

**Faculty of Science Course Syllabus**  
**Department of *Earth and Environmental Sciences***

*ERTH 3010*  
*Igneous Petrology*  
*Fall 2023-2024*

***Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.***

***We acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.***

**Instructor(s):** *Yana Fedortchouk*      [Yana@dal.ca](mailto:Yana@dal.ca)      *Office hours (TBD)*  
*Labs: Richard Cox*      [Richard.Cox@dal.ca](mailto:Richard.Cox@dal.ca)      *Office hours (TBD)*

**Lectures:**      *T, R*                      *13:05-14:25*                      *LSC 2020A*

**Laboratories:** *12 (3 hours); M 14:35-17:25*                      *LSC 2020A*                      &                      *2 day-trips*

**Tutorials:**      *n/a*

**Course delivery:**      *In-person*

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### **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 2002.03 and ERTH 2380.03*

### **Course Exclusion**

*n/a*

### **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 Materials

- John D. Winter "Introduction to Igneous and Metamorphic Petrology". Prentice Hall, 2nd edition, 2010 or 1st 2001. [Chapters 1-19]
- Course Brightspace page

### Course Assessment

Assessment	Weight (% of final grade)	Date
<b>Assignments<sup>1</sup></b>		
Theory assignments (10)	20%	Due Tuesdays starting Sept 12
Lab assignments (7)	14%	Due Mondays starting Sept 18
Weekly discussion questions (8)	5%	Due Tuesdays starting Sept 19
Volcano Project	15%	Due December 4
Field trips with lab component (2)	14%	
Final Lab Assignment	7%	December 5, 6
<b>Tests/quizzes</b>		
Midterm (1.5 hours)	10%	October 12
Final exam (3 hours) <sup>1</sup>	15%	(Scheduled exam period)

### Other course requirements

There are two mandatory field trips in this course on **Sunday September 24 and October 29**.

<sup>1</sup> Final Exam will be completed online. Presence on the campus is not required. No monitoring/proctoring software will be used. Technology required includes any computer and an access to the Internet. Both exams will be given as downloadable assignment, which completion does not require stable Internet; email submission will be used as a backup.

### Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

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

### Course Policies on Missed or Late Academic Requirements

Late assignments will not be accepted and marked unless there was an arrangement with the instructor prior to the deadline for this component.

Late submission of the Volcano project components will not be accepted unless an arrangement with the instructor has been made prior to the deadline.

If the students need to make an arrangement for a late assignment or to miss a test, they can either use SDA or simply send email to the Instructor.

**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.*

**Course Content**

- *Introduction/Fundamental Concepts [Ch. 1]*
- *Classification of Igneous rocks [Ch. 2]*
- *Textures of Igneous rocks [Ch. 3]*
- *Field relationships [Ch. 4]*
- *Introduction to Thermodynamics [Ch. 5]*
- *Phase rule. Binary systems [Ch.6]*
- *Ternary systems [Ch. 7]*
- *Composition and differentiation of the Earth [Ch. 1]*
- *Chemical Petrology-I: Major and minor elements [Ch. 8]*
- *Chemical Petrology-II: Trace Elements [Ch. 9]*
- *Chemical Petrology-III: Isotopes [Ch. 9]*
- *Mantle Petrology and Mantle Melting [Ch. 10]*
- *Generation of Basaltic Magmas [Ch. 10]*
- *Differentiation of Magmas [Ch. 11]*
- *Layered Mafic Intrusions [Ch. 12]*
- *Mid-Ocean-Ridge volcanism [Ch. 13]*
- *Oceanic Intraplate Volcanism [Ch. 14]*
- *Continental Flood Basalts [Ch. 15]*
- *Subduction-related magmatism: Island Arcs [Ch. 16]*
- *Subduction-related magmatism: Continental Arcs [Ch. 17]*
- *Granitoid Rocks [Ch. 18]*
- *Continental Alkaline Magmatism [Ch. 19]*
- *Evolution of magmatism through the Earth's history*

## University Policies and Statements

**This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

### Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

**Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

### Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

**Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.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.

**Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

### 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

**Statement:** <http://www.dal.ca/cultureofrespect.html>

### 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 (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

### Important Dates in the Academic Year (including add/drop dates)

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loadusercredits=False>

### University Grading Practices

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

## Student Resources and Support

### Advising

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

**Science Program Advisors:** <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

**Indigenous Student Centre:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

### Academic supports

**Library:** <https://libraries.dal.ca/>

**Writing Centre:** [https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

**Studying for Success:** [https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

**Copyright Office:** <https://libraries.dal.ca/services/copyright-office.html>

**Fair Dealing Guidelines** <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

### Other supports and services

**Student Health & Wellness Centre:** [https://www.dal.ca/campus\\_life/health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness.html)

**Student Advocacy:** <https://dsu.ca/dsas>

**Ombudsperson:** [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

### Safety

**Biosafety:** <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

**Chemical Safety:** <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

**Radiation Safety:** <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

**Scent-Free Program:** <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

**Dalhousie COVID-19 information and updates:** <https://www.dal.ca/covid-19-information-and-updates.html>