

University of Toronto-Scarborough  
Department of Physical and Environmental Sciences  
**EESB15H3 Earth History - Fall 2022**

- Prerequisites:** EESA06 Planet Earth  
**Course website:** <https://q.utoronto.ca/courses>
- Instructor:** Dr. Heidi Daxberger, ESCB/EV 466, [heidi.daxberger@utoronto.ca](mailto:heidi.daxberger@utoronto.ca)  
**Office hours:** **Wednesday 12 pm-1 pm (EV 224), and by appointment (virtual or in person)**
- Teaching Assistant:** Phillip Rusic, Talin Atikian, Edina Illyes, TBA
- Lectures:** **First lecture is on: Thursday Sept. 8, 2022 at 7- 8 pm**  
**Monday 2 - 3 pm in SW143**  
**Thursday 7 - 8 pm in SW143**
- Lab Exercises:** **Section 1: Monday 8 - 10 am in IC320**  
**Section 2: Tuesday 9 - 11 am in EV222**  
**Section 3: Friday 8 - 10 am in IC320**  
**Section 4: Tuesday 11 am - 1 pm in EV222**

**Overview:**

During this Earth History course, we will utilize in-person lectures, online modules (accessible via links on Quercus), in-person labs and field trips, discussion board posts, online quizzes as well as online glossaries to learn about our planet's development and evolution.

In the first half of this course you will learn about the building blocks of our planet and the most important geological processes and concepts that underlie Earth's formation and evolution. Then we will move on to learning about the 4.56 Billion year-long evolution of our planet during which we will hear about global events and processes, but often will focus on the evolution of the North American Continent in a bit more detail.

We will be starting with the tiniest building blocks of our planet, chemical elements and minerals, and move on to how and where rocks (e.g. igneous, sedimentary and metamorphic rocks) are formed and how these can help us deciphering Earth's historical record of the past 4.56 billion years. We will discuss how the study of plate tectonics emerged and how this process constantly reshapes our planet's surface. Preservation of long dead organisms (fossils) and rock records help us to delineate exactly these plate tectonic movements and therefore the evolution of Earth's continental masses we all live on today.

The rock record and accumulated knowledge of short- and long-term geological processes, as well as rock and sediment properties, becomes more and more important as the human population grows. We are in dire need of a clear understanding of processes such as plate tectonics/rock deformation process (e.g. earthquakes), formation of natural resources (e.g. minerals, oil/gas), fresh water reservoir formation (porous rock). All this we can learn from our planet's past so we hopefully use and protect all resources as efficiently as possible and most importantly are more informed on how to protect our environment for future generations.

One of the lab exercises in this course will be a **mandatory In-Person field trip to Port Colborne (Niagara Region, Ontario)**, where we will practice the learned skills such as rock and fossil description and identification. At this field site one can see that the rocks provide us information regarding paleo-environments and possible plate tectonic events that took place in NE-Northern America during the Devonian time period.

My biggest course goal is to make you all more aware of your environment and what it can tell you. Our planet is beautiful, and its development is one big riddle. And everywhere are clues in the form of minerals, rocks, fossils (etc.) for you to investigate. With their help we can figure out what happened in the most recent past or even billions of years ago.

**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:

- **use** geology specific terminology
- **explain** basic geologic concepts and processes (e.g. rock formation, plate tectonics...)
- **apply** the learned knowledge about geological concepts and methods during lab exercises and a (virtual) field trip.
- **describe, identify and differentiate** between important minerals, rocks types and fossils, as well as drawing conclusions about their formation (lab exercises, field trip).
- **retrieve and interpret** basic geologic information from geological maps, cross-sections and 3D box models (lectures, lab exercises)
- **relate** given data (e.g. fossil occurrence, rock type) to respective geologic processes, environments or historical events (lectures, lab exercises, field trip)
- **work** in a team during lab exercise

**Text Recommended:** H. Levin, **The Earth Through Time, newest edition, Wiley** (11-10<sup>th</sup> editions ok, available as **e-books**)

