

GEOG 303 LEC01 Introduction to Climate Change

GFC Hours 3-0

Fall 2022 classes: September 6th – December 7th, 2022

Section	Days	Time	Location
LEC 01	Web-based	Asynchronous	online

Instructor: Dr. Shawn Marshall	Office:
Telephone:	Email: shawn.marshall@ucalgary.ca
Email communication will be through your UCalgary email address.	Office hours (virtual): Weds 1-3 pm or by appointment

The **Department of Geography** condemns the longstanding and continued injustices against those marginalized by racism, sexism, homophobia, transphobia, classism, xenophobia, able-bodied normativity, mental health profiling, and other forms of prejudice. We are pained by the fact that injustices are unevenly borne. <https://arts.ucalgary.ca/news/anti-racism-statement>

Territorial Acknowledgement

The Department of Geography would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III. <https://www.ucalgary.ca/indigenous/cultural-protocol>

Official Course Description

Introduction to climate change science, climate change impacts, and Canadian and international climate policy. Topics include an introduction to the atmosphere, ocean, and cryosphere, the carbon cycle, the greenhouse effect, natural climate variability in Earth history, climate models, and an overview of economic, political, social, and policy dimensions of climate change.

Course Objectives

Students will learn the fundamentals of the physical climate system and the underlying science of global climate change on anthropogenic timescales. By the end of the course, students will be able to discuss and analyze how climate change impacts a broad spectrum of societal and environmental systems, and the role of domestic and international science policies in addressing climate change. Students will understand and be able to distinguish between natural and anthropogenic climate change processes, climate forcing and feedbacks, and climate change science, policy, and politics. Students will be able to apply their understanding to critically analyze media articles and web content concerning climate change.

The Department of Geography is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes to which they contribute, and the expected level of achievement.

Course Learning Outcomes	PLO(s)	Level(s)
LO1. Students should be able to explain the essential physical, chemical, and biological processes that govern Earth's climate.	2	1
LO2. Students should be able to explain natural vs. anthropogenic influences on Earth's climate, and the nuanced superposition of these processes.	2, 5	2
LO3. Students should be able to quantitatively assess and reflect on ways in which human activity produces greenhouse gases.	1, 2, 4	1
LO4. Students should be able to explain how IPCC and UNFCCC processes work and the way that climate science feeds into climate policy.	2, 4, 5	1
LO5. Students should be able to critically assess and discuss societal and	1, 2, 8	2

policy issues concerning future climate change.		
LO6. Students should be equipped to critically evaluate public and media discussions on climate change science.	1, 8	2
LO7. Students should be able to perform simple calculations and analyses with spreadsheet-based climate data and theoretical equations.	3, 4	2

PLOs = Program Learning Outcomes

1. Reflect and communicate diverse human-environment perspectives
2. Identify and explain human-environment processes
3. Implement sampling, data collection, analyses and communication methods
4. Analyze spatial and temporal aspects of human-environment systems
5. Employ knowledge, arguments, and methodologies to solve environmental problems
6. Evaluate geospatial data and manipulate it to create cartographic products
7. Communicate geographic concepts using oral, written, graphic, and cartographic modes
8. Demonstrate literacy skills.

Levels: (1) Introductory, (2) Intermediate, (3) Advanced.

Prerequisites

There are no prerequisites for this course. Some of the assignments require work with Excel spreadsheets and familiarity with basic mathematical calculations.

This course is delivered fully online and is divided into eight modules. Each of the modules will include a variety of learning activities, which may include assigned readings, D2L discussion boards, films, Zoom class sessions, recorded presentations, guest speakers, etc. A full description of each module will be listed on the D2L site for the course.

D2L Discussions

Class discussions in D2L are integral to learning in this course. The advantage of the discussion board is that it is asynchronous, that is, we can all contribute at a time that is convenient to each of us. Discussion postings remain on the site for the duration of the course, although your contributions to the discussion board should be timely to the unit being discussed by the class.

Zoom Office Hours

Zoom is a web conferencing program that will allow us to meet at specific times for a “live” web session, so that we can have the opportunity to meet each other virtually and discuss the course material and any questions you may have. There will be one Zoom session per module, for a total of eight Zoom sessions. Students are not required to attend the Zoom sessions; these are optional tutorials or office hours where the instructor will be available for discussion of course content.

Module Outline and Schedule

In the readings listed below, “Chapter X” refers to the course textbook (Burch and Harris). Web resources will be provided for each module in addition to the foundational materials in the textbook.

