



## EGEO-GEOG-2001H-A: Earth Materials 2023WI - Peterborough Campus

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### Instructor:

Instructor: Ian Power

Email Address: [ianpower@trentu.ca](mailto:ianpower@trentu.ca)

Phone Number: 705-748-1011 x6257

Office: Chemical Sciences Building F110

Office Hours: Mondays, 1-2 pm and Wednesdays, 10-11 am

### Meeting Times:

#### Lectures:

Monday, 12:00 to 12:50 PM, DNA, Room B110.1

Wednesday, 9:00 to 9:50 AM, DNA, Room B110.1

#### Labs:

Friday, 9:00 to 11:50 AM, ESC, Room C111.3

Friday, 1:00 to 3:50 PM, ESC, Room C111.3

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### Co-instructors and Teaching Assistants:

Heather Klyn-Hesselink (Master's student), [heatherklynhesselink@trentu.ca](mailto:heatherklynhesselink@trentu.ca).

The teaching assistant can answer questions regarding the labs. Other enquiries should be to the instructor.

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## Department:

Academic Administrative Assistant: Mary O'Grady

Email Address: [maryogradys@trentu.ca](mailto:maryogradys@trentu.ca)

Phone Number: (705) 748-1011 ext. 7199

Office: ESC C204

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## Description:

Introduces students to the study of rocks and minerals, including their description, classification, and origin. Rocks and minerals of environmental (e.g., human health) and economic importance are emphasized. Practical laboratory exercises enable students to become proficient at identifying rocks and minerals using physical and optical properties. Prerequisite: GEOG 1040H or permission of instructor. Excludes EGEO-GEOG 3000H.

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## Learning Outcomes:

I have developed this course to address several learning outcomes. By the end of the course, a successful student should be able to:

1. Examine the crystalline nature, chemical composition, physical properties, and optical properties of minerals while relating fundamental mineral properties to their underlying crystallographic structure.
  2. Describe rock-forming processes and place rocks within their plate tectonic context.
  3. Recognize, describe, and classify rocks in both hand specimen and thin section.
  4. Apply mineralogy and petrology concepts and skills learned in lecture and lab exercises to geological, materials science, environmental, and economic topics.
  5. Interpret, present, and communicate Earth materials information.
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## Course Fees:

Up to \$35 to cover the cost of a hand lens and lab supplies.

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## Texts:

Required (available at the Trent Bookstore or online): Klein, C. and Philpotts, A. Earth Materials: Introduction to Mineralogy and Petrology – Second Edition. Cambridge Press, 2017.

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## Readings:

Readings and review questions from Klein and Philpotts text are assigned with each lecture.

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## Assessments, Assignments and Tests:

Your grade is based on laboratory exercises, a geoscience project in mineralogy and petrology, lab quizzes and final exam, and lecture-based midterm and final exams. Your laboratory grade includes 6 reports based on the exercises where you study mineral and rock hand specimens and conduct petrography using a polarizing microscope (20% total). Lab quizzes (4 x 2.5% = 10%) and final lab exam (20%) will test your identification skills and knowledge of minerals and rocks. You may select from several geoscience projects (5%) that you will independently complete: Trent rock hunt, report on KREEM seminar, Marmora Miner's Loop, Bancroft Mineral Museum, or choose your own adventure in geoscience. Midterm (15%) and final (30%) exams will test your understanding and application of the lecture material. The final exam covers all lecture material.

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## Grading:

### **Type of Assignment, Weighting, Due Date**

Note: Lab reports are 20% of your final grade

Lab Exercise 1 – Mineral properties, Jan. 27

Lab Exercise 2 – Mineral identification, Feb. 3

Lab Exercise 3 – Optical mineralogy, Feb. 17

Midterm exam, 15%, Mar. 1

Lab Exercise 4 – Igneous minerals and rocks, Mar. 10

Lab Exercise 5 – Sedimentary minerals and rocks, Mar. 24

Lab Exercise 6 – Metamorphic minerals and rocks, Mar. 31 (submit earlier for grading and feedback prior to lab final exam)

Lab quizzes, 4 x 2.5% = 10%, see Schedule (there will be no makeup quizzes)

Geoscience projects, 5%, Mar. 24 or earlier if completed

- Trent Rock Hunt
- Report on virtual presentation held by Kawartha Regional Earth Scientists, Engineering, and Metallurgy Network (KREEM)
- Marmora Miner's Loop
- Bancroft Mineral Museum
- Choose your own adventure in geoscience

Lab final exam on Exercises 1–6, 20%, Mar. 31

Final exam on all lecture material, 30%, To be scheduled

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## Grade Total by Withdrawal Date:

The grade total by the withdrawal date is 25%.

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## Schedule:

