Igneous Petrology Syllabus

Department of Earth and Environmental Sciences

ERTH3010 Fall 2025

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982, recognizes and affirms Aboriginal and Treaty rights in Canada.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Yana Fedortchouk	yana@dal.ca	Dates, Time (TBD), LSC-B3050
Richard Cox	Richard.cox@dal.ca	Dates, Time (TBD), LSC-B3080

Course Description

Igneous petrology is the study of the field relations, mineralogy, texture, and geochemistry of volcanic and plutonic rocks. Lectures discuss the classification and graphical representation of igneous rocks; the production, differentiation, and emplacement of magma in different tectonic environments. Practical work consists of laboratory petrographic examination and field trips.

Course Prerequisites

ERTH 2002 and ERTH2380

Course Exclusions

n/a

Student Resources

Students can use the Teams channel for this class to post questions for the instructors.

Both instructors will have office hours (TBD)

Students are welcome to use textbooks located in the lab 2020A.

Course Structure

Course Delivery

In-person.

Lectures

Wednesdays and Fridays, 10:05 – 11:25am, LSC-B2020A.

Laboratories

Fridays, 14:35 – 17:25pm, LSC-B2020A, weekly.

Field Trips

Sundays: October 19, 9am – 17pm (South Mountain Batholith); October 26, 7am – 15pm (North Mountain Basalt).

Course Materials

Course materials are posted on Course Brightspace page.

Some lecture material is based on John D. Winter “Introduction to Igneous and Metamorphic Petrology”. Prentice Hall, 2001, 2010. [Chapters 1-19]. It is available in the LSC-B2020A lab.

Assessment

Assignments

Theory assignments (10)	**Due Wednesdays starting October 1**	**20%**
Lab assignments (5)	**Due Fridays starting October 10**	**10%**
Field trips with lab component (2)	**Due November 18 and December 5**	**20%**
Volcano Project	**Due Monday November 17**	**15%**
Lab Project	**Due December 10**	**10%**

Tests/quizzes

- Midterm **October 24, 10:05-11:25am, 1.5 hours** **10%**
  Will cover material from two units "Introductory concepts" and "Geochemistry" lectures 1-9.

Final exam

- will take place during the exam period **15%**

Other course requirements

There are two mandatory field trips in this course on Sunday October 19 and October 26.

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 assignments, labs, submission of the Volcano project components will not be accepted and marked unless an arrangement with the instructor has been made prior to the deadline for this component.

A make-up for a missed midterm will be made if an arrangement with the instructor has been made prior to the midterm.

In order to make an arrangement for a late assignment or to miss a test, send email to the Instructor (yana@dal.ca) for arranging to miss a lab sessions email to (richard.cox@dal.ca).

Course Policies related to Academic Integrity

All lab and theory assignments and the projects in this class are individual. Discussions during lab sessions are encouraged, however, no parts of the lab assignments and projects can be copied from another student.

Students are encouraged to work in groups during the field trips while have to complete their own field trip notes individually.

No plagiarism software will be used in course.

Students are advised **not to use or rely on AI (e.g., ChatGPT)** when completing the assignments. If they chose to do so – the students are fully responsible for all the mistakes made by AI software. Theory assignments are designed to prepare students for the midterm and final exam tests. Therefore, it is essential that students do these assignments to prepare for the tests.

Learning Objectives

- Identify and classify igneous rocks in the field, in hand samples, and in thin sections, using internationally established criteria.
- Plot and interpret different types of geochemical data to learn about the origin, source and tectonic environment of magma formation and crystallization.
- Identify and interpret volcanic and plutonic rocks in the field and describe their field relationships including primary and secondary features.
- Integrate field, petrographic, and analytical data to investigate the origin and crystallization paths of igneous rocks, and report the results in appropriate format.
- Understand melting mechanism and features of igneous rocks in different tectonic environments.
- Explain the significance of igneous rocks and processes to understanding tectonic and ore-forming processes. Recognize geological hazards associated with specific types of igneous activity.

Course Content

Week	Date	Lesson Topic(s)	Reading/Assessment
1	September 22	Classification, textures of igneous rocks; Properties of magma, eruption styles	Chapters 2,3,4
2	September 29	Volcanic and intrusive landforms; Composition and differentiation of Earth	Chapters 1,4/ Assignment 1
3	October 6	Geotherm, magma generation; Phase diagrams	Chapters 1,6 /Assignment 2
4	October 13	Geochemistry: major and trace elements	Chapters 8,9 /Assignment 3
5	October 20	Geochemistry: isotopes	Chapters 9/Assignment 4 + Midterm
6	October 27	Mantle petrology, generation of basaltic melts	Chapters 10/Assignment 5
7	November 3	Differentiation of magmas; Layered mafic intrusions (LMI)	Chapters 11,12 /Assignment 6
8	November 10	READING BREAK	Assignment 7
9	November 17	Basaltic provinces: MORB, OIB, CFB	Chapters 13,14,15 /Assignment 8
10	November 24	Arc magmatism and Granitoids	Chapters 16,17,18 /Assignment 9
11	December 1	Continental Alkaline magmatism; Evolution of magmatism on Earth	Chapters 19 / Assignment 10
12	December 8		Lab project

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 Mi'kmaq and Indigenous Relations (including the Elders in Residence program, Land Acknowledgements, Understanding Our Roots, and much more) can be found at: https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.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/mission-vision-values/global-relations.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/campus_life/ssc.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: https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion.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/content/dam/www/about/leadership-and-governance/governing-bodies/code-student-conduct.pdf

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/content/dam/www/about/leadership-and-governance/university-policies/fair-dealing-policy.pdf

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.