

# GEOG 2133b: Climate Change

## Course Instructors

Katrina Moser Ph.D. Associate Professor; Office: SSC 2407; Tel: 661-2111 Ext. 80115; [kmoser@uwo.ca](mailto:kmoser@uwo.ca)  
Office hours: Thursday 12:30-1:30 SSC Rm. 2407 or by appointment via email.

## TAs

**Rainer Hilland:** [hillandrainer@gmail.com](mailto:hillandrainer@gmail.com) Office Hours:

**Lara Middleton:** [lmiddle7@uwo.ca](mailto:lmiddle7@uwo.ca) Office Hours:

## Lectures

Tuesday 1:30-3:30pm; Thursday 2:30-3:30pm SSC 3022

## Course Description

This course examines the processes that underlie natural and human-induced climate change at global and regional scales and describes the resultant climates that have existed, those projected to occur in the future, and the past and future impacts of climate change on the physical and human environment.

Climate change is one of the most important environmental issues that we face today. We provide an introduction into how Earth's climate works, how internal and external forcings lead to climate changes on different time scales and how past, current and future actions by humans to both the Earth's surface and atmospheric composition have and will affect climates. The course is in large part an examination of global scale climate change, but we will also look at regional and smaller scales to illustrate that climate change is not only a large scale phenomenon. Impacts of climate change will be explored, with a range of examples chosen to illustrate geographical diversity and sectors affected. Finally, we will briefly examine options that may be used to address climate change and their linkage to the physical basis of climates.

The course is taught from a physical scientist's perspective – with an emphasis on how systems work (processes), use of the scientific method, collection and interpretation of data and development and use of numerical models to represent physical processes.

## General Course Objectives

The goal of the course is to provide climate literate students. By the end of this course, students will:

- understand the principles of Earth's climate system;
- describe sources of natural variability and their impact on climate and appreciate the data sources and techniques used to assess past climate variability;
- appreciate the human impact on climate and climate change and its consequences;
- understand the interrelated nature of climate with the atmosphere, hydrosphere, biosphere, lithosphere and cryosphere;
- assess scientific data on climate;
- synthesize and communicate climate change information;
- be able to make informed decisions related to climate change.

## Format

Instruction occurs during two classes (a one and a two hour time slot) and will be a mix of lectures, videos, in-class activities, quizzes and group work. It is imperative to be at all classes.

## Lectures

Lecture notes for each week will be provided on Owl the Friday before the class. Please be aware that the notes are meant as a guide for the lecture, and will also provide figures and charts important for the course. It is important to be in class to hear the lectures, understand the figures and graphs and actively participate in the class discussions. Although having a laptop in class is encouraged, using it to do e-mail or other non-class related activities is strongly discouraged.

## Teaching Assistants

Teaching Assistants will help deliver and evaluate course material and assignments.

## Evaluation

The material covered in lectures including assigned readings and assignments will be evaluated in short in-class quizzes, a midterm and a final exam. A mixed exam format (e.g. short answer, diagram questions) will be used. Marking schemes will be used to assess answers to assignments and exams. Partial marks are awarded for incomplete answers.

Assignments (2)	20%
Quizzes (4)	20%
Midterm	20%
Final exam	30%
Participation	10%
Total	100%

## Notes:

1. Marks as posted by the course instructor are considered provisional until approved by the Department Chair. Final marks are received from the Registrar; errors may be corrected through use of a Marks Revision Form.
2. Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.
3. No electronic devices will be allowed during test and examinations

**Class Engagement with Top Hat:** I am excited to announce that my class will be using Top Hat throughout the course. Top Hat is a web-based system that allows immediate interactive feedback to both aid and assess understanding of the course material. Top Hat feedback, questions and simulations will be launched by me during class. Students can participate using their laptops, netbooks, tablets, smartphones, or cell-phones (through text messaging). I anticipate utilizing a number of questions and the occasional demonstration in lectures using Top Hat. Each student is expected to contribute actively to the questions and discussions. A class engagement grade of up to 10% is assigned to this contribution.

Top Hat is licensed by student subscription, with unlimited courses per student. (A student can access all of their courses using the system throughout the subscription term, with a single subscription). We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. You can visit the Top Hat Overview (<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide>) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our course website: <https://app.tophat.com/e/944646> to create an account.

**NOTE:** Our Course Join Code is 944646

Top Hat will require a paid subscription, and a full breakdown of all subscription options available can be found here: [www.tophat.com/pricing](http://www.tophat.com/pricing).

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email ([support@tophat.com](mailto:support@tophat.com)), the in app support button, or by calling 1-888-663-5491. Subscription keys are available directly on the Top Hat website at <https://tophat.com/>. Tutorials and technical support is available on the website once you register and login.

