

GEOG 3390 D01: INTRODUCTION TO CLIMATE CHANGE AND ITS CAUSES
COURSE SYLLABUS: WINTER 2026



Source: Werner Huth, 2014.

Equity, Diversity and Inclusion Statement

I am committed to creating a welcoming and inclusive learning environment for all students. I acknowledge that the University of Manitoba campuses are located on the ancestral lands of the Anishinaabeg, Ininiwak, Anishinewuk, Dakota, and Dene peoples, and the homeland of the Métis Nation. I respect the treaties that were made on these territories and am committed to working towards reconciliation. I value diversity in all its forms and strive to create a classroom where everyone feels respected and supported. I will work to dismantle systemic barriers and ensure that all students have equitable access to learning opportunities.

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Course Details

Course Title & Number:	GEOG 3390 D01
Number of Credit Hours:	3 credit hours
Class Times & Days of Week:	No in-person lectures; all material is online (UMLearn)
Prerequisites:	Prerequisite: a minimum of three credit hours from Geography or Environment courses, or permission of department head.

Instructor Contact Information

Instructor(s) Name:	Dr. John Iacozza
Preferred Form of Address:	John or Dr. Iacozza
Office Location:	250 Wallace Building
Office Hours or Availability:	Monday and Wednesday 11:00 am – 12:00 pm. Individual assistance is also available by appointment (please email me to make an appointment). I look forward to seeing you during office hours. I am also available for drop-ins; if my office door is open, I would be happy to discuss any issue. We all need help with something at some point in our lives.
Office Phone No.	204-474-8483
Email:	John.Iacozza@umanitoba.ca (preferred method of contact). I will respond to emails or phone calls between 9 am and 4 pm, Monday to Friday. All efforts will be made to respond within 48 hours, excluding weekends.

Course Description

Calendar Description: The primary objective of this course is to provide students with a general understanding of the physical and astronomical factors that drive global climate change. Focus will be given to current and future climate change in the context of observations and modeling.

Extended Description: Climate change is one of the most urgent challenges your generation will face. Its impacts are felt at local, national, and global scales—not only affecting us today but shaping the world your children will inherit. To respond effectively, it is essential to understand the context of both present and future climate change: how the climate system is changing, what these changes mean for the Earth and human societies, and the underlying causes driving them. This course will build that foundation. Lectures will provide the theoretical framework for understanding climate change, while assignments will give you the opportunity to apply core concepts to real-world data and climate models.

Course Goals and Learning Objectives

By the end of this course, you will:

- understand the physical science basis of climate change and the role of greenhouse gases, forcings, and feedbacks.
- critically evaluate climate data, models, and scenarios.
- analyze the impacts of climate change on physical systems, ecosystems, and human societies.
- assess mitigation and adaptation strategies at multiple scales.
- develop skills in quantitative analysis, critical thinking, and science communication.

Learning Objectives

By the end of the course, you will be able to:

- explain the scientific principles underlying the climate system and climate change.
- interpret and analyze climate datasets using appropriate tools.
- compare proxy records of past climate change across timescales.
- evaluate the strengths and limitations of climate models and scenarios.
- assess the vulnerabilities and resilience of ecological and social systems.
- debate policy frameworks in climate governance.
- communicate climate science effectively to academic and public audiences.

Learning Activities

During this course, you are asked to participate in several learning activities:

- viewing the voice over PowerPoint slideshows associated with each module. These videos will be available on UMLearn and students will be able to access them anytime during the term,
- reading assigned instructional material, including textbook chapters, as well as viewing any animations/videos provided in UMLearn,
- complete weekly ungraded quizzes on the lectures of the unit, and
- demonstrate your learning through a variety of assessments, including assignments, thought provoking discussions and a final exam.