Module Dates	Module Topic	Readings
September 6-9 Zoom Meeting: Sept 14, 1-3 pm	<i>1. Introduction to Climate Change</i> weather vs. climate; recent climate change; overview of the UNFCCC and IPCC	Chapter 1 Online readings
September 12-30 Zoom Meeting: Sept 29, 1-3 pm	<i>2. Fundamentals of Earth’s Climate System</i> atmosphere, ocean, cryosphere, biosphere; the carbon cycle; climate system dynamics	Chapters 2, 5 Online readings

October 3-7 Zoom Meeting: Oct 5, 1-3 pm	3. <i>Earth's Energy Budget</i> albedo; atmospheric radiation; sensible and latent heat; solar variability	Chapter 3, pp. 58-69, 79-84 Chapter 4, pp. 85-108
October 10-21 Zoom Meeting: Oct 19, 1-3 pm	4. <i>Climate Change Past, Present, and Future</i> climate forcings and feedbacks; climate models; paleoclimate; IPCC future scenarios	Chapter 3, pp. 70-78 Chapters 7, 8 IPCC (2021) Summary
October 24-28 Zoom Meeting: Oct 26, 1-3 pm	5. <i>Climate Change Impacts</i> IPCC projections; changing weather, oceans, and impacts on society; adaptation strategies	Chapters 9,10 Online readings
Oct 31-Nov 11 Zoom Meeting: Nov 16, 1-3 pm	6. <i>Climate Policies</i> mitigation strategies; geoengineering; the UNFCCC; national policies; carbon pricing	Chapter 6 Online readings
November 14-25 Zoom Meeting: Nov 23, 1-3 pm	7. <i>The Sociology of Climate Change</i> social psychology; denialism and the climate change discourse; climate change myths	Online readings
Nov 28-Dec 9 Zoom Meeting: Nov 30, 1-3 pm	8. <i>Moving Forward</i> environmental ethics; social justice; sustainability and development options	Chapter 11

Learning Resources

Required Text:

Burch, S.L. and S.E. Harris, 2014. *Understanding Climate Change: Science, Policy and Practice*. University of Toronto Press, ISBN: 978-1-4426-1445-1.

Supporting Text:

Dessler, A., 2016. *Introduction to Modern Climate Change*, 2nd Edition. Cambridge University Press. ISBN: 978-1-1074-8067-4.

IPCC (2021), Summary for Policy-Makers.

Assessment Methods

Each module has an assignment or quiz, typically due on the Thursday at the end of each module. Assignments are to be submitted via D2L dropbox and quizzes will also be held on D2L. Marks associated with each module are indicated in brackets **(N)**, followed by the associated learning outcome [LO*]. More detail on the assignment and rubrics will be provided on D2L at the beginning of each module. These are all to be completed online and on your own time. Quizzes have a 30-minute time limit, but D2L will be open for a 24-hour time period for each quiz. Once you trigger the quiz, you will have 30 minutes to complete it.

Assignments for each course module are as follows:

Module 1: Introduction to Climate Change

Online carbon calculator: document your carbon-intensive activities and estimate the amount of CO₂ that you produce in a typical week. **(10)** [LO3, LO7] *Due: September 22*

Module 2: Fundamentals of Earth's Climate System

Online quiz, Modules 1-2, open from *September 29, 12:00 to September 30, 12:00*. **(10)** [LO1, LO2]

Module 3: Earth's Energy Budget

Calculations to explore Earth's energy budget: effects of albedo, the strength of the Sun, and greenhouse gases on Earth's average temperature. **(10)** [LO7, LO2, LO1] *Due: October 13.*

Module 4: Climate Change Past, Present, and Future

Online quiz, Modules 3-4, open from *October 27, 12:00 to October 28, 12:00.* **(10)** [LO1, LO2]

Module 5: Climate Change Impacts

Short Reflection Paper: Consideration of potential climate change impacts (both positive and negative) and how they may affect your life. **(10)** [LO5, LO6, LO1] *Due: November 3*

Module 6: Climate Policies

Analysis of Canada's climate change and carbon pricing policies, building off of your personal carbon footprints in Module 1. **(10)** [LO4, LO3] *Due: November 17*

Online quiz, Modules 5-6, open from *November 24, 12:00 to November 25, 12:00.* **(10)** [LO2, LO4, LO5]

Module 7: The Sociology of Climate Change

Analysis and individual video presentations of online news article on climate change or climate policy, to be posted to the class discussion board. **(10)** [LO6, LO5, LO2, LO1] *Due: December 1*

Module 8: Moving Forward

Commentary (Discussion Board) on others' videos on 'climate in the news'. **(5)** [LO6, LO5, LO1] *Due: December 8*

Term Project: Climate Change Reflections

In addition to the assignments for each module, you will assemble a 'climate change reflection journal' for the semester. Starting on September 23 and continuing ~biweekly until the end of the course, put together an online journal with **six entries** that include a few thoughts on each Module, for Modules 2 to 7. Your final entry can also include concluding thoughts about the whole course, a kind of capstone reflection. For each reflection, include: (a) something you learned in the current module, that you did not know before, (b) something you have a question about, based on this module's material, and (c) a photo or image of what climate change means to you, with a brief description or caption explaining how this represents climate change and how it relates to you. The journal is worth 15% of your mark, based on participation, relevance/alignment with the course material, and evidence of critical thinking. **(15)** [LO3, LO5, LO6]

You can keep your reflections in your own workspace as we go along and submit them all at the end of the semester if you like, but I encourage you to post regularly in order to help keep up with the course material and to allow feedback and input – I will happily try to answer your questions!

