

University of Toronto-Scarborough

EESC 31- Principles of Glacial Sedimentology & Stratigraphy

Fall 2014

Instructor: Dr. Heidi Daxberger, Room SW 648, email: heidi.daxberger@utoronto.ca, Tel: 416-208-5136

Teaching Assistant: Kirsten Kennedy

Lectures: Tuesdays 2 – 5 pm in BV 264

Office hours: Tuesdays 1 – 2 pm in SW 648

Overview:

The surface of our planet is shaped by a multitude of geological processes, such as plate tectonics, volcanism, erosion, and deposition of sediments. But if we venture to northern regions or higher altitude areas such as the Arctic or the Canadian Rockies, glacial processes also have a very strong influence on landscape evolution. Throughout Earth's history, ice sheets and glaciers grew and retreated several times, and thereby played a very important part in reshaping and changing the looks of the continental masses. Canada itself is a perfect example for how glaciations affect landscape development due to glacier growth and retreat, and the accompanying erosional as well as depositional processes. On the one hand these processes were able to grind down entire mountain belts, and on the other hand led to deposition of impressive sediments, which are important to us as they act as groundwater passage ways and storage. Besides erosion and sedimentation due to glaciations, there is a major link between the size, location, growth, and retreat rate of ice sheets and glaciers on Earth with the changing climate we have experienced over the past decades.

To develop a better understanding of the influence of glaciations on our planet and the human population, we will take a look at the formation, growth and decay of glaciers and ice sheets. Furthermore, we will talk about how we can classify glacial environments and processes, including those active in subglacial, proglacial, glaciolacustrine, and glaciomarine settings. You will learn about erosional processes, resultant landforms, and the differentiation of deposited sediments and the depositional landforms. In the last part of the course we will look into the temporal distribution of glacial events, ranging in age from Precambrian to recent, and discuss how today's distribution of glaciers and ice sheets are connected to climate change.

Course goals

During lectures, in-lecture exercises, group research-presentations and a day-field trip, you will learn about

- the definition of glaciers and ice sheets
- how they form and evolve
- what sediments occur and how are they generated
- how the sediments are transported and deposited
- landform evolution due to glaciation
- the definition of permafrost environment

- what are the influencing factors and how did glaciation vary through time
- how glaciation influences the climate and human life (e.g.: albedo, mining)

Additionally, you will get more experience in how to work in a team, how to do research on a given topic, how to present your findings in form of a short presentation, and how to manage your time efficiently throughout the course.

Readings:

Eyles, C., and Eyles, N., 2010, Glacial Deposits, p. 73 – 104; in: Facies Models 4, editors: James, N.P., and Dalrymple, R.W., Geological association of Canada

Additional reading material will be posted on blackboard.

Course Schedule:

Week	Date	Lecture	In-class exercises	Notes
1	Sept. 2	Introduction	None	
2	Sept. 9	Glacial system Morphology of Glaciers		
3	Sept. 16	Morphology of Glaciers Accumulation & Ablation Hydrology		Quiz 1 Last day to drop
4	Sept. 23	Erosion and transport Deposition (terrestrial) & landforms	E1: Sediments & structures Sedimentary logs	
5	Sept. 30	Deposition (marine) & landforms	E2: Sediments & structures Remote sensing	
6	Oct. 7		In-class Field trip	
7	Oct. 14	Thanksgiving – Reading Week		
8	Oct. 21		In-class Midterm	
9	Oct. 28	Periglacial / Permafrost Influencing Factors/Processes	E3: TBA	
10	Nov. 4	Group Presentations		
11	Nov. 11	Group Presentations		
12	Nov. 18	Glaciations through time Glaciation and Climate Change	E4: TBA	Quiz 2; Last day to drop
13	Nov. 25	Influences on human population	Review - Questions	
14	Dec. 2	Study Break		
15	Dec. 9	Final Exams		Final Exam
16	Dec. 16	Final Exams		
17	Dec. 23	Christmas Break Starts		

Marking Scheme:

Group presentations	15%
In-lecture activities participation (4x5%)	20%
Field trip	5%
Midterm	20%
Final exam	30%
<u>2 x 5% Online Quizzes</u>	<u>10%</u>
Total	100%

Lectures and in-class exercises:

ALL students are expected to attend ALL lectures, which include graded in-class exercises.

It is the responsibility of the student to ensure that notes are obtained for any classes missed.

1-Day Field Trip – Location to be announced:

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.

Presentations:

In group 10-15 minute presentations (2-3 people) based on the offered topics or an adequate topic regarding glacial geology. No topic can be assigned twice. The submission of a short hand out is required.

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.

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>

Blackboard:

Lecture and lab material will be posted on and Online Quizzes will be done through blackboard. Please check daily for updates.

Blackboard: <https://portal.utoronto.ca>

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. Submit the certificate and the letter to the secretary in SW 644; Mon-Fri 9-5 (lunch 1-2) jterakita@utsc.utoronto.ca. Joanne Terakita collects these, but will not make a decision on the cases. Carefully following this process will allow us to properly consider you for consideration regarding your late/missed work for EESC31.

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.*

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 or <http://studentlife.utoronto.ca/accessibility>.