

ERTH 2102 Mineralogy to Petrology - Syllabus

Course description

ERTH 2102 Mineralogy to Petrology [0.5 credit]

Chemical, optical and crystallographic properties of common rock-forming minerals, with introduction to common mineral assemblages of igneous, sedimentary, and metamorphic rocks.

Lectures two hours a week and laboratory three hours a week.

Precludes additional credit for ERTH 3202.

Prerequisite(s): ERTH 1006 and ERTH 1009 or GEOG 2013, and CHEM 1002 or CHEM 1006.

Learning outcomes

1. Introduce crystallography, crystal chemistry, and systematic mineralogy.
2. Relate the physical and optical properties of minerals to their crystal structures.
3. Learn how minerals and rocks are classified and named.
4. Identify and describe some of the most common and important minerals in hand specimen and thin section.
5. Introduce analytical methods used in modern mineralogy and petrology, especially polarized light microscopy, electron beam analysis and X-ray methods.
6. Appreciate the importance of minerals in Earth Sciences and our daily life.

Course Schedule

Sep. 10/11	1. Intro, Crystal Chemistry, Symmetry - Lab 1: Crystal Chemistry
Sep. 17/18	2. Crystallography, Mineral Properties – Lab 2: Symmetry, Miller Indices
Sep. 24/25	3. Optical Mineralogy & Microscopy – Lab 3: Optical Mineralogy
Oct. 01/02	4. Mafic minerals: olivine, pyroxenes, amphiboles – Lab 4: Mafic Minerals
Oct. 08/09	5. Felsic minerals: quartz, feldspar, feldspathoids – Lab 5: Felsic Minerals
Oct. 15/16	6. Pegmatite Minerals: mica, tourmaline, etc. – Lab 6: Pegmatite Minerals
Oct. 22/23	Midterm exams (theory & lab)
Oct. 29/30	<i>Reading Week</i>
Nov. 05/06	7. Metamorphic minerals – Lab 7: Metamorphic Al- and Ca-silicates
Nov. 12/13	8. Surficial Minerals - Lab 8: Hydroxides, sheet silicates, zeolites
Nov. 19/20	9. Accessory & Ore Minerals – Lab 9: Oxides, native elements and sulphides
Nov. 21/22	10. Halides, Carbonates, Sulphates – Lab 10: Halides, Carbonates, Sulphates
Dec. 03/04	11. Analytical Methods - Lab 11: Final Lab exam

Times and locations

All lectures will be held in-person (in HP3120) each Thursday from 4:35 - 6:25 pm, the lab sessions will be held in-person Fridays from 8:35 - 11:25 am or from 2:35 am - 5:25 pm (in room HP2120), depending on the lab section. Students should attend the lab section that they have registered in. Exceptions can be made in special circumstances (which should be cleared with the instructors). All students must follow lab protocols.

Teaching team

Instructor: Ingrid Kjarsgaard Email: ingridkjarsgaard@cunet.carleton.ca

Office hours: by appointment via email

Teaching assistant: Brynja Clark E-mail: BRYNJACLARK@gmail.carleton.ca

Teaching assistant: Sarah Sleigh E-mail: SarahSleigh@gmail.carleton.ca

Office hours: by appointment

Textbooks

Free Textbook: Dexter Perkins <https://opengeology.org/Mineralogy/>

Nesse W (various editions): Introduction to (optical) mineralogy. Oxford University Press. This is a **recommended reference** for this course and copies will be available in the classroom.

Online resources

Lecture ppts and lab assignments, other course material, announcements and grades will be posted on the course website on Brightspace. Other external on-line resources will be given in the first lecture.

Other Materials needed for this course

A clear ruler, protractor and pencil to draw crystal models. Coloured pencils to sketch minerals.

Starting with lab 4 you will examine minerals in hand specimen using a **mineral ID kit**, which is available for purchase at the Campus store (<\$10). Optional: hand lens (10x magnification, with built-in light).

