

University of Toronto-Scarborough

Department of Physical and Environmental Sciences

**EESC36H3 Petrology - Fall 2016**

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**Office hours: Tuesday 15 pm to 16 pm, and by appointment**

Teaching Assistant: Shane Sookhan (PhD candidate)

**Lectures: Tuesday, 18 pm – 20 pm (Room HW 402) – may change !!**

**Labs: Wednesday, 9 am – 11 am (Room SW 313) – may change !!**

Overview:

Petrology is the study of rocks. This course examines the origin, evolution and distribution of “hard rocks”, i.e. igneous and metamorphic rocks. In the classroom portion fundamentals on igneous melt generation, evolution and crystallisation processes will be introduced. Furthermore, we will look at magmatic and metamorphic processes in various plate tectonic settings e.g. generation of new oceanic crust at mid ocean ridges or partial melting and metamorphism along subduction zones. Additionally, we will briefly look into the petrology of certain types of sedimentary rocks. Optical mineralogy (microscopy) using polarized microscopes enables identification of rock forming minerals, petrographic description and classification of selected rock samples and thin sections.

Course objectives:

- Development of optical microscopy skills and their application
- Petrographic description (hand sample, thin section)
- Interpretation of petrography regarding conditions of petrogenesis (e.g. mineral phase relations)
- Recognition and interpretation of mineralogical and textural changes in rocks
- Interpretation of metamorphic mineral assemblages and reactions (pressure-temp. conditions)
- Knowledge about metamorphic facies and their distribution due to tectonic and thermal controls
- Properties and formation of chemical sedimentary rocks

To allow us to move through the material in an efficient way, please review the following topics in your Mineralogy EESB19 and Earth History EESB15 notes of the prerequisite:

- Description and ID of rock forming minerals (mineralogy)
- Basics regarding magmatic rocks (common minerals, plutonic vs. volcanic rocks)
- Basics regarding metamorphic rocks (common minerals, metamorphic facies)
- Basics regarding chemical sedimentary rocks (common minerals, precipitation)

### Important:

**Important point:** our lab exercises are held in a space classified as a *laboratory* – this means that we all **should be dressed in lab coats – please bring them for tutorials (labs) and wear them at all times.** Another consequence: **there is no eating or drinking in the lab.** There is also a desk in front of SW313 where you can leave your snacks and drinks.

### Readings:

**Required text:** **Earth Materials – Introduction to Mineralogy and Petrology,**  
**C. Klein & A. Philpotts, 2013, Cambridge Univ. Press**

**Additional (Course reserve):** Introduction to Optical Mineralogy, W. D. Nesse, 2013, Oxford Univ. Press

### Lecture & Lab Schedule - Subject to change:

Week	Date	Lecture (Tuesday)	Lab (Wednesday)	Notes
1	Sept. 8/9	Introduction – Structure of Earth and Petrology	<b>Lab Intro:</b> <b>Optical Microscopy</b>	
2	Sept. 15/16	Igneous Petrology (origin of magmas, magmatic processes and chemical evolution of magmas)	<b>Lab 1:</b> <b>Theory, Mic. Minerals</b>	
3	Sept. 22/23	Igneous Petrology (origin of magmas, magmatic processes and chemical evolution of magmas, Tectonic-igneous rock association)	<b>Lab 2:</b> <b>Theory, Mic. Minerals</b>	
4	Sept. 29/30	Igneous Petrology (Tectonic-igneous rock association, mineralogy of magmatic rocks, classification)	<b>Lab 3: Theory, Mic. Rocks</b>	
5	Oct. 6/7	Igneous Petrology (Classification, texture of igneous rocks & field relations)	<b>Lab 3: Theory, Mic. Rocks</b>	<b>Quiz 1</b>
6	Oct. 13/14	<b>Thanksgiving – Reading Week</b>		
7	Oct. 20/21	Metamorphic Petrology (Intro to metamorphism, mineralogy of metamorphic rock)	<b>Lab 4: Theory, Mic. Rocks</b>	<b>Oct. 23 or 24 for 1-day Field trip</b>
8	Oct. 27/28	Metamorphic Petrology (Classification, deformation and texture of metamorphic rocks)	<b>Lab 5: Theory, Mic. Rocks</b>	
9	Nov. 3/4	<b>Midterm</b>	<b>Lab 6: Theory, Mic. Rocks</b>	
10	Nov. 10/11	Metamorphic Petrology (Classification, deformation and texture of metamorphic rocks)	<b>Lab 7: Theory, Mic. Rocks</b>	<b>Quiz 2</b>
11	Nov. 17/18	Metamorphic Petrology (Metamorphic reactions and metamorphic facies)	<b>Lab 8: Theory, Mic. Rocks</b>	

12	Nov. 24/25	Metamorphic Petrology (Metamorphic reactions and metamorphic facies)	Lab 8: Theory, Mic. Rocks	Quiz 3
13	Dec. 1/2	Metamorphic Petrology (Metamorphic reactions and metamorphic facies)	Practical Test	
14	Dec. 4 - 7	Study Break		
15	Dec. 8 - 22	Final Exams		
17	Dec. 23	Christmas Break Starts		