**Open Access Texts:** see Quercus Home Page for more information!

**Other good sources:** St. M. Stanley & J.A. Luczaj, Earth System History, Freeman (course reserve)

**Lecture Schedule - Subject to change ([click here to access the up to date Google Syllabus](#)):**

Week	Lect Nr.	Day	Lect. Date	Course Topics	Online Module	Lecture topic	Lab topic	Quiz topic
1	1	Thursday	Sept. 8	Intro to Geology	Mod. 1. Minerals	Intro + Minerals		
2	2	Monday	Sept. 12				Elements & Minerals	<b>In Person Lab Module 1: Minerals</b>
	3	Thursday	Sept. 15		Mod.2. Igneous Rocks	Igneous Rocks		
3	4	Monday	Sept. 19		Mod. 3A. Sedimentary Rocks	Igneous rocks & Sediments - Sed. Rocks, Weathering	<b>In Person Lab Module 2: Igneous Rocks + Minerals</b>	
	5	Thursday	Sept. 22			Sediments - Sed. Rocks: Erosion & Transport		Friday to Sunday, <b>Quiz Mod.1 + 2: Minerals &amp; Igneous R</b>
4	6	Monday	Sept. 26			Sediments - Sed. Rocks: Classification & Structures	<b>In Person Lab Module 3.A:</b> Sedimentary Rocks + Minerals	
	7	Thursday	Sept. 29		Mod. 3.B. Fossils	Sediment Structures & Fossils		
5	8	Monday	Oct. 3		Mod. 4: Metamorphic Rocks	Metamorphic Rocks	<b>In Person Lab Module 3.B.: Fossils</b>	
	9	Thursday	Oct. 6		Mod. 5: Earth's Prop, Geo. Processes, Plate Tectonics	Earth's Properties, Geologic Processes, Plate Tectonics		Friday to Sunday, <b>Quiz 3A + 3.B: Sedimentary Rocks &amp; Fossils etc.</b>
<b>Reading Week: Oct. 10 – 14, 2020</b>								

6	10	Monday	Oct. 17	Intro to Geology	Mod. 5: Earth's Prop., Geol. processes, Plate Tectonics	Geologic processes	In Person Lab Module 4: Metamorphic Rocks + Minerals	
	11	Thursday	Oct. 20		Mod. 6. Geologic Principles & Time:	Geologic principles and time		Friday to Sunday, <b>Quiz Mod. 4 + 5:</b> Metam. Rocks, Geol. Proces., Plate Tect.
7	12	Monday	Oct. 24		Module 7: Hadean – Proterozoic Times	Geologic Time + Hadean - Archean	In Person Lab Module 6: Fossils, Geol. Time and Principles	midterm Possible
	13	Thursday	Oct. 27			Proterozoic		
8	14	Monday	Oct. 31		Mod. 8: Paleozoic Times	Proterozoic Life	Online Lab Module 7: Google Earth - Precambrian	Friday to Sunday, <b>Quiz Mod. 6 + 7:</b> Geol. Princ., Geol. Time, Hadean - Prot.
	15	Thursday	Nov. 3			Early Paleozoic Processes		
9	16	Monday	Nov. 7		Mod. 8: Paleozoic Times	Early Paleozoic Processes & Life	In-Person Lab Module 7-9: The Paleozoic & The Grand Canyon	midterm Possible
	17	Thursday	Nov. 10			Late Paleozoic Processes		
10	18	Monday	Nov. 14		Mod. 9: Mesozoic Times	Late Paleozoic Life	Nov. 19, 20, Saturday/Sunday: Port Colborne Field Trip	
	19	Thursday	Nov. 17			Mesozoic processes		
11	20	Monday	Nov. 21		Mod. 9: Mesozoic Times	Mesozoic processes + Life	Online Lab Module 9: Google Earth – Investigate Real Geology	Friday to Sunday: <b>Quiz Mod. 8.A+B.:</b> Entire Paleozoic + Field Trip
	21	Thursday	Nov. 24			Mesozoic life		
12	22	Monday	Nov. 28		Mod. 10: Cenozoic Times	Cenozoic Geol. Processes	Bell Ringer + Online Lab Module 10: Google Earth - Inv. Cenozoic geology	Monday - Wednesday, <b>Quiz Mod 9+10:</b> Mesozoic + Cenozoic
	23	Thursday	Dec. 1	Cenozoic Geol. Processes & Life				
13	24	Monday	Dec. 5	Recap				
	Dec 6-7				Study Break			

### Marking Scheme:

10 x Laboratory Participation (each 3 %)	30%
Field Trip (1% participation, 3 % report)	4%
6 Online Quizzes (each 2 %)	12%
Course Participation (discussion board etc.)	3%
Glossary (6 entries each 0.5%)	3%
Bell Ringer (Min., Rock, Fossil ID)	2%
Midterm	20%
<b>Final Exam (date to be announced)</b>	<b>26%</b>
<b>Total</b>	<b>100%</b>

### **Lectures and Lab Exercise – Group or Individual Work:**

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.*

Ten Lab exercises during which attendance will be taken. Each lab is worth 3 % of final grade (total 30%). During the lab time you will work in a group and/or individually but the submission is for each student individually.

For **Lab 1 to Lab 5**, the assignments will include the description and identification of hand samples. Your results are to be submitted in the form of a **quercus online quiz** (mandatory: submission by end of lab time). **The lab online quiz submission depends on the availability of a smartphone or laptop during the lab time. Please contact me if this is not possible so other arrangements can be made.**

**Lab 6 to Lab 8** are done on paper and will be handed in individually or in pairs by the end of 2 hours.

### **Course Participation:**

Your **active course participation is worth 3% of the final grade** (grade is not based on the correct answer, but participation). You can miss up to 25% of the (live - recorded lecture) activities without losing grades, hence if your participation is between 100-75% off all lectures, you will get the full 3%. If your participation is between 75 and 50% you will get 1.5% of the participation mark. If your participation is below 50% no participation marks will be given (0%).