Course requirements

Attendance of lectures and labs is **mandatory**; the lectures serve as introductions to the labs. Lab assignments are to be completed during lab hours and handed in at the end of each lab. Please be punctual, arriving late to class is distracting to other students and teaching staff.

The lab component of the course must be passed in order to pass the course. It is the **student's responsibility** to familiarize themselves with the lab topic (by reading up on it in the lecture ppt or in the textbook) and reading the lab assignment **before** arriving to the lab. This will ensure that you can complete the lab assignment in time. Lab assignments handed in late will be subject to deductions.

Exams

There will be four exams during the course: (1) a midterm theory exam (ca. 1hr) during lecture hours covering the first six lectures, (2) a midterm lab exam (two hours, during lab hours) covering the first six labs; (3) a final lab exam (two hours, during lab hours) covering the labs of the second half of term; (4) an officially scheduled final exam (2 hrs) during the official examination period that will cover material of the entire course.

Grade Composition

40% 10 Lab assignments
10% Midterm theory exam
10% Midterm lab exam
10% Final lab exam
30% Final theory exam

Academic Accommodations, Regulations, Plagiarism, Etc.

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals. Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference.

The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University. More information can be found at: <https://students.carleton.ca/course-outline/>

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website:

<https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>.

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website](#).

Addressing Human Rights Concerns

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual

orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca.

Religious Obligations

Please contact me with requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation (PDF, 2.1 MB).

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>

Accommodations for Missed Work

Carleton recognizes that students may experience unexpected, temporary incapacitation (i.e., illness, injury, or extraordinary circumstances outside of a student's control). As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>

Note that these forms should be used for short-term concerns related to missed work; if you are experiencing chronic, ongoing challenges which necessitate a broader solution, I recommend reaching out to the Paul Menton Centre and/or the Care Support team.

For Pregnancy

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the Student Guide to Academic Accommodation (PDF, 2.1 MB).

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the Senate Policy on Accommodation for Student Activities (PDF, 25KB).

Academic Integrity

Academic Integrity is upholding the values of honesty, trust, respect, fairness, responsibility, and courage that are fundamental to the educational experience. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity.

(Adapted from [Carleton University's Academic Integrity Policy](#), 2021).

Examples of actions that do not adhere to Carleton's Academic Integrity Policy include:

- Plagiarism
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams
- Using artificial intelligence tools such as ChatGPT when your assessment instructions say that it is not permitted

Please review the checklist [linked here](#) to ensure you understand your responsibilities as a student with respect to academic integrity and this course.

Sanctions for Not Abiding by Carleton's Academic Integrity Policy

A student who has not upheld their responsibilities under Carleton's Academic Integrity Policy may be subject to one of several sanctions. A list of standard sanctions in science can be found [here](#). Additional details about this process can be found on [the Faculty of Science Academic Integrity website](#). Students are expected to familiarize themselves with and follow the Carleton University [Student Academic Integrity Policy](#). The Policy is strictly enforced and is binding on all students.

Artificial Intelligence use in this course

Students may only use AI tools for basic word processing functions, including grammar and spell checking (e.g. Grammarly, Microsoft Word Editor, Copilot) and to summarize definitions and explanations of scientific concepts. It is not necessary to document the use of AI for the permitted purposes. If you have questions about a specific use of AI that isn't listed above, please consult your instructor.

This policy ensures that student voices and ideas are prioritized and authentically represented, maintaining the integrity of the work produced by students while allowing basic support to enhance clarity, correctness, layout and flow of ideas. The goal of adopting a limited use of AI is to help students develop foundational skills in writing and critical thinking by practicing substantive content creation without the support of AI.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the [7 Rights and Responsibilities Policy](#) for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Student Concerns

If a concern arises regarding this course, **your first point of contact is me**: Email or talk to me during lab hours or after the lecture and I will do my best to address your concern. **Note**: You can also bring your concerns to [Ombuds services](#).

Assistance for Students

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>