

## **Weather and Water, GEOG2013-A**

Carleton University  
Department of Geography & Environmental Studies  
Winter 2021

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Virtual Office Hours: Wednesday (1:00pm-2:00pm) or by appointment

Virtual Office Hours Zoom Link: <https://zoom.us/j/99445939783>

### **INTRODUCTION**

This course introduces you to the study of climate, weather and the hydrological cycle. Physical properties of the atmosphere, radiation and energy balances, global circulation, atmospheric moisture and precipitation, weather systems and forecasting, mechanisms of climate change. The topics in this course are important to students interested in the atmospheric sciences and to students who wish to acquire more knowledge about the atmosphere and the environment.

### **COURSE EDUCATIONAL GOALS**

The main goal of this course is to introduce you to major concepts and terminology necessary to observe, interpret, and understand the atmosphere around you and to situate these ideas in the context of real-world issues, including climate change and violent weather. By the end of this course you will be able to: (1) apply radiation, energy and water balance concepts and evaluate mass budgets for these using observed measurement data; (2) describe the relationship and characteristic differences between surface and upper tropospheric winds; (3) to be able to understand and perhaps even make your own weather forecasts; (4) demonstrate an understanding of the meteorologic nature and climatologic significance of severe storms; and (5) discuss the nature, significance and effects of both deliberate and inadvertent climatic modification and change.

### **COURSE FORMAT AND TECHNOLOGICAL REQUIREMENTS**

Synchronous delivery - attendance required for lecture/labs. Class lectures will be streamed live and recorded via zoom on this link <https://carleton-ca.zoom.us/j/97687484049>

Lectures will follow the attached course outline. The schedule may require minor revisions to accommodate unexpected scheduling issues. The lectures will introduce and illustrate the major concepts in global environmental systems. Support material, including recorded lectures, will be available on the cuLearn course site.

Labs will be live streamed but not recorded on this link <https://carleton-ca.zoom.us/j/98528209550>. Lab introductions will be recorded and will be available on cuLearn site.

For best online learning experience, Carleton's ITS recommends the following minimum technical requirements: Windows 10 or macOS 10.15 operating system; Google Chrome, Firefox, and/or Edge web browser; Intel Core i5 based model processor; 4GB Ram/Memory; minimum 5 GB available storage; 1-24x768 screens resolution; WiFi or Ethernet; available USB port(s) to accommodate recommended accessories; antivirus; high speed internet; and speakers, microphone or headphones, Video Camera, Keyboard. More details can be found on this link <https://carleton.ca/its/help-centre/faq-technical-specs-for-new-students/>.

We will use the chat function in Zoom to queue questions and discussion. In order to facilitate that, we must require strict chatroom etiquette. Please use the chat room only to for questions related to the class.

## **SCHEDULE**

**Lectures:** Monday 9:35am- 11:25am ET

**Lab sessions:** - section A01: Tuesday 8:35pm-11:25am ET <https://carleton-ca.zoom.us/j/98528209550>  
- section A02: Wednesday 8:35pm-11:25am ET <https://carleton-ca.zoom.us/j/98528209550>  
- section A04: Thursday 2:35pm-5:25pm ET <https://carleton-ca.zoom.us/j/98528209550>  
- section A05: Friday 2:35pm-5:25pm ET <https://carleton-ca.zoom.us/j/98528209550>

Note the labs will run in the following order: A01→A02→ A04→A05

## **COURSE TEACHING ASSISTANTS**

Check cuLearn for TA contact information and office hours.

## **RECOMMENDED TEXTBOOK**

Ross, Sheila Loudon. (2017) Weather & Climate: an introduction, 2<sup>nd</sup> Edition, Oxford University Press, Don Mills, Ont. Will be available from Carleton University Bookstore.

## **STUDENT RESOURCES AND COMMUNICATION**

### **Virtual Office Hours, Email and Appointments**

If you have questions pertaining to lecture materials, I encourage you to come to my virtual office hours or to ask me your questions at the end of class or make an appointment for a virtual meeting.

All questions about missed assignments, missed exams, and other practical concerns about the course should be directed to me by email. Emails will be responded to during business hours only. Please place the course number GEOG 2013 in the subject line. Private correspondence with the Instructor and Teaching Assistants should be through a Carleton email account (this is accessible in cuLearn).

### **cuLearn Course Site**

The cuLearn course site of GEOG 2013 contains information on all aspects of the course. It includes partial outlines of lectures (not complete notes) and graphs or diagrams presented in class. It includes recorded lecture videos. You need to supplement these notes by attending the class live lectures or watching the recorded lectures and by referring to the textbook. You will be able to access cuLearn course site and to download files on the first week of classes. If you are not able to login, please contact the course instructor.