Suggested Reflection Dates: Sept 23, Oct 7, Oct 21, Nov 4, Nov 18, Dec 2

Grading (Weighting)

Module assignments:	55%
Term project (journal):	15%
Three online quizzes:	30%

Students are not required to pass all components of the course to pass the course as a whole.
Late assignment policy: 10% deduction per day

Grading System

95 – 100	A+	78 – 82	B	60 – 65	C-
90 – 95	A	74 – 78	B-	55 – 60	D+
86 – 90	A-	70 – 74	C+	50 – 55	D
82 – 86	B+	65 – 70	C	0 – 50	F

GPA equivalence and qualitative interpretation of letter grades:

A+	4.00	Outstanding performance
A	4.00	Excellent performance
A-	3.70	Approaching excellent performance
B+	3.30	Exceeding good performance
B	3.00	Good performance
B-	2.70	Approaching good performance
C+	2.30	Exceeding satisfactory performance
C	2.00	Satisfactory performance
C-	1.70	Approaching satisfactory performance.
D+	1.30	Marginal pass. Insufficient preparation for subsequent courses in the same subject
D	1.00	Minimal Pass. Insufficient preparation for subsequent courses in the same subject.
F	0.00	Failure. Did not meet course requirements.

Flexible Grade Option (CG Grade)

<https://www.ucalgary.ca/pubs/calendar/current/f-1-3.html>

Additional Course Information

Course evaluation includes a blend of quizzes, calculations, written assignments, and a class presentation. Written work is expected to be in correct English, but evaluation will be based on your content, conciseness, logical presentation of ideas, understanding of course material, and critical thinking. In the event that a student misses a quiz or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration may be requested

<https://www.ucalgary.ca/pubs/calendar/current/m-1.html>

Please refer to <https://www.ucalgary.ca/registrar/registration/appeals/student-faq> for frequently asked questions concerning the provision of a medical note/statutory declaration.

Supplementary Fees

Not applicable.

Referencing Standard

In written work presented in this class, the accepted method for referencing the work of others will be the Chicago Manual of Style: <https://www.chicagomanualofstyle.org/home.html>

Important Dates

The last day to drop this course and receive a tuition fee refund is **Thursday, September 15th, 2022**. The last day to add or swap a course for Fall 2022 is **Friday, September 16th, 2022**. The last day to withdraw from this course is **Wednesday, December 7th, 2022**. Please note that the University is closed on Friday, September 30th; Monday, October 10th; and Friday, November 11th, 2022.

For additional detailed course information posted by the instructor, visit the course Desire2Learn page online at <https://d2l.ucalgary.ca/d2l/home>.

Resources and Writing support

Please note writing support resources provided by the Student Success Centre <https://ucalgary.ca/ssc/resources/writing-support> and the library <https://libguides.ucalgary.ca/guides/>

University of Calgary Academic Integrity Policy

Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. The University Calendar includes a statement on the principles of conduct expected of all members of the university community (including students, faculty, administrators, any category of staff, practicum supervisors, and volunteers), whether on or off university property. This statement applies in all situations where members of the university community are acting in their university capacities. All members of the university community have a responsibility to familiarize themselves with the principles of conduct statement, which is available at: www.ucalgary.ca/pubs/calendar/current/k.html.

Plagiarism, Cheating, and Student Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.

Academic dishonesty is not an acceptable activity at the University of Calgary, and students are **strongly advised** to read the Student Misconduct section in the University Calendar at: www.ucalgary.ca/pubs/calendar/current/k-3.html. Often, students are unaware of what constitutes academic dishonesty or plagiarism. The most common are (1) presenting another student's work as your own, (2) presenting an author's work or ideas as your own without adequate citation, and (3) using work completed for another course. Such activities will not be tolerated in this course, and students suspected of academic misconduct will be dealt with according to the procedures outlined in the calendar at: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-procedure>

For students wishing to know more about what constitutes plagiarism and how to properly cite the work of others, the Department of Geography recommends that they attend Academic Integrity workshops offered through the Student Success Centre: <https://www.ucalgary.ca/student-services/student-success/learning/academic-integrity>

Instructor Intellectual Property

Information on Instructor Intellectual Property can be found at <https://www.ucalgary.ca/legal-services/university-policies-procedures/intellectual-property-policy>

Freedom of Information and Protection of Privacy

Freedom of Information and Protection of Privacy (FOIP) legislation in Alberta disallows the practice of having students retrieve assignments from a public place, such as outside an instructor's office, the department office, etc. Term assignments will be returned to students individually, during class or during the instructor's office hours; if students are unable to pick up their assignments from the instructor, they must provide the instructor with a stamped, self-addressed envelope to be used for the return of the assignment.

