CLIMATE CHANGE GEOG/ENST 4351 Fall 2023

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Description

An interdisciplinary analysis of the complex issue of global climatic change. This course provides a detailed investigation of every aspect of one of the most challenging problems of our era: the physics and causes of change, the likely environmental and socio-economic impacts, and the politics and technologies behind mitigation and adaptation.

Course Text

Dessler, Andrew (2022). *Introduction to Modern Climate Change, 3rd ed.* UK: Cambridge University Press.

Students will be assigned readings to complete *before each lecture*. Readings chosen from the academic literature will be available through either the Library or MyCourselink.

Evaluation Scheme

Midterm Examination	**25%**	October 18
Seminar Abstract	**3%**	October 18
Seminar	**15%**	November 20 – December 4
Summary Paper	**7%**	December 4
Final Examination	**50%**	TBA

There will be one midterm test, plus a final examination. Each student will conduct a 15-minute seminar in class. Students will also write an original paper of no more than five pages on the same topic as their seminar.

Lecture Times

Mondays and Wednesdays: 11:30 am – 1:00 pm, RB 3049

GEOG/ENST 4351 Course Schedule

(subject to changes as necessary)

Date	Reading	Topic(s)
September 6	Chapter 1	Introduction
September 11	Chapter 2	Evidence of Change
September 13	Chapter 3	Balancing Energy and Radiation
September 18	Chapter 5	The Carbon Cycle
September 20	Chapter 6	Forcings and Feedbacks
September 25		**No Lecture**
September 27	Chapter 7	Past Climate Change
October 2	Chapter 4	Modelling the Climate System
October 4	Chapter 8	Scenarios of Change
October 9		**Study Week**
October 11		**Study Week**
October 16	Chapter 9	Expected Climatic Change
October 18		**Midterm**
October 23		Sea Level Rise
October 25		Impacts on Water Resources and Agriculture
October 30		Impacts on Forests
November 1		Impacts on Marine and Human Systems
November 6	Chapter 11	Reducing Emissions
November 8	Chapter 12	Mitigation Policy
November 13	Chapter 13	Political History
November 15	Chapter 14	Targets and Recommendations
November 20		Seminars
November 22		Seminars
November 27		Seminars
November 29		Seminars
December 4		Seminars

Learning Outcomes

Knowledge

- Identify the physical processes that produce global climatic changes
- Describe the climatological history of Earth and theory surrounding past changes
- Connect ongoing changes in the atmosphere with observed patterns of global and local climatic changes, and anticipate future changes in the system
- Summarize the expected effects that climatic change will have on human and natural systems, including water resources, agriculture, biodiversity, and sea level rise
- Appraise alternative options that could be implemented to mitigate anthropogenic interference in the climate system
- Compare policy mechanisms and multilateral regimes for implementing mitigation options

Skill Development

- Consideration of uncertainty in decision-making
- Critical analysis of scientific literature and its significance
- Effective communication of scholarly research in both written and verbal formats

Course Delivery

In accordance with the safety protocols at Lakehead University in Fall 2022, this course will be delivered in-person. The primary mode of contact will be lectures during the scheduled time periods each week. It is possible that this will change if circumstances warrant.

Course materials will be delivered through the **Desire2Learn** platform at MyCourselink.

LU Accommodation Statement

Lakehead University is committed to achieving full accessibility for persons with disabilities/medical conditions. Part of this commitment includes arranging academic accommodations for students with disabilities/medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability/medical condition and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please email sas@lakeheadu.ca or visit https://www.lakeheadu.ca/faculty-and-staff/departments/services/sas.

GEOG/ENST 4351 Individual Research Projects

Introduction

4351 is a course loaded with content from the instructor. However, as a fourth-year course it is expected that students will seek out exposure to a wider range of knowledge and viewpoints. These seminars provide the opportunity for each student to gain familiarity with an area of current research related to global climate change. The goal of the project is to present new material to the class and solicit opinions and discussion.

Material

The basis for each project is ***current research***, represented by articles chosen from academic journals and emphasizing ones that were published within the last 10 years. **This research must go beyond what is covered in the course.**

Your sources should be primarily **peer-reviewed journal articles**; you are expected to make use of **at least three**. Reports from the "grey literature" (unpublished manuscripts, conference proceedings, government reports, dissertations, etc.) will be acceptable as **secondary** sources. Magazines, newspapers, web sites, etc. will generally **not** be considered useful.

Look for articles that cover the same or closely related subjects but also *complement* rather than duplicate each other. Consider both quality and quantity of papers in your research; 4-10 should be sufficient, but you must acquire a good grasp of a subject that is new and interesting.

Seminar Abstract

An abstract is a short and pithy summary of a work. The abstract for your seminar will introduce the main topic, the sources of information, and the key findings that will be presented. It should consist of summary statements, not opinions or plans. The abstract must be **250 words** or less and include at least two peer-reviewed references.

Seminars

You will be allotted **20 minutes** of class time to share your research with your peers. You may organize your seminar in many ways: presentations, discussions, games, debates, etc.

Seminars will be evaluated according to the following criteria:

- Was the seminar well-organized? Was it clear that the presenter understood the material?
- Was the material new and interesting? Did the presenter include his/her own insight and opinions?
- Was it pitched at a level appropriate to the class? How well did it solicit participation from the other students?
- Was the delivery professional? Was originality or creativity evident?

