DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus

Department of *Earth Sciences*

ERTH3010

Igneous Petrology

Fall 2018 - 2019

Instructor(s): *Yana Fedortchouk (labs. Luke Hilchie)* *yana@dal.ca* *LSC 3050*

Lectures: *T, R 10:05 – 11:25* *LSC C202*

Laboratories: *12 (3 hours); 2 day-trips*

Tutorials: *n/a*

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 two field trips.

Course Prerequisites

ERTH 2002.03 and ERTH 2380.03

Course Objectives/Learning Outcomes

- *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 website on Brightspace*

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Course Assessment

Component	Weight (% of final grade)	Date
Tests/quizzes		
Midterm	*10%*	*October 16*
Lab Exam	*10%*	*November 29*
Final exam	*30%*	*(Scheduled by Registrar)*
Assignments		
Lab assignments (8 in total)	*20%*	
Weekly theory assignments	*10%*	
Volcano Project	*10%*	
Lab Project (SMB)	*5%*	
Field Trips notes	*5%*	

Other course requirements

*There are two field trips in this course on **Sunday September 16 and October 28**. The attendance is **mandatory** and field trip two forms a part of the Lab Project.*

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

Late assignments will not be accepted and marked. A missed midterm, lab exam, or final exam require a doctor's note. It will not be possible to make up the field trip if it is missed. The marks for the missed class components can be made-up only if there is an arrangement with the instructor prior to this component.

All lab and theory assignments and the projects in this class are individual. 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, but have to complete their own field trip notes individually.

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]*

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- *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

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Faculty of Science Course Syllabus (Section B)
ERTH3010

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

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

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

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).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)
https://www.dal.ca/academics/important_dates.html

University Grading Practices
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy)
https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

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Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: https://www.dal.ca/faculty/science/current-students/academic-advising.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: 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

Studying for Success: 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/services-support/student-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

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