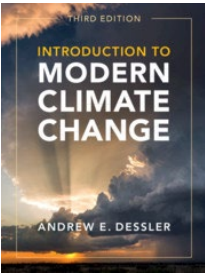
What You Can Expect From Me

- I will listen actively and be respectful ([Respectful Work and Learning Environment Policy.](#))
- I will keep conversations confidential, sharing ideas but not specific stories or names.
- I will be punctual for all meetings.
- I will be available for meetings outside of class times to discuss course material and assignments/tests. Please feel free to make an appointment through email. I am always happy to talk about the course material in greater detail.
- I will normally grade assignments within 2 weeks of submission. Grades (including explanations) will be provided in UMLearn. Feedback will be summative for most assessments. If you have any questions about your grades, I encourage you to talk to me in person as it is easier to discuss the answers in person though.

What I Can Expect From You

- You will treat me, and other students with respect ([Respectful Work and Learning Environment Policy.](#))
- You will accept that it is OK not to know, both for yourselves and others, and ask questions when you need to.
- You will view online lectures and take notes, as well as participating in class discussions.
- You are encouraged to read the assigned readings prior to the unit as much as possible. This will help with the learning process during class. I have tried to limit the assigned readings as much as possible to make it not as onerous on you.
- You are required to complete the assessments individually and on time, unless otherwise stated. You may consult with other students; however, it is expected that all assessments will be submitted in your own words. Failure to do so will result in a penalty (see section of course outline on Academic Integrity). If you have any questions about the assessments, please see me during office hours or by appointment.

Textbook and Technology



Dessler, A.E. (2022) Introduction to Modern Climate Change (3rd ed.)
Cambridge Press. ISBN: 978-1-108-79387-2

This textbook is required. It will be referred to in the assignments and lectures, as well as a resource for you to enhance your understanding of the topics presented in the lectures.

Technology: It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. You can use technology in classroom setting only for educational purposes.

You have access to Office365 through the university. You are encouraged to save your assignments to the Cloud using this program to ensure material is not lost through technological issues (not a reason for granting an extension).

Course Schedule

The following table lists the dates for each unit of this course, as well as the various assessments for the course.

****Note:** Poster is due on a Monday, all other assignments are due on Friday.

DATE	TOPIC	READINGS	ASSESSMENT (DUE DATE)
JAN 5 - 9	UNIT 1: Introduction to Climate Change	pp. 1 – 5; 221-240	
JAN 12 - 16	UNIT 1: Introduction (con't)	pp. 39-49; 53-58	Thought Provoking Question #1 (Jan 16)
JAN 19 - 23	UNIT 2: Review of Energy System	pp. 39 – 62; 69 – 78; 91 – 93	
JAN 26 - 30	UNIT 2: Review of Energy System (con't)		Thought Provoking Question #2 (Jan 30) Assignment #1 (Jan 30)
FEB 2 - 6	UNIT 3: Climate Change in Context	pp. 28 - 35	
FEB 9 - 13	UNIT 3: Climate Change in Context (con't)	pp. 39 – 62; 69 – 78; 91 – 93	Thought Provoking Question #3 (Feb 13) Assignment #2 (Feb 13)
FEB 16 - 20	WINTER BREAK – Time to Relax and Recharge		
FEB 23 - 27	UNIT 4: Current Climate Change	pp. 16 - 28	
MAR 2 - 6	UNIT 4: Current Climate Change (con't)		Thought Provoking Question #4 (Mar 6) Assignment #3 (Mar 6)
MAR 9 - 13	UNIT 5: Forcing Factors	pp. 78 – 88; 93 – 107; 112 - 125	
MAR 16 - 20	UNIT 5: Forcing Factors (con't)		Thought Provoking Question #5 (Mar 20)
MAR 23 - 27	UNIT 6: Future Climate Change	pp. 129 – 144; 146 - 165; 187 – 201; 205 - 216	Case Study (Mar 27)
MAR 30 – APR 3	UNIT 6: Future Climate Change (con't)		Thought Provoking Question #6 (Apr 3)
APR 6 - 9	Final Exam Review		Poster (Apr 6)** Thought Provoking Summary (Apr 9) Final Exam (TBD)

Assessment Descriptions

Data Analysis Assignments (30% of final grade)

You are required to complete three assignments designed to build and apply your data analysis skills in the context of real-world climate change questions. Each assignment will focus on a specific analytical task, such as calculating components of the climate system, analyzing proxy records to reconstruct past climates, or computing climate anomalies and evaluating trends in key climate parameters.

