

**University of Toronto-Scarborough**  
**EESB20 - Sedimentology & Stratigraphy**  
**Winter 2022-2023**

**Instructor:** Dr. Heidi Daxberger, Room EV466, email: heidi.daxberger@utoronto.ca  
**Office hours:** Monday, 11.30 am – 12.30 pm

**Teaching Assistant:** Andreia Hamid

**Lectures:** **Tuesday**                      **1 pm – 3 pm**                      **Room: HW 408**

**Labs:**                      **Tuesday's Section**                      **3 pm – 5 pm**                      **Room: EV 224 + EV222**

**Overview:**

This course will provide you with an integrated overview of the formation of clastic and carbonate sedimentary rocks, as well as an overview of the main depositional environments in which these rocks form.

During this course we will be covering rock classifications (material & texture), principles of sediment transport including fluid hydrodynamics and development of primary and secondary sedimentary structures of clastic sediments, and the various mechanisms for the formation of carbonate sediments. After covering the basic principles, we will turn our focus to the interpretation of ancient and recent sedimentary rock formations regarding their depositional environments (facies analysis). Furthermore, we will discuss the application and principles of sequence stratigraphy and what information we can gain about local and global sea level changes. The gained knowledge will then be used for an integrated analysis and interpretation of the depositional processes in southern Ontario during Paleozoic times.

The Sedimentology & Stratigraphy course is a university-based course (laboratory intensive) that incorporates active and inquiry-based learning to help students maximize learning outcome achievements.

**Learning Outcomes:**

By the end of the course students should have a thorough understanding of depositional processes, the environments in which they operate and the sedimentary record they produce. Students will also develop skills in the following areas:

- Solving Problem and analyse data
- Conduct textural analysis of sediments and sedimentary rock samples
- Classify and identify various sediments, sedimentary rocks and fossils
- Describe and log sediments and sedimentary rocks in the field (weather permitting)
- Interpret sedimentary facies and sedimentary structures, as well as drawing conclusions in terms of depositional environments and conditions
- Write laboratory reports and apply appropriate terminology
- Conduction literature reviews and research
- Create and deliver quality oral presentations

**Course structure:**

During a weekly two-hour lecture (Tuesdays from 1-3 pm) I will introduce the theoretical background needed for facies and sequence stratigraphic analysis and interpretations. During the two-hour lab (section 1 on Tuesdays, 3 - 5 pm) students will learn the fundamentals of field and laboratory analysis of sedimentary rocks, including: sediment / sedimentary rock / fossil classification and identification, textural analyses and sedimentary structure interpretation, preparation of stratigraphic logs, stratigraphic correlation, facies analyses and interpretation of paleo-environments. If the weather and Health and Safety measures permit, I will organize a one-day field trip (possibly to the Niagara region) in early April 2023.

**Literature:**

No course textbook, instead I recommend to consult the books listed below, which are on course reserve.

**Literature (course reserve):**

- Sedimentology and Stratigraphy, G. Nichols, 2009, Wiley
- Principles of Sedimentology and Stratigraphy, S. Boggs, latest edition, Prentice Hall
- Sedimentary Geology, An Introduction to Sedimentary Rocks and Stratigraphy, Prothero & Schwab, Freeman
- Facies Model 4, N.P. James & R.W. Dalrymple, 2010, Geological Assoc. of Canada

