

University of Toronto-Scarborough  
Department of Physical and Environmental Sciences  
**EESB19H3 Mineralogy - Winter 2022- 2023**

**Instructor:** Dr. Heidi Daxberger, EV 466, phone: 416-208-5136, [heidi.daxberger@utoronto.ca](mailto:heidi.daxberger@utoronto.ca)  
**Office hours: Tuesday 10.00 am to 11.00 pm, and by appointment**

**Teaching Assistant:** Adriano Roberto

**Lectures:** **Monday, 1 pm – 3 pm (Room HW 408)**

**Labs:** **Monday: 3 pm – 5 pm (Section 1 in EV2242, Section 2 in EV224)**

**Overview:**

In this course you will learn about minerals, the smallest and most basic building blocks of our planet. These minerals, with 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 together in rocks, and how these are used in our daily life.

Furthermore, we will practice 3D visualization and spatial skills needed in all geology-related disciplines in the form of in-class exercises, laboratory exercises and a 3D printing bonus project.

**Learning Outcomes:**

This course aims to introduce and develop the basic geo-scientific and soft skills so you as a student will be able to/has developed:

- **remember** and **apply** crystallography and mineralogy specific terminology
- **summarize and explain** basic concepts and processes that are related to crystallography, mineralogy and mineral formation (e.g. crystal symmetry, crystal systems, mineral groups, mineral - rock formation processes)
- **apply** the learned knowledge of concepts and methodology in lab exercises
- **describe, identify and differentiate** between important minerals and hence rocks types, and **drawing conclusions** about their formation (lab exercises)
- **retrieve and interpret** basic geologic information from geological maps, cross-sections and Google Earth (lectures, lab exercises)
- **use** given geologic evidence **to support** your **conclusions**
- **relate** given data (e.g. crystallographic parameters, mineral properties) to minerals and formation processes (e.g. mineral deposits and their formation, exploration for deposits)
- **peer and self-assessment skills** (e.g. student presentations)

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, anions)
- Periodic table of the elements (metallic, non-metallic, metalloids, sizes of atoms and ions)

**Readings:**

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

Complimentary reading: Introduction to Mineralogy, W. D. Nesse, any edition (course reserve)  
 A dictionary of earth sciences (course reserve)  
 The facts on file – dictionary of earth sciences (course reserve)

**Lecture & Lab Schedule - Subject to change – Please check Quercus for updated version:**

Week	Date	Topic	Lab	Topic	Student Presentations	Quizzes
1	Jan. 9	Lect. 1: intro to Mineralogy		No Lab		
2	Jan. 16	Lect. 2: Mineral Chemistry	Lab 1	Mineral Chemistry		
3	Jan. 23	Lect. 3 Symmetry - crystallography	Lab 2	Crystallography		Q1:
4	Jan. 30	Lect. 4: Crystallography – Morphology	Lab 3	Crystallography		
5	Feb. 6	Lect. 5: Growth - Morphology – classification - physical Properties	Lab 4	Intro to mineral ID and techniques - physical properties		
6	Feb. 13	Lect. 6: Intro Polarizing Light Microscopy	Lab 5	Intro to mineral ID and techniques - Pol Microscope (intro lab modules)	Midterm?	online
<b>Feb 20-24</b>				<b>Reading Week</b>		
<b>7</b>	<b>Feb. 27</b>	Lect 7: silicates	Lab 6	Lab 5: silicates start	Midterm	online
8	March 6	No Class - PDAC?				Q2:
9	March 13	lect. 8: carbonates, sulphates, phosphates	Lab 7	Lab: 6: Silicate minerals/rocks		
10	March 20	Lect. 9: Sulphides, Halides, Oxides, Hydroxides, native	Lab 8	Lab 7: respective minerals/rocks		
11	March 27	Lect 10:	Lab 9	Lab 8: respective minerals/rocks		
12	April 3	Lect 11: Mineral Analysis - Traces lab	Lab 10	Lab 9 Traces		Q3:
13	April 10	Q & A (last day of term)		<b>Bell ringer</b>		

**Marking Scheme:**

10 Lab assignments (each 3 %)	30%
3 Online Quizzes (weekly, each 0.5 %)	3%
Glossary	3 % (Attention: only graded if submitted by deadlines!)
Documented ROM visit	1.5%
Mineral presentations	4%
Bell Ringer	2%
Midterm	26.5%
<u>Final Exam</u>	<u>30%</u>
Total	100%

**Lectures:**

**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.**

**Lab exercises (3% each – 30%):**

**Labs are mandatory (attendance is built in each lab grade) for all students and the respective assignments are graded.** During laboratories/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 Online Quizzes, term test and in the final exam.

