

University of Toronto-Scarborough
Department of Physical and Environmental
Sciences **EESB19H3 Mineralogy - Winter 2016**

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Office hours: Tuesday 10.00 am to 11.00 pm, and by appointment

Teaching Assistant: Alice Alex

Lectures: Monday, 1 pm – 3 pm (Room IC 320)

Labs: Monday: 3 pm – 5 pm (Room EV224, EV222)

Overview:

In this course you will learn about minerals, the smallest and most basic building blocks of our planet. These minerals, which can vary in specimen size from microscopic to a macroscopic scale of meters, form aggregates (rocks), fill cavities and caves, form natural resources (e.g. gold, iron-minerals, rock salt), and are often used in our daily life, for example in form of specifically developed concrete mixtures, without being recognized as such. This course will help you to better understand mineral growth, their distinct structure and chemical composition, how they associate with one another, how minerals aggregate to form rocks and what applications minerals are used for.

We will start with an introduction to the study of crystallography, as it is an important tool of Earth and material sciences. This will include the delineation of specific crystal symmetries and morphologies, as well as basic classification of minerals by crystal classes. Furthermore, we will study the mineralogy, including physical and chemical properties, of the most important mineral groups, in which mineral assemblages they occur in form of rocks, and how these are used in our daily life.

To allow us to move through the material in an efficient way, please review the following topics in your chemistry notes of the prerequisite:

- Elements, atoms and atomic structure (nucleus, electrons, atomic orbitals)
- Cations and anions
- Periodic table of the elements (groups of periodic table, metallic, non-metallic and metalloids; sizes of atoms and ions)
- Basic chemical bonding (ionic, covalent and molecular bonds; van der Waals and hydrogen bonds)

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 EV222 and EV224 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**

Complimentary reading: Introduction to Mineralogy, W. D. Nesse, 2nd edition, 2011 or latest edition
Mineral Science, C. Klein & B. Dutrow, 32nd edition
Geologic Dictionary (library)

Lecture & Lab Schedule - Subject to change:

Week	Date	Lecture	Lab	Notes
1	Jan. 4	Lect. 1: Introduction + Crystallography	No lab	
2	Jan. 11	Lect. 2: Crystallography	Lab 1: Crystallography	
3	Jan. 18	Lect. 3: Crystallography	Lab 2: Crystallography	
4	Jan. 25	Lect. 4: Crystal morphology	Lab 3: Crystal morphology	
5	Feb. 1	Lect. 5: Chemical composition, crystal structures and growth, bonds, Mineral properties	Lab. 4: Introduction to Mineral ID techniques	Quiz 1
6	Feb. 8	Lect. 6: Introduction to Microscopy	Introduction to Microscopy	
7	Feb. 15	Thanksgiving – Reading Week		
8	Feb. 22	No class	Midterm (during lab time)	
9	Feb. 29	Lect. 7: Mineral classification and groups, (Ortho-/Di-) Silicates	Lab 5: Respective minerals (incl. microscopy)	
10	March. 7	Lect. 8: (Ring-/chain-/double chain-) Silicates	Lab 6: Respective minerals (incl. microscopy)	Quiz 2
11	March. 14	Lect. 9: (Sheet-/framework-) Silicates Native elements	Lab 7: Respective minerals (incl. microscopy)	
12	March 21	Lect. 10: Carbonates, sulphates, phosphates	Lab 8: Respective minerals (incl. microscopy)	
13	March 28	Lect. 11: Halides, oxides, hydroxides	Lab 9: Respective minerals (incl. microscopy)	Quiz 3
14	April 4	Lect. 12: Ore deposits, use of minerals, remote sensing	No lab	
15	April 5 - 7	Study Break		
16	April 8 - 22	Final Exam		

Marking Scheme:

9 Lab assignments (each 4 %)	36%
3 Online Quizzes (each 2 %)	6%
ROM visit + Mineral Presentation	8%
Midterm	20%
Final Exam	30%
Total	100%

ROM visit and Mineral Presentation:

- Visit the ROM (downtown Toronto) before February 13th, 2016
(Student free admission for post-secondary students on TUESDAYS!!!:
<https://www.rom.on.ca/en/visit-us/accessibility/community-access-network>
Bring your student ID and picture ID!!!)
- At the ROM: Go to the mineral collection and select your favorite 2 minerals
(1 will be chosen!). Take notes and take a picture.
- Tell me before Feb. 22th which mineral you chose and get a date for your presentation
- Make a 5-7 min power point presentation (3 slides) about your favorite mineral
(incl. properties/characteristics) more on the format see blackboard!
- Present your mineral in the allocated presentation time in the
beginning or at the end of the respective lecture.

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 also very useful for this course)

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 instructor. Carefully following this process will allow us to properly consider you for consideration regarding your late/missed work for EESB19.

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

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.utoronto.ca/~ability/> or St. George Campus DisAbility disability.services@utoronto.ca or <http://studentlife.utoronto.ca/accessibility>.