Posting of Grades and Picking-up of Assignments

Graded assignments will be submitted and returned electronically through the course D2L webpage. Grades and assignments will not be available at the Department of Geography's main office and assignments cannot be dropped off at the Department Office.

Academic Accommodations

It is the student's responsibility to request academic accommodations, according to the university policies and procedures listed in the University Calendar.

The student accommodation policy can be found at: <https://www.ucalgary.ca/pubs/calendar/current/b-6-1.html>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>

Students needing an accommodation based on a protected ground other than disability should communicate this need, preferably in writing to their instructor or the Department Head (email: freeman@ucalgary.ca).

Online courses

Learning Technologies and Requirements

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology.

- A computer with a supported operating system, as well as the latest security and malware updates
- A current and updates web browser
- Webcam (built in or external)
- Microphone and speaker (built in or external) or headset with microphone
- Broadband internet connection
- Access to Excel spreadsheet or related software for calculations

Timed Assessments for Online and Blended Courses

- Students will be provided with a 24-hour window in which they can access and complete a timed online assessment,
- If an issue arises affecting a student's ability to complete an assessment (e.g., issues with technology, caregiving responsibilities, or distractions within a students' test-taking environment), an alternative time to complete the assessment can be arranged with the instructor.
- Accommodation requirements through Student Accessibility Services still apply. The time allocated for issues that arise during an assessment would be in addition to accommodation requirements. See Section **G (Examination and Tests)** for additional details.
- The course instructor is available to answer questions related to the course material (assignments, quizzes) each Wednesday from 1-3 pm or by appointment (via Zoom).

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a "live" video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith and respect (as per the [Code of Conduct](#)). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment.

Please be mindful of how your behavior in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g. Student Non Academic Misconduct Policy). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your Zoom sessions visit: <https://elearn.ucalgary.ca/guidelines-for-zoom/>.

If you are unable to attend a Zoom session, please contact your instructor to arrange an alternative activity for the missed session (e.g., to review a recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

Media Recording (if applicable)

Students are not required to be recorded for the lecture content, but the final assessment item involves class presentations, where you will be asked to record yourself explaining some course material. Accommodations are possible if you are not comfortable with this, e.g., you can just present an annotated powerpoint presentation without video.

Course evaluations and student feedback

Student feedback will be sought at the end of the course through the standard University Student Ratings of Instruction (USRI) and Faculty course evaluation forms.

Accessibility

Students will need to see and hear the pre-recorded lectures to attain the full course learning material. Zoom will be used for the videos, not YuJa, so captioning will not be available, as the audio quality is too poor on YuJa (at least with the Instructor's setup).

Copyright Legislation

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright <https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy> and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Act.

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness, and academic success and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support, or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy website (<http://www.ucalgary.ca/mentalhealth/>).

Students requiring assistance are encouraged to email the **Student at Risk line** if they or others appear to need wellness assistance: sar@ucalgary.ca For more immediate response, please call: 403-210-9355 and select option #2.

Sexual Violence Policy

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. Please see the policy available at <https://www.ucalgary.ca/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy>

Contact Information for Student and Faculty Representation

- Student Union VP Academic 403-220-3911, suypaca@ucalgary.ca
- Students Union Representatives for the Faculty of Arts – 403-220-3913, arts1@su.ucalgary.ca, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca, arts4@su.ucalgary.ca
- Student Ombuds Office information can be found at: www.ucalgary.ca/ombuds/

Emergency Evacuation/Assembly Points

Assembly points for emergencies have been identified across campus. Assembly points are designed to establish a location for information updates from the emergency responders to the evacuees; from the evacuated population to the emergency responders.

For more information, see the University of Calgary's Emergency Management website: <https://www.ucalgary.ca/risk/emergency-management>. Note: N/A for this online course.

Campus Safewalk

Campus Security, in partnership with the Students' Union, provides the Safewalk service, 24 hours a day, to any location on Campus, including the LRT station, parking lots, bus zones, and university residences. Contact Campus Security at 220-5333 or use a help phone, and Safewalkers or a Campus Security officer will accompany you to your campus destination.