These assignments will assess your ability to apply and interpret concepts introduced in class, incorporating both quantitative analyses and qualitative discussions of underlying principles. Detailed instructions and datasets will be provided with each assignment.

You are expected to demonstrate scientific reasoning, use proper data citation (APA format), and present your findings with clarity and precision in both analysis and written communication.

All assignments must be completed independently and submitted through UMLearn. Emailed submissions will not be accepted under any circumstances. You may upload multiple versions of your assignment prior to the deadline; however, only the most recent submission will be graded.

Formatting for assignments:

- assignments must be submitted as a single MS word document. Submission of the assignment in any other format (including Excel, PDF or Pages) will be given a grade of 0.
- handwritten answers will not be accepted for any reason and thus will be given a grade of 0. This includes photos of handwritten answers.
- answers to questions must be provided in complete sentences and double-spaced; 10% will be deducted for improper format
- questions involving calculations must have a concluding statement that provides the answer to the question (i.e. the wavelength of maximum emission is 6.75 mm). Failure to do so will result in a deduction of 0.5 mark for each question.
- others listed in the assignment

Case Study Assignment (10% of final grade)

In this assignment, you will write a case study focused on the predicted future climate change and its potential impacts in a specific region of your choice. The goal is to synthesize scientific data, model projections, and regional assessments to evaluate how climate change is expected to alter key environmental and socio-economic systems within that region.

Your case study should:

- identify the region (e.g., Arctic, Prairies, Amazon Basin, Mediterranean, Sub-Saharan Africa, etc.) and provide a brief overview of its current climate characteristics.
- summarize projected climate changes for the 21st century or up to 2100 (e.g., temperature, precipitation, extreme events, sea level, cryosphere changes) using data from sources such as the IPCC, national climate assessments, or peer-reviewed literature.
- analyze the expected environmental and human impacts, including effects on ecosystems, water resources, agriculture, infrastructure, or communities.

- discuss potential adaptation or mitigation strategies and evaluate how these responses could reduce future risks.
- incorporate maps, figures, or datasets where appropriate to support your analysis (with proper captions and citations).

The case study should be written in a report format (approximately 1500–2000 words), include proper citations in APA style, and demonstrate critical thinking about the interactions between climate projections and regional vulnerability. The written report should follow the formatting instructions for the assignments.

Poster – Mitigation/Adaptation (10% of final grade)

You are required to create a poster that presents and evaluates a current climate change mitigation strategy. The poster should clearly outline the key arguments supporting the strategy, explaining how it contributes to addressing climate change. The poster must be created in PowerPoint and submitted as a PDF or JPEG file through UMLearn. Be sure to include your name at the top of the poster.

Your poster should include:

- a brief description of the mitigation strategy.
- information on whether the strategy is currently being implemented in a specific region or country, including an assessment of its effectiveness or success, or if not implemented, the expected outcomes or projected impacts of the strategy.
- at least one relevant graph or figure that visually supports your discussion.
- any additional context or details you consider important.

Evaluation Criteria:

- quality and accuracy of information presented – 50%
- effective and appropriate use of graphics – 20%
- overall design, organization, and clarity – 30%

Formatting for the poster:

- poster must be portrait orientation and a size of 30 cm (width) and 40 cm (height).
- font should be at least 36-point
- must have at least one graph/figure with a caption at the bottom of the figure
- must have a title, as well as your name and student number
- save and submit your poster as a jpeg.
- references should be included at the bottom of the page in 12-point font

Thought Provoking Discussion and Summary (15% of final grade)

The discussion questions will be utilized to facilitate engagement with other students. For each unit, you are asked to provide your opinion to an open-ended question or scenario based on the material for the unit, as well as reply to the responses by other students. These discussions will typically not have a correct answer; rather will be opinion-based, therefore, grades will be provided based on the quality of their opinion, rather than 'correctness'. A full mark will be provided for an original post to the question, and one-half mark each for two responses to other students' post for a total of 2 marks. In order to get the full marks, your response(s) to other students' post should be more than a simple statement of agreement. Something such as

"Great post John. I really liked your discussion on polar bears" will receive no marks. You need to add to the discussion by posting a question, elaborating on point(s) made or any other points that can further the original post. The discussion questions will be available in UMLearn (under Communications > Discussions) from Monday at 12:01 am until Friday at 11:59 pm (Central Time).

