

SIO 120: Introduction to Mineralogy

Lecture (Zoom) M/W 1:00 PM – 2:20 PM

Lab (Zoom) W 2:30 PM – 3:50 PM

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Welcome to the wonderful world of minerals! This class is designed to provide you with a solid understanding of Earth materials, including physical properties, chemistry, crystallography, systematic classifications, identification, formation and uses, and optical microscopy.

Traditionally, this is a highly experiential class that relies heavily on hands-on and in-person activities. Because of the ongoing COVID-19 pandemic it has been adapted to the remote environment. We will do our very best to give you the most outstanding experience possible, and we are mindful of the challenges that you have all faced thus far; accordingly, we will make every attempt to appreciate the challenges you face as you navigate the class. Student learning is my utmost priority as an instructor, and I encourage you to contact me or the TA any time you have questions or concerns. Rest assured, I would very much prefer to teach in person, but I promise to be organized, enthusiastic, and engaging with the course.

Learning Outcomes:

- Know the definition of a mineral and understand how physical characteristics reflect chemistry and atomic structure.
- Identify common rock-forming minerals and categorize them based on chemical and physical properties using the Dana System.
- Understand basics of crystallography and identify crystal structures.
- Analyze minerals (and rocks) in thin section using a petrographic microscope.
- Examine, compare, and describe mineral specimens in hand specimen and thin section.

Class Organization:

We will meet on M/W from 1:00-2:20 PM (PST) on Zoom for lectures. Lab will meet (on Zoom) on Wednesdays from 2:30-3:50 PM (PST). **Please note:** your synchronous “presence” is always appreciated and I think you will get more out of the class by interacting in real-time. Because of the unique nature of teaching this year during the pandemic, recordings of all meetings will be posted on Canvas. To be clear, no assignment or exam will require your presence at any time.

Grade breakdown:

- Weekly Canvas quizzes (open-note, open-book) on readings and lectures: 25%
- Midterm (open-note, open book, on Canvas): 25%
- Final exam (open-note, open book, on Canvas): 25%
- Lab exercises and assignments: 25%

Textbook:

The lecture text is *Mineralogy* by Dexter Perkins. It is free, and available at <https://opengeology.org/Mineralogy/>. You are responsible for reading the chapters assigned. Weekly quizzes and the midterm and final exams will include material covered in the text.

Absences and Missed Work:

In the case of legitimate conflicts, notification is required at least one week prior to the regularly scheduled examination. In the case of other types of emergencies or eventualities (sickness, etc.) notification is appreciated as soon as possible and must be verified by a third party. *All excuses must be in writing.*

Academic Integrity- Students' Responsibilities:

Students are expected to complete the course in compliance with the instructor's and university standards. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort. University policies, regulations, and standards of conduct can be found on the Academic integrity office website at http://www.ucsd.edu/current-students/_organizations/academic-integrity-office/.

Accommodations for Documented Disabilities:

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter (paper or electronic) issued by the Office for Students with Disabilities (<https://osd.ucsd.edu>). Students are required to discuss accommodation arrangements with instructors and OSD liaisons in the department in advance of any exams or assignments.

SIO 120 Schedule

Note: This syllabus is an outline of proposed events. It is subject to change; however, never without notification, and never to advance the due dates of assignments.

WEEK 1: JAN. 4 AND 6

M (1/4/21) Introduction to mineralogy: what is a mineral, why are they important? **(Ch.1)**

W (1/6/21) Physical properties of minerals **(Ch.3)**

LAB (1/6/21): Physical properties of minerals

WEEK 2: JAN. 11 AND 13

M: Physical properties and crystals **(Ch. 4)**

W: Crystallography: symmetry operators, crystal classes, H-M notation, xtal. axes and systems **(Ch. 10)**

Lab (1/13/21): Rock forming minerals (properties and identification)

WEEK 3: JAN. 18 AND 20

M- NO CLASS (MLK Holiday)

W- Crystallography: miller index, space groups, Bravais lattices, xtal. defects, Twinning **(Ch. 11)**

Lab (1/20/21): Crystallography (models)

WEEK 4: JAN. 25 AND JAN. 27: SYSTEMATIC MINERALOGY

M- Introduction to systematic mineralogy/non-silicates **(Ch. 6-8)**

W- Non-silicate minerals **(Ch. 6-8)**

Lab (1/27/21): Non-Silicate minerals

WEEK 5: FEB. 1 AND 3: SYSTEMATIC MINERALOGY

M- Silicate minerals **(Ch. 6-8)**

W- Silicate minerals **(Ch. 6-8)**

Lab (2/3/21): Non-silicate minerals

WEEK 6: FEB. 8 AND 10: SYSTEMATIC MINERALOGY

M- MIDTERM EXAM (available during a 24-hour period on Canvas; details to follow)

W- Silicate minerals **(Ch. 6-8)**

Lab (2/10/21): Silicate minerals

WEEK 7: FEB. 15 AND 17: SYSTEMATIC MINERALOGY

M- NO CLASS (PRESIDENTS' DAY)

W- Mineral chemistry and bonding (Ch. 2, 13)

Lab (2/17/21): TBA

WEEK 8: FEB. 22 AND FEB. 24: OPTICAL MINERALOGY

M- Optical mineralogy (Ch. 5)

W- Optical mineralogy (Ch. 5)

Lab (2/24/21): The Petrographic microscope

WEEK 9: MAR. 1 AND 3: OPTICAL MINERALOGY

M- Optical mineralogy (Ch. 5)

W- Optical mineralogy (Ch. 5)

Lab (3/3/21): Minerals in thin section

WEEK 10: MAR. 8 AND 10: OPTICAL MINERALOGY AND ANALYTICAL MINERALOGY

M- Minerals as natural resources and as hazards; economic minerals and ores (Ch. 9)

W- Analytical techniques in mineralogy (Ch. 12)

Lab (3/10/21): Rocks in thin section

FINAL EXAM Friday, March 19th 11:30-2:30 (will be available during a 24-hr. window)