Questions will be asked throughout the lecture where challenging and interesting aspects of climate change are being addressed and discussed. This will allow an opportunity for the class to pause and consider how well a particular aspect of the material has been understood and could potentially be applied. Responses to the questions will be displayed immediately and taken up in class for discussion and clarification. The evaluation is delivered in the form of a participation grade for your engagement during the entirety of the course. While Top Hat will require your email address AND student ID during the registration process, all information is used for the sole purpose of the course and to link participation (as correlated to a cell phone number or computer login) to a registered student in the course. It is the responsibility of the student to ensure that they have registered an account with Top Hat and that it is current, activated and functional. Students must see me if they have any concerns about whether or not they are using the technology correctly. Students must use their own login registration or cell phone. The use of somebody else's phone or login account in class constitutes a scholastic offence. The possession of a cell phone or computer belonging to another student will be interpreted as an attempt to commit a scholastic offence.

### **Participation**

Participation is an important part of the success of the course and ensuring students learn the material in Climate Change, so part of the final grade will be based on participation. This will include attendance as determined through Top Hat participation (see above).

### **Statement on Use of Electronic Devices**

No calculators will be required or permitted in the exams. Students who require electronic assistance with language translation must obtain prior approval from the instructor.

### **Penalties**

*Exams:* In accordance with university policy, missed exams cannot be made up except on written medical grounds and notification prior to exam date.

*Assignments:* Late assignments will have a penalty of 10% per day. Assignments submitted more than 1 week late will not be accepted. Exceptions can be made for documented medical and other significant reasons beyond your control (see subsequent sections).

## **Non-medical Absences**

Non-medical absence from the midterm requires prior approval of the instructor or approval by the Dean's office (appropriate documentation will be required by the Faculty Dean's Office for approval if it is not obtained prior to the midterm).

## **Medical Absences**

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth **10% or more** of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf)

Downloadable Student Medical Certificate (SMC):

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf). When medical illness affects work worth **less than 10%** of the total course grade (i.e. an assignment), please contact the course instructor for academic accommodation (documentation not required).

Students with special accommodation will write make-up tests and examinations administered by the department on Fridays during respective periods of fall and winter terms. To prevent prior disclosure, the format and contents of make-ups may differ substantially from the scheduled test or examination.

## **University Statement on Academic Offences**

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

“Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.”

## **Mental Health**

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit the site below for more information on mental health resources:

<http://www.uwo.ca/uwocom/mentalhealth/>.

## **Course Texts**

We have used several different text books for this course, and have not found a suitable textbook covering the materials we feel essential for a thorough knowledge of climate change. This year, therefore, we have chosen not to have a required text. Below we highlight some books we feel are useful for your interest.

## **Useful Texts**

Houghton, J., 2009: *Global Warming: The Complete Briefing*, 4<sup>th</sup> Edition, Cambridge University Press. This book is available online through the Western library and is useful for understanding the science of climate change.

IPCC AR5 Fifth Assessment Reports, 2013: Available from <http://www.ipcc.ch/>.

Dessler, A., 2011: *Introduction to Modern Climate Change*, Cambridge University Press. This book is on one day reserve from Weldon library and is useful for understanding the modern climate system.

Ruddiman, W.F. 2008: *Earth's Climate: Past and Future*. 2<sup>nd</sup> Edition. W.H. Freeman and Company. This book is on one day reserve from Weldon library and is useful for understanding paleoclimates and past climate change.

A wide range of web resources and discussions (i.e. “blogs”) on climate change exist. These may help provide explanation and discussion of climate change, especially with respect to recent findings. However, many of these encompass much more than just the science of climate change. We urge some caution in using these resources – these are, unlike texts and journal articles which undergo a formal review process by independent experts in the subject matter, unreviewed commentary by individuals. We will discuss this further in class.

### **Supplementary Material:**

Course supplementary materials will be provided through the course OWL site.

### **Course Web Site**

Additional course information will be provided on the web using OWL. Use <http://owl.uwo.ca/> and then log in using your uwo username and password. Your log in will require that you be officially enrolled in the course. Please become familiar with this site, and carefully check that your computer meets the OWL requirements.

### **Western's commitment to accessibility**

The University of Western Ontario is committed to achieving barrier free accessibility for persons studying, visiting and working at Western. Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

### **Fire Drills:**

Students are required to evacuate the building when the fire alarm is act

### **Support Services**

Registrarial Services: <http://www.registrar.uwo.ca/>

Student Development Services: <http://www.sdc.uwo.ca/>

Emotional/Mental Health: Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.