### Lecture Topics and Laboratory Exercises

#### Week 1

**Jan. 9:** Course overview; Introductory mineralogy and petrology

**Jan. 11:** Materials of the solid earth

**Jan. 13:** Lecture - Identifying minerals; Start Lab 1 - Mineral properties

#### Week 2

**Jan. 16:** Fundamentals of crystal structures I

**Jan. 18:** Fundamentals of crystal structures II

**Jan. 20:** Finish Lab 1 - Mineral properties; Start Lab 2 - Mineral identification

#### Week 3

**Jan. 23:** Crystallography

**Jan. 25:** Optical mineralogy I

**Jan. 27:** Finish Lab 2 - Mineral identification

#### Week 4

**Jan. 30:** Optical mineralogy II

**Feb. 1:** Igneous mineralogy

**Feb. 3:** Lab quiz #1; Start Lab 3 - Optical mineralogy

#### Week 5

**Feb. 6:** Igneous rock formation I

**Feb. 8:** Igneous rock formation II

**Feb. 10:** Finish Lab 3 - Optical mineralogy

### **Week 6**

**Feb. 13:** Igneous rocks and tectonics I

**Feb. 15:** Igneous rocks and tectonics II

**Feb. 17:** Lab quiz #2; Start Lab 4 - Igneous minerals and rocks

### **Week 7**

Reading week

### **Week 8**

**Feb. 27:** Review & integration

**Mar. 1:** Midterm exam

**Mar. 3:** Finish Lab 4 - Igneous minerals and rocks

### **Week 9**

**Mar. 6:** Sediment formation and transport I

**Mar. 8:** Sediment formation and transport II

**Mar. 10:** Lab quiz #3; Start Lab 5 - Sedimentary minerals and rock

### **Week 10**

**Mar. 13:** Sedimentary rocks I

**Mar. 15:** Sedimentary rocks II

**Mar. 17:** Finish Lab 5 - Sedimentary minerals and rock; Start Lab 6 - Metamorphic minerals and rocks

### **Week 11**

**Mar. 20:** Metamorphism

**Mar. 22:** Metamorphic minerals and rocks

**Mar. 24:** Lab quiz #4; Finish Lab 6 - Metamorphic minerals and rocks

**Week 12** - Lab review sessions will be scheduled during this week to prepare for the lab final exam.

**Mar. 27:** X-ray diffraction

**Mar. 29:** Review for lab exam

**Mar. 31:** Lab final exam on Exercises 1 through 6

### **Week 13**

**Apr. 3:** Mineral evolution or Guest lecture

**Apr. 5:** Review & integration

**Final exam: To be scheduled; covers all lecture material**

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## **Course Guidelines:**

**Blackboard:** Lecture slides, Lab exercise guides, and Geoscience projects are posted on Blackboard. All assignments can be uploaded to Blackboard for grading.

**Communication:** Asking questions in class helps you *and* others learn while also helping me assess your learning. Email me for shorter questions or minor matters, and I usually respond promptly. Please use my office hours, but you are welcome to stop by my office to discuss the course at any time. Although you are welcome to email me outside work hours, I may reply on the next business day.

**Labs:** Labs are scheduled every week. Also, studying the specimens outside class time will help you be successful on quizzes and lab final exam. Additionally, the Geomorphology lab (ESC C111.3) is usually open Monday to Friday during work hours. You are welcome to check the schedule posted on the door and come in to study. Rock and mineral specimens are freely accessible and you may request access to the microscopes that are locked in cabinets by contacting your instructor, TA, or Craig Murray (ESC A201.1). Finally, students must complete the lab exercise to be graded on their reports.

**Lab quizzes:** There are four lab quizzes (2.5% each) scheduled during the term. There are no makeup quizzes.

**Late Policy:** You are allowed one 5-day extension on a laboratory assignment. You must inform me and the teaching assistant in person or by email (ianpower@trentu.ca) that you have opted for an extension before the assignment is due.

**Lab Bonus:** You can receive a bonus of **25% on a single lab report** by attending one of the seminars in the ***Trent School of the Environment Seminar Series*** and providing a short paragraph that summarizes the key points of the seminar and what you learnt.

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## University Policies:

### Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's *Academic Integrity Policy*. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: [www.trentu.ca/academicintegrity](http://www.trentu.ca/academicintegrity).

### Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that they may need accommodations to succeed in a course, the student should contact the Student

Accessibility Services Office (SAS) at the respective campus as soon as possible.

## Sharing and Distribution of Course Content

Students in this class should be aware that classroom activities (lecture, seminars, labs, etc.) may be recorded for teaching and learning purposes. Any students with concerns about being recorded in a classroom context should speak with their professor. If a student shares or distributes course content in any way that breaches copyright legislation, privacy legislation, and/or this policy, the student will be subject to disciplinary actions under the relevant Academic Integrity Policy, the Charter of Student Rights & Responsibilities, or the Policy on the Protection of Personal Information, at a minimum, and may be subject to legal consequences that are outside of the responsibility of the university.

## Student Absenteeism, Missed Tests and Examinations

Students are responsible for completing all course requirements, including attending classes and meeting assignment deadlines as specified on their syllabus.

Adjustments and deferrals to dates for participation, assignment submissions, tests, midterms and final examinations are not automatic. It is the student's responsibility to email their instructor immediately if they are unable to fulfill academic requirements.

Courses delivered remotely may involve student participation in scheduled (synchronous) classes via web-based platforms, such as Zoom. Students unable to participate (i.e., by video and/or audio) should email their instructors to request alternative arrangements for participation in these scheduled (synchronous) classes.

Students are required to be available for all tests, midterms and exams that are listed in their course syllabus and scheduled by their instructor or the Office of the Registrar. Depending on their program, the instructor or the chair/director may decide on alternative arrangements for exams and tests. Normally a doctor's note or supporting documentation is not required; however, when a student's success in the course or program is in jeopardy as determined by the instructor or chair/director, documentation may be requested.

Specific SAS accommodations can be implemented for students registered with Student Accessibility Services (SAS), but it is the responsibility of the student to make these arrangements in advance as per SAS guidelines, and to discuss accommodations of due dates with their instructors.

Students can notify the Office of the Registrar of their wish to observe cultural or religious holidays during scheduled examination periods by the deadline set in the Academic Calendar. Personal travel plans are not acceptable reasons for missing tests or exams.

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