## Course Schedule:

Week	Date	Topic	Date Lab	Lab topic	Due Dates	Quizzes	
1	10. Jan	<b>Lect. 1:</b> Intro to Sed. Rocks					
2	17. Jan	<b>Lect. 2:</b> Clastic sed., textures, fabrics, structures	Jan 17	<b>lab 1:</b> Clastic: grain size analysis			
3	24. Jan	<b>Lect. 3:</b> Clastic sed., textures, fabrics, structures	Jan 24	<b>Lab 2:</b> Clastic sediments & sedimentary rocks ID/interpret		Q1	
4	31. Jan	<b>Lect. 4 A:</b> Sedimentary structures, Carbonates	Jan 31	<b>lab 3:</b> Clastic rocks + sediment structures ID/interpret.			
5	7. Feb	<b>Lect. 4 B:</b> Carbonates & Fossils	Feb 7	<b>lab 4:</b> Carbonate / Fossils		Q2	
6	14. Feb	<b>Lect. 5:</b> Chem. Sed. rocks, Stratigraphy, Facies Analysis/Facies Models	Feb 14	<b>lab 5:</b> Chem. Sed. Rocks + Sedimentary Rocks/Structures/Fossils in general		??? Midterm (online take home) ???	
	20-24. Feb	Reading Week					
7	Feb. 28	<b>Lect. 6:</b> Basics on Basins, Basin Analysis	Feb 28	<b>Lab 6:</b> Strat. Log Correlation		??? Midterm (online take home) ???	
8	7. March	<b>Lect. 7:</b> Continental Environments <b>Presentations</b>	March 7	<b>Lab 7.A:</b> Geology of S Ontario - Map & Stratigraphic Chart		??? Midterm (online take home) ???	
9	14. March	<b>Lect. 8:</b> Cont.-Marginal Marine Environments <b>Presentations</b>	March 14	<b>Lab 7.B:</b> Stratigraphic logs S Geology of Ontario			
10	21. March	<b>Lect. 9:</b> Marginal Marine Environments, <b>Shelf Presentations</b>	March 21	<b>Lab 7B + 7C:</b> Stratigraphic logs Geology of Ontario + 3D model of S. Ontario Geology ( <b>in Room BV471</b> )			
11	28. March	<b>Lect. 10:</b> Deep Water Environments <b>Presentations</b>	March 28	<b>Lab 7C:</b> Stratigraphic logs Geology of Ontario + 3D model of S. Ontario Geology ( <b>in Room BV471</b> )		Q3	
12	4. April	<b>Lect. 11:</b> Sequence Stratigraphy	April 4	<b>Lab 8:</b> Virtual Field Trip Albion Falls + Bell Ringer ( <b>in Room BV471</b> )			
<b>Sat. 8. April: Field Trip (field book due end of trip)</b>							
13	10 April	Study break starts April 11					
Final Exam Period							

## Marking Scheme:

Group (2 students) presentations	6 %
Laboratory exercises 10 (10x3%)	30 %
Field Trip (1 % participation – 2 % Field Book)	3 %
3 x 1% Online Quizzes	3 %
Glossary 6 terms (before midterm, before exam: 2 x 1.5 %)	3 %
Bell Ringer	2%
Midterm or Midterm Project (2 Days take home, open book, individual work)	25 %
Final exam or Final Project (3 Days take home, open book, individual work)	28 %
<b>Total</b>	<b>100 %</b>

### **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!

### **1-Day Field Trip – Early April (3%):**

If Health and Safety Regulations permit, we will do a field. A fee for transportation will arise, which we will keep as low as possible. Furthermore, we are outdoors and therefore some preparations are needed:

- Be prepared for any kind of weather (sun vs. rain: rain jacket, sunscreen, hat)
- Sturdy footwear (at least running shoes, ideally hiking boots) -> **NO open-toed shoes, sandals, or heels!!!**
- Adequate clothing (long pants, layers)
- 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

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

### **Group Presentations: Depositional Environments (6%):**

In group 15-minute presentations (2 people, max. 10 slides, worth 6%) based on the offered topics. Topics must be chosen and approved by the instructor by the end of January and a presentation schedule will be worked up for classes following reading week. The topic list will be posted on Quercus.

### **Midterm and Final Exam (24% and 28% 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.

### **Online Quizzes – Individual Work (3%):**

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 (One Drive) – Individual Work (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 Sunday February 18th, and the second three posts by April 10!**

### **Bell-Ringer Tests – Individual Work (2%) – In-Person or Online (depending on Health Advisory):**

In the course schedule above, you will find a date for a Bell Ringer Test (2% of final grade). The c. 10-minute bell ringer will test your rock and fossil ID skills and is based on the lecture/lab samples. Before the Bell Ringer happens, the lab (ESCB 224 or online in case of a Pandemic-caused shutdown) will be opened to look at the lab samples.

### **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 without informing the instructor 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 EESB20.

#### **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 <https://www.utsc.utoronto.ca/vpdean/welcome-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:**

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 [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>