**Required lab materials:**

- Ruler, protractor, small scissors, pencils, eraser
- Lab coat: **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.** Leave your snacks and drinks on the desk in front of EV222 and EV224!

**Mineral Presentations (4%):**

- individual
- 7-minute presentation (max. 5-7 slides)
- **Topics, dates & sign-up: see quercus -> people tab -> group presentation topics**

**Online Quizzes – Individual Work (1%):**

3 online quizzes will be posted (see course schedule) and each quiz is 1 % (3% total) of final grade. Each quiz will consist of roughly 8 - 15 questions (multiple choice, True/False).

**Glossary (3%):**

Part of the course work is to create **six glossary posts (each 0.5%, total 3%)**. The glossary (make your own geodictionary) is hosted on quercus and will include the most important new terminology of the course. You can select **six terms** from the glossary list on quercus. Student contributions will be monitored by the TAs and instructor throughout and by the end of the term (grade based on quality of posts – for more information see glossary main page on quercus).

**Posts only graded if submitted by deadlines: Three of the posts have to be finished by February 18th, the second three posts by April 10!**

**Bell-Ringer Test – Individual Work:**

In the course schedule above, you will find one date for a Bell Ringer Test (worth 2% of final grade). This test will be held in preparation for the final exam. This c. 20-minute bell ringer will test your mineral ID skills and is based on the lecture/lab samples. Before the Bell Ringer happens, the lab (EV 222-224) will be open to look at the lab samples again.

**Student ROM visit (1.5%):**

Visit the ROM mineral and rock collection, take a selfie with your favorite mineral and send it to the instructor for the bonus. Please check the ROM website as there are days / times when admission is free (generally or for students).

### **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. You will find the study questions at the end of each Quercus Module.

### **Midterm and Final Exam (26.5% and 30% accordingly) – Individual work:**

Both, the midterm (2 Days, Dates TBA) and Final Exam (3 Days, dates TBA), will be open book take home exams that may include open ended and reflection questions. To guarantee that rules about academic integrity and ethics are followed, the online plagiarism detection tool will be used.

### **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 **5% 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 **UTSC Verification of Student Illness or Injury** ([https://www.utsc.utoronto.ca/~registrar/resources/pdf\\_general/UTSCmedicalcertificate.pdf](https://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf)) 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. 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.

### **Use of Plagiarism Detection Tool (Quercus) For Submitted Academic Work:**

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation website (<https://uoft.me/pdt-faq>)

### **Academic Integrity Statement:**

"All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to me. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources (for example, the [University of Toronto website on Academic Integrity](#))."

- 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.

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### **Library Services:**

#### ***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: [Library's Information and Reference Desk Website](#)**Need in-depth or department specific assistance?** Contact Sarah Forbes, Liaison Librarian for Physical and Environmental Sciences: <http://uoft.me/smforbes>

**Accessibility Needs:**

Students with diverse learning needs are welcome in this course. I strive to create a classroom environment that is welcoming and inclusive and have considered this as I designed the course. However, if you still find you need accommodations due to a disability/health consideration please feel free to approach me and/or the *AccessAbility* Services Office as soon as possible.

*AccessAbility* Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email [ability.utsc@utoronto.ca](mailto:ability.utsc@utoronto.ca). The sooner you let me know your needs the quicker I can assist you in achieving your learning goals in this course. UTSC campus [Accessibility Services](#)

**Center for Teaching & Learning:**

<https://www.utsc.utoronto.ca/ctl/welcome-centre-teaching-and-learning>

**Student Services:**

<https://www.utsc.utoronto.ca/studentexperience/student-services>