

**LAKEHEAD UNIVERSITY – ORILLIA CAMPUS  
DEPARTMENT OF GEOGRAPHY AND THE ENVIRONMENT  
GEOG 4351 WAO – GLOBAL CLIMATE CHANGE 2023**

**Course Outline**

**A) COURSE INSTRUCTOR:**

Florin Pendea (OA, Room 3026)  
Office hours – by appointment

**B) COURSE DESCRIPTION**

This course aims to help students develop an understanding of the natural climate forcing, natural variability and feedbacks in the climate system. We will discuss the role of Earth's major systems - the atmosphere, oceans, lithosphere, and living organisms— in defining the global climate across various timescales and, more importantly, the interactions among them. Those interactions are crucial to shaping Earth's climate and hold the key to predicting future climate shifts and understanding the role that humans might play. To this end, we will be studying the Earth's environmental history focusing on the last two million years (Quaternary Era). Also, students will develop a clear understanding of climate research methodology and its limitations.

**C) PREREQUISITES**

GEOG 2331 and GEOG 3331; or permission of the Instructor.

**D) STUDENT LEARNING OUTCOME**

At the end of semester, students will be able to:

1. **Explain** how the Earth's climate system has changed over various time scales;
2. **Identify and critically discuss** the conceptual, empirical, and methodological approaches used in the study of climate history (paleoclimatology);
3. **Apply** the General System Theory and interdisciplinary approaches to identify and characterize climate change;
4. **Analyze and critique** ways in which climate change can be detected in observational material and modelling scenarios and the ways in which modelling tools can be used to research climate change.

**E) IMPORTANT DATES**

Lectures are Tuesday and Thursday from 8h:30 to 10h:00 in OA Room 2014. Winter term runs from January 9 to April 11; as the semester progresses lectures in PPT format, lecture notes, assigned readings, and supplementary material will be put on D2L. **The Midterm will be held on February 16<sup>th</sup> in class.**

## F) ASSIGNMENTS

There will be one assignment worth 30% and this is due on **March 23<sup>th</sup>**.

## G) EVALUATION

Midterm Exam	30%
Assignment	30%
Final Exam	40%

The midterm test and final exam will include multiple choice and “short answer” questions as well as hand-written essays. The "short answer" questions may require one or two paragraph answers. The essays should normally be 1-2 pages long. Typically, up to 1/3 short-answer questions come from reading material not covered in lectures. Definitions make up 10-15 percent of the exams. One-third of the final exam will be comprehensive (i.e., from the entire semester's material).

Please realise that departments have no control over the scheduling of final examinations and that individual professors do not have the authority to allow students to write the final exam outside the designated time slot. Furthermore, there will be no opportunity to "re-do" or "make-up" missed or failed assignments and midterms. Additional work to improve a grade is not an option. If you miss the midterm or fail to submit an assignment without a doctor's certificate a mark of "1" will be awarded. Students with disabilities, however, can arrange to write the exam in a special setting. Please contact Student Affairs for more information.

## H) REFERENCE TEXTS

Since no single textbook satisfy our needs, I have prepared written handouts for each major topic and these will be handed out progressively throughout the semester. Some of the assigned readings will be available on D2L others can be accessed through Lakehead University Library Catalogue. Students are expected to complete the readings **BEFORE class**.

## I) LECTURE TOPICS<sup>1</sup>

- **Introduction - The climate system. Course outline**
- **Topic 1. The age of the Earth – an overview of the geologic time and the critical climate events in Earth’s history**
- **Topic 2. Ice Ages (I)– The terrestrial evidence**
- **Topic 3. Ice Ages (II) – The evidence in the sea and ice**
- **Topic 4. Ice Ages (III) Causes of Quaternary glaciations**

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<sup>1</sup> Topics timing along the semester may vary depending on how class discussions develop.

- **Topic 5. The Ice Age Aftermath** - The Meltdown – a story about lakes and forests
- **Topic 6. Rapid Climate Change – The Younger Dryas**
- **Topic 7. Slow climate change – The Holocene Climatic Optimum**

Time permitting:

- **Topic 8. Methods in climate change research**
  - Dating techniques
  - Proxy methods of tracking climate change

## **J) ACCESSIBILITY**

General regulations

Student Accessibility Services (SAS) and Student Affairs (Orillia) coordinate services and facilitates reasonable academic accommodations for students with disabilities. Academic accommodations are provided on the basis of documentation of a disability. Additional information is available at the following campus websites:

SAS: <https://www.lakeheadu.ca/students/student-life/student-services/accessibility>

Orillia: <https://www.lakeheadu.ca/faculty-and-staff/departments/services/sa-orillia>

## **K) STUDENT RESPONSIBILITIES AND ACADEMIC INTEGRITY**

Students are expected to participate in all course activities and complete all assignments on time. Late assignments carry a 10% reduction in value per day, no exceptions.

