

University of Toronto-Scarborough  
Department of Physical and Environmental Sciences  
**EESB15H3 Earth History - Fall 2018**

**Instructor:** Dr. Heidi Daxberger, ESCB 466, phone: 416-208-5136, [heidi.daxberger@utoronto.ca](mailto:heidi.daxberger@utoronto.ca)  
**Office hours:** Monday 12.45 pm – 1.45 pm in EV224 rock lab (or EV466)  
or Thursday 2 pm to 3 pm, and by appointment

**Teaching Assistant:** Talin Atikian, Abigail Harrichand

**Lectures:** Mondays: 2 pm – 3 pm ( IC 220 )  
and Thursdays: 7 pm - 8 pm ( MW 170 )

**Lab Exercises:** Section 1 - Tuesdays: 8 am - 10 am ( IC 208 )  
Section 2 - Thursdays: 8 am - 10 am ( IC 300 )  
Section 3 – Fridays: 8 am – 10 am ( IC 320 )  
First lecture is on Thursday Sept. 6, 7 - 8 pm in MW 170

**Overview:**

In this course you will learn about Earth's 4.56 billion years long history, the building blocks of our planet and the most important geological processes and concepts to better understand the evolution of Earth through time. A special focus will be given to the evolution of and the processes happening on the North American Continent during these 4.56 billion years.

Igneous, sedimentary and metamorphic rocks are not only the building blocks of our planet, but also represent a detailed record of how Earth evolved during the past 4.56 billion years. After plate tectonics started in the early age of Earth, they reshaped our planet's surface constantly. The fossil and rock records help us to delineate plate tectonic movement and therewith the evolution of Earth's continental masses we live on today. However, the long ongoing investigation of past and current geological processes does not only provide us with information of the past, but also allows us a glimpse into the future and to model future continent configurations.

The 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. With population growth, more natural resources are required and more damage, for example in form of soil contamination, is done to our environment. Therefore, we need to understand processes, which lead to certain geological structures, formation of ore deposits, fresh water storage, and the development of today's environment to efficiently use and protect all resource components and most importantly the environment for future generations.

Part of this course are two 1-Day field trips to Albion Falls (Hamilton, Ontario), where we will look at a part of the geologic record (Silurian to Devonian) to practice the learned skills such as rock ID and description. At this field site we will discuss what insight the rocks can give us regarding paleo-environments and plate tectonic events, which took place in NE-Northern America during the Silurian and Devonian time period.

This course also aims to introduce and develop the following geo-scientific and soft skills:

- Identification of important minerals, rocks types and fossils, as well as drawing conclusions about their implications (lab exercises).
- Visualization and retrieving information about geological features in 2D and 3D by using geological maps and cross-sections.
- Development of an understanding of temporal and spatial data interpretation (e.g. development of continents through time using stratigraphic columns and geological maps)

- Problem solving skills during hands-on lab exercises
- Real world application of geological concepts and methods during lab exercises and the field trip.
- Developing of teamwork skills during lab exercise as well as a field trip.
- Development of peer and self-assessment skills during teamwork.

**Literature - Required:** H. Levin, The Earth Through Time, 11<sup>th</sup> edition, Wiley (10<sup>th</sup> editions is also ok, course reserve)

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

**Lecture Schedule - Subject to change:**

Week	Lecture Nr.	Day	Date	Topic	lab Nr.	Topic	Lab dates	All over topic	
1	1	Thursday	Sept. 6	Intro + Minerals				Intro to Geology	
2	2	Monday	Sept. 10	Minerals	Lab 1	Minerals	Sept. 11, 13, 14		
	3	Thursday	Sept. 13	Igneous Rocks					
3	4	Monday	Sept. 17	Sediments - Sed. Rocks: Weathering	Lab 2	Igneous Rocks + Minerals	Sept. 18, 20, 21		
	5	Thursday	Sept. 20	Sediments - Sed. Rocks: Erosion & Transport					
4	6	Monday	Sept. 24	Sediments - Sed. Rocks: Classification & Sediment Structures	Lab 3	Sedimentary Rocks + Minerals	Sept. 25, 27, 28		
	7	Thursday	Sept. 27	Sedimentary Structures + Fossils					
5	8	Monday	Oct. 1	Metamorphic Rocks + Geologic Principles/Processes	Lab 4	Fossils + Sedimentary Structures	Oct. 2, 4, 5		
	9	Thursday	Oct. 4	Geol. Principles/Processes + Plate Tectonics					
Oct. 8-12: Reading Week									
6	10	Monday	Oct. 15	Geologic Time + Geol. Processes/Principles	Lab 5	Metamorphic Rocks + Minerals	Oct. 16, 18, 19		
	11	Thursday	Oct. 18	Hadean + Archean					
7	12	Monday	Oct. 22	Proterozoic	Mid-terms	Tuesday - Thursday Sections in Lab Time	October 23, 25, 26	Earth History	
	Activity Lecture I	Thursday	Oct. 25	Precambrian					
8	13	Monday	Oct. 28	Early Paleozoic - Geol. Processes	Lab 6	Geologic Time	Oct. 30, Nov. 1, 2		
	14	Thursday	Nov. 1	Early Paleozoic - Life	<b>Field Trip Port Colborne: Nov 3-4</b>				
9	15	Monday	Nov. 5	late Paleozoic - Geol. Processes	Lab 7	Topographic and geologic cross section and maps	Nov. 6, 8, 9		
	16	Thursday	Nov. 8	Late Paleozoic - Life					
10	Activity Lecture II	Monday	Nov. 12	Paleozoic	Lab 8	Grand Canyon	Nov. 13, 15, 16		
	17	Thursday	Nov. 15	Mesozoic - Geol. Processes					
11	18	Monday	Nov. 19	Mesozoic - Life	Lab 9	Geologic cross section and box model	Nov. 20, 22, 23		
	Activity Lecture III	Thursday	Nov. 22	Mesozoic					
12	19	Monday	Nov. 26	Cenozoic - Geol. Processes	Bell-ringer		Nov. 27, 29, 30		
	20	Thursday	Nov. 29	Cenozoic - Geol. Processes & Life					
13	Recap	Monday	Dec. 3	Recap					

