope 2</i>
	Th 12 April	Nucleation and Growth – Kinetics	
Week 13	T 17 April	Nucleation and Growth – Kinetics	<i>Optical Microscope 3</i>
	Th 19 April	Mineral Zoning, Exsolution & Defects	
Week 14	T 24 April	Minerals and Petrogenesis (reports)	Review
	Th 26 April	Minerals and Petrogenesis (reports)	
	T 1 May	Minerals and Petrogenesis	

Week 15	Th 3 May	Minerals and Petrogenesis	<i>LAB FINAL EXAM</i>
Week 16	Th 10 May	FINAL EXAM (cumulative) 8:00- 10:00AM	

Course Readings

Week	Date	Lecture	Lab
Week 1	T 16 Jan	Chapter 1 (p.1-10)	Chapter 1 (p.1-10)
	Th 18 Jan	Chapter 2 (p.11-20, 25-44)	
Week 2	T 23 Jan	Chapter 7 (p. 136); Chapter 8 (p. 184); Chapter 9 (p. 194-196); Chapters 3 & 4	<i>Chapter 2 (p.11-20, 25-44)</i>
	Th 25 Jan	Chapters 3 & 4	
Week 3	T 30 Jan	Chapter 11 (p. 211-214)	<i>Chapter 2 (p.11-20, 25-36)</i>
	Th 1 Feb	Chapter 12; Chapter 9 (p. 198-200)	
Week 4	T 6 Feb	Chapter 12	Chapter 12 & 13
	Th 8 Feb	Chapter 13	
Week 5	T 13 Feb	Chapter 13	<i>Chapter 14</i>
	Th 15 Feb	EXAM I	
Week 6	T 20 Feb	Chapter 14 (p. 310-322)	Chapters 15 & 16
	Th 22 Feb	Chapter 14 (p. 294-310)	
Week 7	T 27 Feb	Chapters 15 & 16	Chapter 17
	Th 1 Mar	Chapter 17	
Week 8	T 6 Mar	Chapter 18	Chapter 18
	Th 8 Mar	Chapters 19 & 20	
Week 9	T 13 Mar	Chapter 5 (p. 85-92)	Chapters 19 & 20
	Th 15 Mar	Chapter 5 (p. 85-92)	
Week 10	T 20 Mar	Chapter 5 (p. 85-92)	Chapter 7
	Th 22 Mar	EXAM II (cumulative)	
Spring Break	26-30 Mar	Spring Break	No Lab – Spring Break
Week 11	T 3 April	Chapter 7	PRACTICE MINERAL EXAM
	Th 5 April	Chapter 7	
Week 12	T 10 April	Chapter 5 (p. 93-110)	Chapter 7
	Th 12 April	Chapter 5 (p. 93-110)	
Week 13	T 17 April	Chapter 5 (p. 93-110)	No Lab – Thanksgiving Week
	Th 19 April	Chapter 5 (p. 93-110)	
Week 14	T 24 April	Chapters 11 (p. 214-229) & 19 (p. 414-420)	Chapter 7

	Th 26 April	Chapters 11 (p. 214-229) & 19 (p. 414-420)	
Week 15	T 1 May	Chapters 11 (p. 214-229) & 19 (p. 414-420)	<i>LAB FINAL EXAM</i>
	Th 3 May	Chapters 11 (p. 214-229) & 19 (p. 414-420)	
Week 16	M 12 Dec	FINAL EXAM (cumulative) 8:00-10:00AM	

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Copyright—The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor **within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Transparency in Learning and Teaching—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>
<https://www.unlv.edu/provost/transparency>

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university

communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.