In addition, you will also be required to provide a brief summary of the posts for ONE of the discussion questions for an additional 3 marks. This summary should outline the main points made in the discussion and reflect on how your opinion/knowledge of the topic has changed (or not) after reading the posts. The grade will be based on completeness and quality of the summary. The summary should be no more than 250 words, and should follow the guidelines for the assignment

Final Exam (35% of final grade)

The final exam for this course will consist of short answer questions. The questions will be designed to test the student's understanding of the main concepts, and integrate the knowledge gained through the various units. The material covered in the final exam will be cumulative and include all units. Questions will not involve any calculations and thus no calculators are needed. Students will have 2 hours to complete the exam on the date scheduled by the University. No extraneous devices (i.e., calculators, dictionaries, cell phones, notes, textbooks, etc.) will be allowed for the final exam. Students must be available during the university examination period. The exam will be written online through UMLearn. More information will be provided closer to the end of term.

Ungraded (formative) assessment

You can complete 6 quizzes (one for each unit) with immediate feedback. These quizzes will not be part of the final grade; however, will allow students to gauge their knowledge as they progress through the units and prepare for the final exam. Each quiz will involve 20 multiple choice/true-false questions. The questions will be standard multiple choice (or true-false) format. Multiple attempts will be allowed with no timing enforced. The quizzes will be available for the entire unit. Photos of the questions/answers should not be taken for any reason (see section on Copyright).

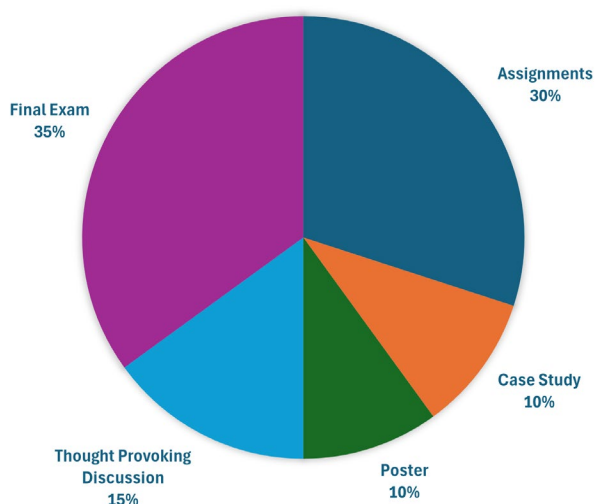


Figure 1. Breakdown of course assessments for GEOG 3390 D01.

Grade Distribution

LETTER GRADE	PERCENTAGE RANGE	DESCRIPTION
A+	90-100	Exceptional
A	80-89.9	Excellent
B+	75-79.9	Very Good
B	70-74.9	Good
C+	65-69.9	Satisfactory
C	60-64.9	Adequate
D	50-59.9	Marginal
F	0-49.9	Failure

NOTE: All final grades are subject to departmental review.

Course Policies

Assessment Extension and Late Penalty

All assessments (assignments, case study and poster) for this course must be completed and handed in on time – by **11:59 pm** on due date (unless otherwise stated). Late assessments will be assessed a penalty of 10% per day unless you have obtained approval from me **at least 48 hours in advance** of the deadline (see list below for acceptable reasons). If you know that you will be away, you **MUST** submit the assessment before the due date.

Deferrals for the midterm are available for the medical or compassionate reasons listed below. The test will be different than the original to maintain academic integrity. The date for deferred midterm is March 6 at 8:30 am. No further extensions will be granted without formal request through the university. Extensions for the final exam must be requested through your faculty office (I can not grant an extension).

Reasons for granting an extension: a death in your immediate family, a religious observance, an illness in either yourself or in a dependent, and you are required to travel for work.

Reasons for not granting an extension: having course work for another class due on the same day, being away from the university for a personal reason (i.e. holiday or personal vacation), being too busy with other course work, not attending the lectures due to personal or compassionate reasons, car broke down and could not submit assignment on time, computer is not working properly and you lost the assignment, or any other reason deemed inappropriate by myself.

