

University of Toronto-Scarborough

EESB20 - Sedimentology & Stratigraphy

Winter 2018-2019

Instructor: Dr. Heidi Daxberger, Room EV466, email: heidi.axberger@utoronto.ca,

Office hours: Tuesdays, 10 am – 12 pm

Teaching Assistant: Talin Atikian

Lectures: **Tuesdays 1 pm – 3 pm Room: IC 120**

Labs: **Tuesdays 3 pm – 5 pm Room: EV224**

Wednesdays 9 am – 11 am Room: EV224

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.

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:

- Problem solving and data analysis
- Laboratory methods for textural analysis of sediments and core samples
- Classification and identification of the various sedimentary rocks
- Field description and logging sediments and sedimentary rocks (weather permitting)
- Interpretation of sedimentary facies and structures
- Lab report writing

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 and section 2 on Wednesdays, 9-11 am) students will learn the fundamentals of field and laboratory analysis of sedimentary rocks, including: sedimentary rock classification and identification, textural analyses and sedimentary structure interpretation, preparation of stratigraphic logs (possibly: core logging, outcrop logging if weather permits in end of

March), stratigraphic correlation, facies analyses and interpretation of paleo-environments. If the weather permits I will organize a one-day field trip (possibly to the Niagara region).

Literature: No course textbook, instead, I will be posting occasional readings. However, I do recommend the following as a useful manual for in the field.

Good to get: Sedimentary Rocks in the Field – A Practical Guide, M.E., Tucker, latest edition, Wiley-Blackwell

Text (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	deadlines	quizzes	
1	8. Jan	Introduction Sed. Rocks	8 / 9. Jan	Lab 1: Clastics: Grain Size Analysis	lab due at end		
2	15. Jan	Clastic Seds., Textures, Fabrics, Structures	15 / 16. Jan	Lab 2: Clastic Rocks ID / Interpretation	lab due at end	Q1	
3	22. Jan	Carbonate Rocks & Environments	22 / 23. Jan	Lab 3: Carbonate Rocks and fossils	lab due at end		
4	29. Jan	Chemical Sedimentary Rocks	29 / 30. Jan	Lab 4: Chemical Sediments	lab due at end	Q2	
5	5. Feb	Facies Analysis & Facies Models	5 / 6. Feb	Bell Ringer 1 + Lab 5: Stratigraphic Log	Lab 5 due end of lab		
6	12. Feb	Basics on Basins	12 / 13 Feb.	Lab 5	Lab 5 due end of lab		
7	19. Feb	Reading week					
8	26. Feb	Midterm	26 / 27 Feb.	lab 6: Log Correlation	Lab 6: due on March 7 (drop box)	Q3	
9	5. March	No class & lab: Go To PDAC!					
10	12. March	Continental Environments	12 / 13 March	no official lab but space can be used to work on summary report	March 15, 5pm: Draft Summary Paper Due in dropbox		
11	19. March	marginal Marine Environments	19 / 20. March			Q4	
12	26. March	Marginal Marine Environments	26 / 27 March	Bell Ringer 2			
12	30 or 31 March	possible dates for 1 Day Field Trip to Niagara Gorge					
13	2. April	Deep Water Environments		NO LAB	Final Paper in class	Q5	
13	5. April	Study Break					

Marking Scheme:

Group (2 -3 students) presentations	6.5 %
Laboratory exercises 6 (6x4%)	24 %
Written Assignment – Summary (individual, Draft 1%, final sub. 7&)	6.5 %
Field Trip (2 % participation – 2 % Field Book)	4 %
i-clicker	2 %
Bell Ringers (2x1%)	2 %
Midterm	20 %
Final exam	30 %
<u>5 x 1% Online Quizzes</u>	<u>5 %</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.

1-Day Field Trip – Niagara Gorge:

This field trip is mandatory for all students. 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, sun screen, 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 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

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

You will be graded on participation and the quality of your field book (2%) which will be handed in at the end of the day.

Individual Written Assignment: Ancient Sedimentary Successions

Write a 4 page (single sided) report on a sedimentary formation summarizing the significance of the formation, tectonic setting, the depositional setting, and character. For this exercise you will be given an opportunity to hand in a rough draft. Further instructions including a list of appropriate formations will be provided in class.

Group Presentations: Depositional Environments

In group 15 minute presentations (2-3 people, max. 12 slides) 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 Blackboard

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 4% 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 above 75% of total questions answered, you will get the full 2%. 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:

In the course schedule above you will find a date for two Bell Ringer Tests (1 percent each for a total 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) will be open to look at the lab samples again.

Study Questions & Geodictionary:

I will post a set of study questions and a geodictionary (for you to fill out) 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

Need in-depth or department specific assistance? Contact Sarah Forbes, Liaison Librarian for Physical and Environmental Sciences: <http://uoft.me/smforbes>

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 deducted **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 and hand in with the instructor.

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.*

Turnitin:

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

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>.