Academic dishonesty (plagiarism):

The most common offense under the Academic Code of Conduct is plagiarism.

This could be material copied word for word from books, journals, internet sites, professor's course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. "Presentation" is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

**Remember! Do not copy, paraphrase or translate anything from anywhere without citing where you obtained it!**

University guidelines on the matter:

The University takes a most serious view of offences against academic honesty such as plagiarism, cheating and impersonation. Penalties for dealing with such offences will be strictly enforced.

A copy of the "Code of Student Behaviour and Disciplinary Procedures" including sections on plagiarism and other forms of misconduct may be obtained from the Office of the Registrar. The following rules shall govern the treatment of candidates who have been found guilty of attempting to obtain academic credit dishonestly.

(a) The minimum penalty for a candidate found guilty of plagiarism, or of cheating on any part of a course will be a zero for the work concerned.

(b) A candidate found guilty of cheating on a formal examination or a test, or of serious or repeated plagiarism, or of unofficially obtaining a copy of an examination paper before the examination is scheduled to be written, will receive zero for the course and may be expelled from the University.

Students disciplined under the Code of Student Behaviour and Disciplinary Procedures may appeal their case through the Judicial Panel.

Note: "Plagiarism" shall be deemed to include:

1. Plagiarism of ideas as where an idea of an author or speaker is incorporated into the body of an assignment as though it were the writer's idea, i.e. no credit is given the person through referencing or footnoting or endnoting.
2. Plagiarism of words occurs when phrases, sentences, tables or illustrations of an author or speaker are incorporated into the body of a writer's own, i.e. no quotations or indentations (depending on the format followed) are present but referencing or footnoting or endnoting is given.
3. Plagiarism of ideas and words as where words and an idea(s) of an author or speaker are incorporated into the body of a written assignment as though they were the writer's own words and ideas, i.e. no quotations or indentations (depending on format followed) are present and no referencing or footnoting or endnoting is given.

A listing of University Regulations can be found at:

<http://calendar.lakeheadu.ca/current/contents/regulations/univregsintro.html>

The code of student behaviour and disciplinary procedures can be found at:

<http://policies.lakeheadu.ca/policy.php?pid=60>

Academic Integrity Statement:

I understand and agree that:

- (1) Unless otherwise allowed by the course instructor, I must complete the assignments in this course without the assistance of anyone else.
- (2) Unless otherwise allowed by the course instructor, I must not access any sources or materials (in print, online, or in any other way) to complete any course exam.

I further understand and agree that, if I violate either of these two rules, or if I provide any false or misleading information about my completion of course assignments or exams, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity,

which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

### **L) Class Etiquette**

Out of common courtesy, your professors request a few things of you. While students are in class, they are expected to give their full attention to the professor. Reading, talking, sleeping, and leaving before the end of class are impolite. If you know before class that you will have to leave early sit towards the back near the door so as not to disrupt the class. Likewise, if you arrive late, please enter from the back of the class.

### **M) Copyright**

Students should be aware that all instructional, reference, and administrative materials prepared for this course are protected in their entirety by copyright. Students are expected to comply with this copyright by only accessing and using the course materials for personal educational use related to the course, and that the materials cannot be shared in any way, without the written authorization of the course instructor. If this copyright is infringed in anyway, students may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

#### Copyright Compliance:

I understand and agree that all instructional, reference, and administrative materials to which I am given access in this course (the "course materials"), whether they consist of text, still or kinetic images, or sound, whether they are in digital or hard copy formats, and in whatever media they are offered, are protected in their entirety by copyright, and that to comply with this copyright and the law

(1) I may access and download the course materials only for my own personal and non-commercial use for this course; and

(2) I am not permitted to download, copy, or store (in any medium) any text, image, or sound component of the course materials for any other purpose whatsoever, or to forward or share, transmit, broadcast, show, post or play in public, adapt, or change in any way any text, image, or sound component of the course materials, except as expressly authorized, and only to the extent authorized, in writing, by the course instructor."

I further understand and agree that, if I infringe the copyright of the course materials in any way, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

*This course is designed to compliment other geography, geology and environmental courses. Certain important and "fundamental" topics are the domain of all of these courses and will probably be repeated.*