### **Marking Scheme:**

8 Lab assignments (each 4%)	40%
3 Online Quizzes (each 2%)	6%
1-Day Field Trip	8%
Midterm	18%
Final Exam	28%
Total	100%

### **Lectures and Lab exercises:**

**ALL students are expected to attend ALL lectures. *It is the responsibility of the student to ensure that notes are obtained for any classes missed.***

**Labs are mandatory for all students and the respective assignments are graded.** During tutorials you will have a chance to work more independently in order to strengthen your knowledge; during the lectures you'll receive more guidance throughout the material. The knowledge acquired during the laboratory exercises can also be tested in the 3 Online Quizzes.

### **Required lab materials:**

- A drafting compass (for drawing cycles and arcs)
- A drafting ruler, small scissors, pencils, eraser
- A notebook for tutorials and practice (having some simple drafting paper, without lines or squares, is very useful for this course)

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### **Study Questions:**

I will post a set of study questions on each course topic, which should help you to identify the important course information, study for the quizzes and exams, prepare you for the field trip and to keep on top of the material.

### **Missed academic work:**

If you know that you will miss a deadline then please let me know in advance, as we might be able to work something out. Should you miss a deadline for any term work you will be automatically penalized **10% per day (including weekends)** if you do not follow the following procedure and receive consideration. Within **one week** of the missed deadline you must submit a completed **University of Toronto medical certificate** (available on BB in Course Documents) as well as a **letter from you** describing when you fell ill, how it prevented you from making the deadline and when you returned to school as well as your name and student number and the course code. Submit the certificate and the letter to the secretary in EV-Building (new room number: TBA); Mon-Fri 9-5 (lunch 1-2) [jterakita@utsc.utoronto.ca](mailto:jterakita@utsc.utoronto.ca). Joanne Terakita collects these, but will not make a decision on the cases. Carefully following this process will allow us to properly consider you for consideration regarding your late/missed work for EESB15.

### **Final Examination:**

The final examination is cumulative and will be scheduled by the University and held during the December examination period. The exam will contain multiple choice, true and false and short answer questions. Figures, movies and animations are examinable, as are in-class participation/lab type exercises. The exam will be more heavily focused on post-midterm material. The assigned readings are examinable, the material covered in lecture is weighted more heavily than the readings.

### **Library Service:**

#### ***Research Help: University of Toronto Scarborough Library***

Staff at the UTSC Library will be happy to help you find the resources you need for your assignments, and learn the research skills you will need for success at university.

**Research help is available by phone, e-mail, chat, or in-person in the Library.**

For more information, please see the Library's Help Guide for UTSC

Students: [http://guides.library.utoronto.ca/utsc\\_help](http://guides.library.utoronto.ca/utsc_help)

**Need in-depth or department specific assistance?** Contact Sarah Forbes, Liaison Librarian for Physical and Environmental Sciences: <http://uoft.me/smforbes>

## **Blackboard:**

**Lecture and lab material will be posted on and Online Quizzes will be done through blackboard. Please check daily for updates.**

Blackboard: <https://portal.utoronto.ca>

## **Academic Integrity Statement:**

Academic integrity is one of the cornerstones of the University of Toronto. It is critically and important both to maintain our community which honours the values of honesty, trust, respect, fairness and responsibility and to protect you, the students within this community, and the value of the degree towards which you are all working so diligently. According to Section B of the University of Toronto's Code of Behaviour on Academic Matters which all students are expected to know and respect, it is an offence for students:

- To use someone else's **ideas or words** in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit plagiarism.
- To include false, misleading or concocted **citations** in their work.
- To obtain **unauthorized assistance** on any assignment.
- To provide **unauthorized assistance** to another student. This includes showing another student completed work.
- To submit their own work for credit in **more than one course** without the permission of the instructor.
- To falsify or alter any **documentation** required by the University. This includes, but is not limited to, doctor's notes.
- To use or possess an **unauthorized aid** in any test or exam.

There are other offences covered under the Code, but these are by far the most common. Please respect these rules and the values which they protect. It is your responsibility to ensure that your work maintains academic integrity. If you have any concerns please see the instructor before a potential problem arises. Please familiarize yourself with the Code (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) and also with the handout "How not to plagiarize", available in the Course Documents section on BB. At the University of Toronto academic dishonesty can result in a *mark of zero, a reduction in final grades, denial of privileges, a monetary fine, failure in the course, suspension, permanent record, a recalling of degrees/diplomas and certificates, or expulsion.*

## **Accessibility Needs:**

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: UTSC campus AccessAbility <http://www.utsc.utoronto.ca/~ability/> or St. George Campus DisAbility [disability.services@utoronto.ca](mailto:disability.services@utoronto.ca) or <http://studentlife.utoronto.ca/accessibility>.