

SIO 120: Introduction to Mineralogy (Winter 2022)

Lecture: M/W 1:00 PM – 2:20 PM **Lab:** 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. 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. Despite the continued disruption from the pandemic, I promise to be organized, enthusiastic, and engaging with the course.

OMICRON NOTE: Because of the emergence of the Omicron variant, the first two weeks of this class will be remote (and possibly more). There is a great deal of uncertainty about instructional modality after January 18, and I just want to be clear that the syllabus and instructional modality may be subject to change pending changes to university guidelines surrounding COVID. The situation is evolving and more information regarding instructional modality (remote, in-person, etc.) will be given out as it becomes available.

I apologize in advance for any inconveniences or difficulties; please know that I will always do my absolute best to ensure that any changes to instruction will not disadvantage student learning, grades or outcomes. I want this to be a positive and useful learning experience for everyone. 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.

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 for lecture from 1:00-2:20 PM (PST), initially on Zoom. For the first two weeks, Lab will meet (on Zoom) on Wednesday from 2:30-3:50 PM (PST). Remote meetings will be posted as recordings on Canvas. Depending on the situation after January 18, lectures and labs may or may not move to in-person instruction at SIO. More information to follow.

Grade breakdown:

- Weekly Canvas quizzes (open-note, open-book) on readings and lectures: 20%
- Midterm Exam: 25%
- Final exam (open-note, open book, on Canvas): 25%
- Lab exercises and assignments: 30%

Textbook:

The textbook is *Manual of Mineral Science 23rd Ed.*, by Klein and Dutrow. The text is required and will supplement the lectures. You are responsible for reading the chapters assigned, and the exams will include material covered in the text. Please note, however, that there will be information covered in class that is not covered in the book. You may purchase a hard-copy of the book from the bookstore, but it is being provided to you digitally via inclusive access. From the bookstore:

*Your digital course materials are provided by the UC San Diego Bookstore through Canvas and are free for the first two weeks of classes. After two weeks, your student account will be charged a special reduced price unless you opt out. If you decide to opt out you must complete the process by **January 15th, 2022** and you will be responsible for sourcing the materials elsewhere.*

For any questions about billing please contact textbooks@ucsd.edu. For any questions about using your eBook please reference [RedShelf Solve](#).

To opt-out:

- *Click the RedShelf link in Canvas*
- *Click View Course Materials*
- *Scroll down to the gray opt-out button and follow the prompts to opt out.*

*Again, you have until **January 15th, 2022** to complete this process and you will be responsible for getting access to the materials elsewhere.*

Have a great term!

The UC San Diego Bookstore Inclusive Access Team

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 and Student 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. 3 AND 5

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

W: Physical properties of minerals **(Ch.2)**

LAB (1/5/22): Introduction to minerals

WEEK 2: JAN. 10 AND 12

M: Physical properties and crystals **(Ch. 2)**

W: Crystallography: symmetry operators, crystal classes, H-M notation, crystal axes and systems **(Ch. 6-10)**

Lab (1/12/22): Physical properties of minerals/rock-forming minerals (properties and identification)

WEEK 3: JAN. 17 AND 19

M- NO CLASS (MLK Holiday)

W- Crystallography: miller index, space groups, Bravais lattices, crystal defects, Twinning **(Ch. 6-10)**

Lab: Crystallography (3D models)

WEEK 4: JAN. 24 AND JAN. 26: SYSTEMATIC MINERALOGY

M- Introduction to systematic mineralogy/non-silicates **(Ch. 15-17)**

W- Non-silicate minerals **(Ch. 15-17)**

Lab: Crystallography (Miller Index)

WEEK 5: JAN. 31 AND FEB. 2: SYSTEMATIC MINERALOGY

M- Silicate minerals **(Ch. 18-19)**

W- Silicate minerals **(Ch. 18-19)**

Lab: Non-silicate minerals

WEEK 6: FEB. 7 AND 9: SYSTEMATIC MINERALOGY

M- MIDTERM EXAM

W- Silicate minerals (Ch. 18-19)

Lab: Non-silicate minerals

WEEK 7: FEB. 14 AND 16: SYSTEMATIC MINERALOGY

M- NO CLASS (PRESIDENTS' DAY)

W- Mineral chemistry and bonding (Ch. 3+4)

Lab: Silicate minerals

WEEK 8: FEB. 21 AND FEB. 23: OPTICAL MINERALOGY

M- Optical mineralogy (Ch. 13)

W- Optical mineralogy (Ch. 13)

Lab: Silicate minerals

WEEK 9: MAR. 1 AND 3: OPTICAL MINERALOGY

M- Optical mineralogy (Ch. 13)

W- Optical mineralogy (Ch. 13)

Lab: The Petrographic microscope; 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. 14)

Lab: Rocks in thin section

FINAL EXAM Friday, March 18th 11:30-2:30