

## EESC31 Glacial Sedimentology and Stratigraphy Autumn 2009

### Rationale:

Why do we need to know about glaciers and their deposits? Because ice sheets have covered the country many times in the past 2 million years and Canada's landscapes and surface sediments in the main, have been profoundly modified by ice sheets. Engineering, mineral exploration, environmental, soils, hydrogeological work all require a firm knowledge of glacial geology. Oil exploration and development of Canada's north has to deal with permanently frozen ground (permafrost). Examining this glacial sediment cover also provides key information on past climate changes and environments.

### Overview:

Glaciations have occurred several times in Earth history at about 2.4 Ga (Huronian glaciation), between 750 and 545 Ma (Neoproterozoic glaciations), at 440 Ma (Late Ordovician glaciation), between 350 and 250 Ma (Late Paleozoic glaciations) and most recently within the last 2.5 million years when large continental ice sheets as much as 3 km thick, formed over North America and Europe (late Cenozoic glaciations).

The landscape of Ontario is a fossil landscape inherited from the last ice sheet (Laurentide Ice Sheet) that began to grow about 70,000 years ago and disappeared only 10,000 before present; across Canada huge glacially dammed lakes formed and large areas are covered by glacial sediment; the Great Lake basins are the direct result of glacial erosion. Huge changes have taken place in flora and fauna as a consequence of glaciation; humans migrated into southern Ontario just as the ice sheet was leaving about 12,000 years ago.

**Instructor:** Ms. Lisa Tutty BSc (hon) MSc PhD candidate in Geology

**Office Hours:** Monday 10:30 – 11:30 and Wednesday 12:30 – 1:30 in portable 103 room TBA (this is a shared office; I am only there during my scheduled office hours). I am also available after lecture.

**Contact information:** please use the discussion board on Blackboard (BB) for all course related communication. You may discuss matters of a *personal* nature (e.g. illness) during the office hours or by email ([tutty@utsc.utoronto.ca](mailto:tutty@utsc.utoronto.ca)). I like being able to discuss course related questions/concerns with students on BB because it is interactive (we can have a back and forth discussion) and because your fellow students may have been wondering about the same things but were afraid to ask. I am here to help you do well in this class; please don't be shy about asking me questions.

**Teaching assistant:** Ms. Shannon Carto BSc (hon) MSc PhD candidate in Geology

**Contact information:** [scarto@utsc.utoronto.ca](mailto:scarto@utsc.utoronto.ca)

**Office Hours:** Due-date driven, to be announced on Blackboard.

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## Course objectives:

1. **SKILLS:** All geoscientists must present their work to other geoscientists, to management and/or to the public. Much of the time this is done in an academic conference setting. Through this course you will gain valuable experience in **presenting** your work in a conference format – your choice of either an academic poster presentation or an oral presentation. A further skill to be mastered during your undergraduate education is **time management**, as the assignment has a ‘staged hand-in’ you will learn the steps to completing an assignment well and on time.
2. **CONTENT:** By the end of this course you will be able to recognize the principal glacial sediments and landforms. Lectures and a one day field trip will review the cause of glaciations and their geological and geomorphological effects paying especial regard to the long record of past glacial and interglacial climates preserved in the Toronto region. You will demonstrate your **knowledge** of course content on brief weekly homework/quiz assignments as well as on the final examination.

## Expectations:

1. Students and the instructor will treat one another with *respect* at all times – this includes during lecture, on the discussion board, by email and during office hours.
2. Students will take the *initiative* to learn the material; in all university courses you must try to question and apply the material and not simply absorb it.
3. Students will continue to work on their time management and appropriate study habits *skills*.
4. Students will regularly check the Blackboard site (<http://portal.utoronto.ca>) for important updates, lecture notes, recorded lectures, discussion board, assignment information, etc.

## Marking Scheme:

<b>Term Assignment (staged hand in)</b>	<b>40%</b>
<b>Final Examination</b>	<b>35%</b>
<b>Weekly mini-homework/quiz (BB)</b>	<b>15%</b>
<b>Field Trip (mandatory for all students)</b>	<b>10%</b>

## Textbook:

No textbook is required; I will assign readings which are available through the University of Toronto library system. This will save you lots of money! If it helps you and you

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wish to read a textbook about glaciers and glaciation then I recommend Benn, D.G.I. and Evans, D.J.A. 1998. book called “Glaciers and Glaciation”, Arnold. This textbook is very good – but it is written at a high level. It is available at the Robarts, UTM and St. Michael’s College U of T libraries in addition to as a short term loan in the UTSC library. I stress, this book is not required but rather is optional. I will announce your readings each week during lecture.

### Academic Integrity Statement:

Academic integrity is one of the cornerstones of the University of Toronto. It is critically 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 53 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.*

### Procedures to be followed for missed term 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 receive a grade of zero if you do not follow the following procedure. Within **one week** of the missed deadline you must submit a completed **University of Toronto**

## EESC31 Glacial Sedimentology and Stratigraphy Autumn 2009

**medical certificate** (available on BB) 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 Ms. Pat Woodcock in SW 644; Mon-Fri 9-5 (lunch 1-2)

[woodcock@utsc.utoronto.ca](mailto:woodcock@utsc.utoronto.ca). [Please note, due to the H1N1 pandemic there are separate rules for **flu** like symptoms: “Since we are encouraging you to stay at home if you are unwell, the university has developed guidelines around the temporary suspension of the need for a doctor’s note or medical certificate in relation to flu-related absences. In order to receive academic accommodation, students will need to record all flu-related absences through a new tool on the Student Web Service of ROSI (<http://www.rosi.utoronto.ca>).”]

**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>.

**Final Examination:** The final examination is cumulative and will be scheduled by the University and held during the December examination period. The exam will contain multiple choice, true and false and essay type (short/long answer) questions.

### Schedule:

- Lec 1: The glacier as a system; glacier morphology. Wed Sept 16<sup>th</sup>.
- Lec 2: Glacial motion. Wed Sept 23<sup>rd</sup>.
- Lec 3: Interaction with water bodies. Wed Sept 30<sup>th</sup>, **topic choices form** due on BB.
- Lec 4: Supraglacial processes, deposits, landforms and landscapes. Wed Oct 7<sup>th</sup>, **annotated bibliography** due on BB.
- Lec 5: Subglacial processes, deposits, landforms and landscapes. Wed Oct 14<sup>th</sup>.
- Lec 6: Englacial processes, deposits, landforms and landscapes. Wed Oct 21<sup>st</sup>, **project outline** due on BB.
- Lec 7: FIELD TRIP (transportation by TTC). Wed Oct 28<sup>th</sup>.
- Lec 8: Periglacial processes, deposits, landforms and landscapes. MEET AT COMPUTER LAB BV469 for class Wed Nov 4th. **Draft** due on BB.
- Lec 9: Climate interactions and environmental challenges. Wed Nov 11<sup>th</sup>. **Peer reviewed draft versions** due on BB.
- Lec 10: Rock Record; Snowball Earth. Guest lecture by course TA Ms. Shannon Carto. Wed Nov 18<sup>th</sup>. Drop date at UTSC.
- Lec 11: Oral presentations and academic poster exhibition, Wed Nov 25th. **Final projects due.**
- Lec 12: Review and “catch-up” session. Wed Dec 2<sup>nd</sup>.