### **1-Day Field Trip (4% - 1% Participation, 3% report):**

This field trip (Nov. 19, Nov. 20, 2022) is mandatory for all students. A fee for transportation will arise, which we will keep as low as possible.

During the field trip groups of 2-4 students (best 4) will look at the local fossils and rocks (field trip participation 1%). Field trip assignment (report) will be available on quercus at the date of the trip and has to be completed & submitted by Nov.24, 2022 (course drop box in EV building 2<sup>nd</sup> floor). This assignment sheet (report) is a group assignment and is worth 3% of final grade.

Furthermore, we are outdoors and therefore some preparations are needed:

- Be prepared for any kind of weather (sun vs. rain: rain jacket, sun screen, hat)
- Sturdy footwear (at least running shoes, preferably hiking boots) -> NO open-toed shoes, sandals, or heels!!!
- Adequate clothing (long pants, layers, rain cloth)
- Safety goggles or light tinted sunglasses
- Daypack with an adequate amount of water and lunch (+ smaller snack)
- If possible small camera, field book (e.g. small notebook), pencil & pen
- See "Intro to field safety" PDF on quercus.

Additional required safety equipment (e.g. hard hats, additional safety goggles) will be supplied by the department.

### **Bell Ringer - Recap Mineral, Rock, Fossil ID Test – Individual Work (2%):**

At the end of the term a Bell Ringer Test will be held (during week 12, Nov. 28-Dec. 1) in preparation for the final exam in the beginning of the lab. This c. 20 min test will test your mineral, rock and fossil ID skills and is based on the lab samples.

### **Quercus Glossary (3%):**

Part of the course work is to create **SIX glossary posts (each 0.5%, total 3%)**. The glossary (make your own geo-dictionary) 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 term definition – figure/diagram if applicable).

**THREE of the posts have to be finished by October 23, and the second set of THREE posts by December 5, 2022!**

### **Module Quizzes on Quercus– Individual Work (12%):**

6 online quizzes will be posted. Each quiz will consist of roughly 15-25 questions and is worth 2 % (12% total) of final grade.

These quizzes will test the knowledge and skills practiced in the respective module or module section.

#### **Schedule: Topic**

**Quiz 1 Module 1 + 2: Minerals + Igneous Rocks**

**Quiz 2 Module 3.A. + 3.B: Sedimentary Rocks + Fossils**

**Quiz 3 Module 4 + 5: Metamorphic Rocks + Earth's Pro. Geol. Processes, Plate Tect.**

**Quiz 4 Module 6 + 7: Geologic Principles & Geol. Time + Hadean, Archean, Proterozoic**

**Quiz 5 Module 8.A. + 8.B.: Early + Late Paleozoic + Virtual Field Trip**

**Quiz 6 Module 9 + 10: Mesozoic times + Cenozoic times**

#### **Dates:**

Friday - Sunday, Sept. 23 - 25 (midnight)

Friday - Sunday, Oct. 7 - 9 (midnight)

Friday - Sunday, Oct. 20 - 22 (midnight)

Friday - Sunday, Nov. 4 - 6 (midnight)

Friday - Sunday, Nov. 25 - 27 (midnight)

Friday - Sunday, Dec. 2 - 4 (midnight)

### **Final Examination:**

The final examination is cumulative and will be scheduled by the University and held during the December examination period. The exam will be a 3-Day Open Book Take Home Exam Project. This may include open ended questions, critical thinking, drawing of graphs/diagrams, geological data (etc.). More information will be distributed closer to the end of the term.

### **Study Questions – Group or Individual Work:**

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.

### **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: [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>

### **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/exercise/quiz. **This includes the use of i-clicker !!!**
- 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>.

### **Religious Accommodations:**

The University has a commitment concerning accommodation for religious observances. I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. According to University Policy, if you anticipate being absent from class or missing a major course activity (like a test, or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

### **Grading – Scheme Final Grade: based on UofT Regulations**

Refined Letter Grade Scale	Grade Point Value	Numerical Scale of Marks
A+	4.0	90 - 100%
A	4.0	85 - 89%
A-	3.7	80 - 84%
B+	3.3	77 - 79%
B	3.0	73 - 76%
B-	2.7	70 - 72%
C+	2.3	67 - 69%
C	2.0	63 - 66%
C-	1.7	60 - 62%
D+	1.3	57 - 59%
D	1.0	53 - 56%
D-	0.7	50 - 52%
F*	0.0	0 - 49%