

Mineral Deposits Syllabus

Department of Earth and Environmental Sciences

ERTH 4151 Winter 2023-2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Yana Fedortchouk	yana@dal.ca	T, 10am-12pm, LSC 3050
Richard Cox	Richard.cox@dal.ca	TBD

Course Description

This course is an introduction to the geology of metallic ore and some industrial mineral deposits. Emphasis is given to the ore formation processes that lead to the economic concentrations of commodities. The course integrates many Earth Science disciplines. Laboratory work introduces ore study in reflected light microscopy.

Course Prerequisites

ERTH 3010.03, 3140.03

Course Exclusions

n/a

Student Resources

Additional resources are posted on Bright Space.

Course Structure

Course Delivery

The course is delivered in-person. If a student has to stay home due to sickness or other reasons, they can reach out to the instructor 30 min before the beginning of the class to request a Teams session and attend the class via Teams.

Lectures

M, W 13:05 – 14:25pm LSC-C210

Laboratories

M 8:35 – 11:25am LSC-B2020A weekly

Tutorials

n/a

Course Materials

There is no required textbook(s)

Lecture material is based on several sources including:

- L. Robb “Introduction to Ore-Forming Processes”, Wiley, 2009
- John Ridley “Ore Deposit Geology” 2013 Cambridge University Press

Additional materials include:

- Ore Deposit Models vol. 1 and vol. 2, 1988 and 1993, Geological Association of Canada to use for in-class presentations (available to borrow from the instructor)
- Ore Mineral Atlas by Marshall, Anglin and Mumin, 2004, Geological Association of Canada to use during lab sessions (will be provided during the labs)
- Course website on Brightspace

Assessment

Assignments

Assignment	Weight (% of final grade)	Due dates
Theory Problem Sets (5)	10% (2% each)	Jan 15, 22, Feb 5, 12, Mar 18
“Deposits Summary”	5%	Mar 25
Lab assignments (10)	25% (2.5% each)	every Monday
Presentation 1	5%	January 31
Presentation (group) 2	5%	March 6
Term Project	15%	April 1

Tests/quizzes

Test	Weight (% of final grade)	Due dates
Lab Test/Project	15%	Mar 25
Final Test/Project	20%	Apr 18

Other course requirements

n/a

Conversion of numerical grades to final letter grades follows the

Dalhousie Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

Late submission and assignments will not be accepted and marked unless there was an arrangement with the instructor prior to the deadline for this component. Student Declaration of Absence form is not needed for late or missed requirements, instead the students can simply email to the instructors to arrange for alternative assignment submission time.

Students who unable to deliver their class presentations in person can do presentation by Teams during the regular class time.

Course Policies related to Academic Integrity

All lab and theory assignments, midterm and final projects are individual. Students are encouraged to work together but no parts of the assignments, labs and projects can be copied from another student. There is one group presentation.

There is no limitation on using AI and large language models (e.g., ChatGPT). However, students have full responsibility of the content they submit.

Learning Objectives

- Understand principles of evaluation and classification of mineral deposits and ore-forming processes.
- Evaluate the geological, economical, geographical and other factors affecting the prospectively of a deposit, recognize stages of exploration and mining
- Ore formation and mechanism of concentration, stratigraphic and structural control of mineral deposits and their metallogeny.
- Identify ore minerals and interpret ore textures and alteration assemblages in hand samples and under a microscope in reflected and transmitted light
- The application of isotopes, trace elements, and thermobarometry to understanding ore forming processes.
- Link the formation of ore deposits to large-scale geologic and tectonic processes; recognition and evaluation of metallogenic provinces and epochs

Course Content

Month	Topics
January	<ul style="list-style-type: none"> • Classification of ore deposits, reserves vs. resources • Igneous ore-forming processes • Magmatic-hydrothermal ore-forming processes
February	<ul style="list-style-type: none"> • Hydrothermal ore-forming processes • Surficial and supergene ore-forming processes • Sedimentary ore-forming processes
March	<ul style="list-style-type: none"> • Geochemical and geophysical exploration methods • Gem Deposits, Diamond exploration • Deposits of Critical Minerals • Appalachian Metallogeny • Global Tectonics and Metallogeny

The course includes guest lectures by experts on selected topics

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at:

https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:

https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.