Voluntary Withdrawal Date

The voluntary withdrawal date for this course is **March 19, 2026**, this is the last date for withdrawing from this course without academic penalty. Evaluative feedback will be provided prior to this date.

Academic Integrity

Academic Integrity: Academic dishonesty (plagiarism, cheating) is a very serious matter in any academic institution and is dealt with severely at the University of Manitoba.

Please refer to these specific course requirements for academic integrity for individual work in this course:

- i. Unless otherwise stated, complete the assessments for this class by yourself with no help from your class peers, family members, or from tutors that are not approved by me. If you need assistance, please contact me immediately for support and/or to arrange for approved supports.
- ii. Do not share course materials (e.g., lectures, notes, exam questions, assignment instructions, article) that have been created by me or were authored by another person. Unpermitted sharing of such materials with your peers or with note-sharing companies, such as One Class, Course Hero, or Chegg (or other similar websites), is a violation of Copyright Law.
- iii. areas can work in study groups and consult their peers regarding general questions about assessments; however, the submitted assessment must be original work by the student.
- iv. Do not submit assessments already graded in another course.

Plagiarism, duplicate submission, cheating on quizzes, tests, and exams, inappropriate collaboration, academic fraud, and personation are violations of the Student Discipline Bylaw and will lead to the serious disciplinary action. Visit the Academic Calendar, Student Advocacy, and Academic Integrity web pages for more information and support.

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. Obviously, it is not necessary to state the source of well-known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources.

The knowing use of generative artificial intelligence (GenAI) tools, including ChatGPT and other AI writing and coding assistants, for the completion of, or to support the completion of, an examination, term test, assignment, or any other form of academic assessment, may be considered as academic misconduct in this course.

Please familiarize yourself with the University policy on academic dishonesty found on the following website: <https://umanitoba.ca/student-supports/academic-supports/academic-integrity#:~:text=UM%20considers%20duplicate%20submission%20as,using%20a%20previously%20submitted%20paper>. When in doubt about any practice, ask me.

Students are encouraged to review the University policy on Responsibilities of Academic Staff with Regards to Students (ROASS):

<https://catalog.umanitoba.ca/undergraduate-studies/policies-procedures/responsibilities-academic-staff-regard-students-policy/>

Accessibility

The University of Manitoba is committed to providing an accessible academic community. Student Accessibility Services offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g., mental health, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

SAS is located at 520 University Centre (Fort Garry Campus). You contact SAS in person, by phone (204 474 7423) or email (student_accessibility@umanitoba.ca).

Class Communication

You are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy:

http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html.

Recording Class Lectures

The University of Manitoba and I hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without written permission from me.

Copyright Material

Students are expected to respect copyright. Copyrighted content used will be used in this course in accordance with copyright laws and university guidelines. Copyrighted works, including course materials created by me (such as PowerPoints, handouts, or notes), are made available for private study and research and must not be shared or distributed in any format without authorization (including to course note sharing or tutoring websites such as Course Hero, Chegg, etc.). Violating copyright can result in serious consequences for students at the UM, including (but not limited to) allegations of academic and non-academic misconduct. If you have questions or need help see the University's Copyright Office website (<http://umanitoba.ca/copyright/>) or contact um.copyright@umanitoba.ca.

Referencing Style

The research paper must use the APA reference style (7th ed.). Information can also be found on the UM Libraries website: <https://libguides.lib.umanitoba.ca/learning/citing>. You should not cite the lecture notes in your research paper or outline. If you do need to reference the course lectures in other assessments, the format can be found in the APA reference guide available at the link above. **Students will be penalized 10% if another style or footnotes are used.**

UM Policies and Resources

Students should familiarize themselves with the policies and resources at the University of Manitoba under ROASS (Responsibilities of Academic Staff with Regard to Students). A document has been prepared and is available in UMLearn under the Content Tab (titled - *ROASS Schedule A*). If you have any questions about the policies or resources, please contact me. I would be happy to help guide you through anything listed in the document.