



General Information

Course Code: ENVS*4360

Course Title: Glacial Environments

Course Description:

This course will explore modern to ancient glacial environments, focusing on the sedimentary record they leave behind and applications of glacial geology including reconstructing past environments, examining how glacial deposits affect the distribution of resources or groundwater contaminants, and discovering the response of glaciers to recent and past climate change. Students will develop skills in critically evaluating literature and geological data, description and identification of glacial deposits.

Credit Weight: 0.50

Academic Department (or campus): School of Environmental Sciences

Campus: Guelph

Semester Offering: W17

Class Schedule and Location: lectures MW at 1:30-2:20 in MCKN 233,
seminar Friday at 11:30-1:30 in ALEX 024 on Feb 3/10; all
other seminars will be in ALEX 265

Instructor Information

Instructor Name: Emmanuelle Arnaud

Instructor Email: earnaud@uoguelph.ca

Instructor Phone and Extension: 519-824-4120 xt 58087

Office location and office hours: ALEX 126, by appointment via email

Course Content

Specific Learning Outcomes:

Upon completing this course, students will:

- A. Distinguish the different types of glacial settings using both modern and ancient examples.
- B. Identify and describe glacial sediments and sedimentary rocks found in different glacial settings and explain the different processes responsible for their formation
- C. Apply the knowledge above to interpret ancient glacial deposits and reconstruct the nature of past climatic conditions and glacial processes
- D. Resolve scientific and environmental questions using their knowledge of glacial settings and glacial deposits

- E. Demonstrate the ability to find and critically evaluate literature on a specific topic in glacial geology
- F. Organize and summarize scientific information into a coherent and convincing term paper.

Lecture Content:

WEEK of	TOPICS	SEMINAR SCHEDULE	ASSIGNMENTS
January 9	Introductions, subglacial environments	Skills workshop 1	
January 16	Glaciofluvial environments	Skills workshop 2	
January 23	Glaciolacustrine environments	No seminar	
January 30	Glaciomarine environments	core lab	Outline & bibliography
February 6	Marine vs terrestrial environments	core lab	
February 13	Snowball Earth	Discussion	Lab report
February 20	FEBRUARY BREAK		
February 27	Hydrocarbons in glaciated basins	Workshop 3/Discussion	
March 6	Glacial environments and groundwater	Workshop 4/Discussion	Draft
March 13	Catastrophic flooding from glaciers	Discussion	Peer review
March 20	Heinrich events and climate change	Discussion	
March 27	Ice sheet collapse and climate change	Discussion	Final paper
April 3	Review		

Labs:

There will be one lab where you will work on a core over several weeks.

Seminars:

The seminar discussions will give students a chance to learn to read scientific literature; readings will match the topics covered in lectures and highlight key issues in glacial geology such as challenges in reconstructing past environments, heterogeneity and modelling of systems using limited data, resolution and chronological control, preservation potential, the use of multi-proxy analyses, and the larger scale controls on the nature of glacial sedimentary successions. We will also have several workshops related to research skills:

- Critical Reading and Oral Presentations
- Looking for sources and citation
- Writing and peer review

Course Assignments and Tests:

Assignment or Test	Due Dates	Contribution to Final Mark (%)	Learning Outcomes Assessed
Lab assignment	Feb 17, 2016	15%	B, C, D
Oral presentation	Throughout the term	15%	E
Term paper	Feb 3/Mar10/Mar17/Mar 31	50%	E, F
Final exam	April 22, 2016	20%	A, B, C, D

Final examination date and time: April 22, 2017, 7-9 pm

Final exam weighting: 20%

Course Resources

- Readings will be from scientific journals and books. Reference to them and links where available will be posted to the course website on D2L.
- Instructions for the core lab will be posted to the course website the week prior for you to download and print.
- Check the **course website** for additional in-course resources and information. Login with your email login and password at <http://courselink.uoguelph.ca/index.html>.

Course Policies

Grading Policies:

Assignments are due by 5PM on the Friday of the week it is due. Please submit all assignments through the dropbox function on the course website (D2L).

Policy on Late Assignments: If you cannot meet a course requirement, let me know in writing as soon as possible and preferably before the due date. Late assignment will be penalized 10% per day and will no longer be accepted a week after the due date.

Copies of out-of-class assignments: Keep paper and/or other reliable electronic back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Course Policy on Group Work:

Group work is encouraged when completing the lab though students have to make their own field or lab notes and write their own individual lab report.

Course Policy regarding use of electronic devices and recording of lectures:

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted, they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

University Policies

Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

Academic Misconduct:

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

Accessibility:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment.

Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the [Student Accessibility Services website \(http://www.uoguelph.ca/csd/\)](http://www.uoguelph.ca/csd/).

Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](#) for more information.

Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III \(Schedule of Dates\) of the Undergraduate Calendar](#).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

Additional Course Information

It is recommended you keep copies of the course outline and any course work you complete if you are interested in professional certification (e.g. APGO) as you will no longer have access to the course site once the course ends and you may need these documents as part of your application to fulfill the academic requirements of this certification.