### Marking Scheme:

9 laboratory exercises (each 3%)	27%
10 Online Preparation-Quizzes (each 0.5%)	5%
Field trip Report	6%
I-Clicker (Lect. Participation)	2%
Participation AIM course	1%
Bell Ringer (Min., Rock, Fossil ID)	2%
Midterm (in lab sections)	27%
<u>Final Exam (date to be announced)</u>	<u>30%</u>
Total	100%

### 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.***

Nine Lab exercises (**Section 1:** Tuesday 8 -10 am, **Section 2:** Thursdays, 8 -10 am, **Section 3:** Fridays: 8-10am) during which attendance will be taken. Each lab is worth 3 % of final grade (total 27%). During the lab time you will work in group and/or individually but the submission is for each student individually.

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

**Lab 6 to Lab 9** are done on paper and will be handed in individually at end of 2 hours.

### i-clicker (Lecture participation) – Individual submission:

**i-clickers are mandatory for this class** and they will be used for participation marks during the lectures (I-clicker). Total **participation is worth 2% of the final grade** (grade is not based on right answer, but participation). We will start using/testing the I-clickers in the first week. Graded participation will start in the **second week (Lecture 2)**. You can miss up to 25% of the I-clicker participation without losing grades. If your participation is between 75 and 50% you will get 1% of the participation mark. If your participation is below 50% no participation marks will be given (0%). **Each student can only use their own clicker! Submitting answers for a fellow student, who is not present during class, is an offence covered under the code of Academic Integrity (see section below)!**

### Bell-Ringer Test – Individual Work:

At the end of the term (before the final exam) a Bell Ringer Test will be held (Nov. 27, 29, 30, during lab time) in preparation for the final exam. This c. 20 min test will test your mineral, rock and fossil ID skills and is based on the lab samples. Before the Bell Ringer happens, the lab (ESCB 224) will be open to look at the lab samples again.

### 1-Day Field Trip:

This field trip (dates to be announced during the lectures as soon as possible) 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 rock formation, describe and ID these, by filling out a given table. This table will be handed in during the in-class exercise in the week after the field trip (6% 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 sun glasses
- 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.

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

### **Lecture-Lab Prep. Quizzes on Quercus– Individual Work:**

ten online quizzes will be posted. Each quiz will consist of roughly 10 questions and is worth 0.5 % (5% total) of final grade.

#### **Schedule: Topic**

#### **Dates:**

Quiz 1: Minerals & Igneous Rocks	Thursday Sept. 6 to Sunday Sept. 9 (midnight)
Quiz 2: Igneous & Seds. Weathering, Erosion	Thursday Sept. 13 to Sunday Sept. 16 (midnight)
Quiz 3: Sedimentary Rocks & Fossils	Thursday Sept. 20 to Sunday Sept. 23 (midnight)
Quiz 4: Metam. Rocks, Geologic Processes etc.	Thursday Sept. 27 to Sunday Sept. 30 (midnight)
Quiz 5: Geo. Processes/plate tectonics & Time	Thursday Oct. 4 to Sunday Oct. 14 (midnight)
Quiz 6: Lab 6 Prep. Geo.Principles and Time, Formation of Earth	Thursday Oct. 25 to Sunday Oct. 28 (midnight)
Quiz 7: Paleozoic times	Thursday Nov. 1 to Sunday Nov. 4 (midnight)
Quiz 8: lab 8 Prep Topo.-/Geo. Map/Cross section	Thursday Nov. 8 to Sunday Nov. 11 (midnight)
Quiz 9: Mesozoic times	Thursday Nov. 17 to Sunday Nov. 21 (midnight)
Quiz 10: Cenozoic times	Thursday Nov. 28 to Sunday Dec. 2 (midnight)

### **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.

### **Make Your Own Geo-dictionary (MYOGD) – Group or Individual Work:**

A file called "Make your Own Geo-dictionary (MYOGD) is a word document which provides you with important terminology and concepts in Geology. This exercise is not graded, therefore is not mandatory to be finished, but finding the definitions (figures etc.) for these terms will help you to prepare for the exams, quizzes, in-class exercises and later courses. As there are many terms new to you, this can be an overwhelming task to do on your own. Best is if you from a group with some of your fellow students to complete the dictionary together. Make sure all of your group mates are on the same page about accuracy and detail. Besides online sources, the appendix of the course textbook, as well as already existing dictionaries for Earth Sciences or Geology (see course reserve) may be useful to find the respective definitions (and figures etc.).

### **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 the instructor. 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 will be 3 hours, is cumulative (1/3 before midterm, 2/3 after midterm) 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 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>

## Quercus:

**Course material will be posted on Quercus. Please check Quercus and your email daily for updates.** [q.utoronto.ca](http://q.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/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.utoronto.ca/~ability/> or St. George Campus DisAbility [disability.services@utoronto.ca](mailto:disability.services@utoronto.ca) or <http://studentlife.utoronto.ca/accessibility>.