You may make use of software tools to aid in presentation of your seminar, as long as necessary equipment is available. Any videos must be five minutes or less.

Please note that since seminar topics may be included on the final exam, continued attendance at these sessions is expected.

Papers

You will write a summary paper on your seminar topic of approximately **1500 words** (roughly five pages in length at 1.5 line spacing). The paper should review and synthesize material you have collected for that topic along with your own insight.

While this is a short paper, it should still have a formal style ***beginning with its own abstract and ending with a concluding section***. Tables, figures, and the reference list are not included in the five-page limit.

Remember to cite your sources within your paper! Failure to refer to your sources constitutes plagiarism. All papers are to be fully referenced using the author-date style of referencing (e.g.: Hanson et al. 2019). If you are unsure of how to do this, follow the format described in the Department of Geography and the Environment Undergraduate Thesis Manual, available through the department web site:
https://www.lakeheadu.ca/academics/departments/geography/thesis

A short paper may seem like an easier task, but in practice it may seem difficult to distill the material and opinions in your seminar into five pages of content. Focus your writing style. Papers will be evaluated according to:

- Content
- Analysis
- Writing style
- Formatting and referencing

Project Support

The Library provides considerable support for students conducting academic research and accessing reputable peer-reviewed literature. Contact your librarian liaison, Nicole Stradiotto (nicole.stradiotto@lakeheadu.ca), for help refining your topic and locating the information that you need. They're **much better than Google**.

The Academic Support Zone (https://www.lakeheadu.ca/students/academic-success/student-success-centre/academic-support-zone) provides free consultation and coaching for writing and polishing your work.

Suggested Topics

Listed below are some suggested starting points for individual research. **This list is not exhaustive**; you may decide on a topic that does not fit any of these categories. Topics will often be focussed on a particular region, sector, or ecosystem, but could also have a global scope.

You should discuss your topic with the instructor before the end of September in order to avoid duplication with other students, and to ensure that your topic is relevant and goes beyond the basic course material.

2022 United Nations Climate Change Conference (COP 27)
- National priorities and plans
- Commitments versus objectives
- Nongovernmental participation
- History of negotiations and emissions

Climatology
- Paleoclimatology
- Global observation networks
- Emissions projections
- Climate models

Impacts
- Agricultural impacts
- Forest impacts
- Sea level rise
- Water resource impacts
- Biodiversity
- Biological surprise
- Polar impacts
- Disease
- Economic costs

Mitigation
- Setting targets for emission reductions
- Policy mechanisms
- Ethics and politics
- International cooperation
- Public perspectives
- Politics

LU Statement on Generative AI

Generative artificial intelligence (Generative AI or GenAI) is a category of AI systems capable of generating text, images, or other media in response to prompts. These systems include ChatGPT and its variant Bing (built by OpenAI) and Bard (built by Google) among several others. Other generative AI models include artificial intelligence art systems such as Stable Diffusion, Midjourney, and DALL-E.
GenAI tools can provide valuable assistance and support in academic work. However, it is essential to use them responsibly and ethically. The following information and guidelines apply to the use of AI-based tools in this course:

a. **Student Responsibility** – It is the responsibility of the student to understand the limitations of AI-based tools. While these tools can provide suggestions and insights, final decisions and critical thinking should come from the student's own understanding and effort. Before submitting, review your work with this in mind. If you don't understand what type of GenAI usage is appropriate, ask the course instructor for clarification.

b. **Formative Usage** – In this class, you may use GenAI for formative, but not summative, work. That means it can be used as a "possibility engine" (brainstorm tool), a "study buddy," a "collaboration coach," a "guide on the side," a "personal tutor," a "co-designer," etc. to help you learn course content, but it cannot be used as the primary vehicle for any work that is submitted for marks or evaluation. (See UNESCO's "ChatGPT and Artificial Intelligence in Higher Education Quick Start Guide," page 9, for explanations and examples of these and other roles GenAI can productively serve in a formative capacity.)

c. **Error & Bias** – AI content is created by computer algorithms that have been trained using large amounts of data. The AI learns from patterns and examples in the data to generate new content that resembles what it has been trained on. If the training data used to train the AI model is biased or limited in scope, the AI may reproduce content that is inaccurate, incomplete, offensive, and/or biased. Students should weigh this as they consider material produced by AI.

d. **Trustworthiness** – Generative AI can be vulnerable to manipulation and misuse. It can be used to generate fake news, misinformation, or deepfake content, which can have harmful consequences. Students should check AI generated content against reputable sources.

e. **Plagiarism** – Since [writing and critical thinking ability] are learning outcomes of this course, all work submitted for evaluation must be the student's original work. Using the work of others (including content curated/generated by AI) without proper citation is considered plagiarism. See "Citing Artificial Intelligence" for assistance with correct documentation.

f. **Citation of Sources** – If you use material generated by an AI program for an assignment in this course, it must be cited like any other source (with due consideration for the quality of the source, which may be judged as poor). Failure to do so will be considered a violation of academic integrity. See Student Code of Conduct – Academic Integrity.