## **EVALUATION**

Final marks in the course are based on your performance in four categories as follows:

Participation (zoom polling/alternative activity)	10%
Lab Exercises	35%
Midterm Lecture Exam	25%
Final Lecture Exam	30%

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

## **Participation**

To encourage and enable active student participation in lectures, this course uses zoom polling questions during live lectures. To properly track your answers to the polling questions and to fairly assign your participation mark, set up a free zoom account using your Carleton's email address and join the class lectures using your first and last names as used in Carleton's records. You can sign up for a zoom free account using this link <https://zoom.us/join>. Students that are not able to join the live lectures due to time zone differences (international student) or due to family commitments (caring for children or elders) will be allowed to complete an alternative activity that is worth 10%. Students requesting to complete the alternative activity will need to notify the instructor about this within the first three weeks of classes.

## **Lab exercises**

There will be five lab assignments (35% of the total course grade) and an orientation lab (bonus 2%). The lab exercises are meant to complement the course material and to facilitate application and integration of knowledge gained from lectures and readings. The lab exercises will be posted on cuLearn at least one day ahead of their corresponding lab session. Please feel free to collaborate with others in zoom breakout rooms during the lab sessions to obtain common data, but please submit your own individually completed lab assignments/reports that contain your own analyses and answers to questions. Check the course schedule below for due dates for each lab.

## **Exams**

Exams will be conducted online in the format of a quiz available on course cuLearn site. Exams will cover lecture materials. Only students who have made prior arrangements with the instructor, or students who have contacted the instructor within 5 days of the missed midterm exam will be permitted to write the make-up exam.

## **COURSE POLICIES**

### **Late Assignments**

Late assignments will be penalized by subtracting 10% per day of the total value of the assignment. Students whose assignments are late because of a valid medical reason or family emergency will not be penalized, however, documentation from a family physician or counseling services will be required.

### **Missed Assignments or Exams**

Students who fail to submit an assignment or write the midterm exam will receive an automatic grade of zero. The only exceptions will be for instances of significant illness or a family emergency. Students who are not able to write the final exam during the exam period must consult with *Exam Services* as soon as they are aware that they will miss the test.

### **Standards of Written Work**

Any assignment submitted should be written using *word processing software* and checked for spelling and grammar. The overall presentation quality of the assignments will be reflected in your grade.

## ACADEMIC INTEGRITY

Academic integrity is a necessary foundation for all meaningful scholarly activity and verified instances of intellectual dishonesty will be dealt with in full accordance with the procedures laid out in Academic Integrity Policy. Additional information regarding what constitutes plagiarism may be found on Carleton University web site: <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy.pdf> The University Senate defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This can include:

- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

Plagiarism is a serious offence which cannot be resolved directly with the course’s instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

## ACADEMIC ACCOMMODATION

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www.carleton.ca/equity/>

**Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www.carleton.ca/equity/>

**Academic Accommodations for Students with Disabilities:** The **Paul Menton Centre** for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (*if applicable*) at <http://www.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/> You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://www.carleton.ca/equity/>

**Survivors of Sexual Violence:** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/equity/sexual-assault-support-services>

**Students representing Carleton University, Ontario or Canada** (at academic or sports events):

I fully support students involved with organizations and teams that travel during the semester; however, with this privilege comes additional responsibility. You are responsible for providing formal documentation identifying the organization you represent and potential schedule conflicts with this course. In the event that you are travelling and unable to attend an exam, you must schedule a secondary exam before you depart. Without proper documentation, a missed exam will earn zero points.

### **HINTS FOR SUCCESS**

It is in your best interest to attend class regularly and to participate in class. Try to keep up with your readings and address questions you have on the subject matter at the appropriate time rather than waiting until just before the midterm and final for clarification.

**Weather and Water (GEOG2013)-A**  
**Winter term 2021 Course Outline**

<b>Week</b>	<b>Lecture</b>	<b>Lab</b>	<b>Readings</b>
Jan 11-15	Introduction to Course Atmospheric Composition and Structure & Air Pressure	Lab exercise 0: Orientation lab (Bonus 2%)	Ch. 1 (13-16) Ch. 2 (20-39) Ch. 3 (53-56)
Jan. 18-22	Energy and Radiation laws Shortwave radiation	Lab exercise 1: Atmospheric Pressure and Radiation Laws (5%) <i>Lab exercise 0 is due at the beginning of your lab period</i>	Ch. 4 Ch. 5 (88-96) Ch. 5 (105-117)
Jan. 25-29	Shortwave radiation and Longwave radiation	Lab exercise 1: Atmospheric Pressure and Radiation Laws <i>Lab exercise 1 is due at 11:59pm on the day of your lab period</i>	Ch. 5 (96-105) Ch. 6 (124-137)
Feb. 1-5	Net radiation and Heat balance	Lab exercise 2: Longwave (IR) and Net Radiation (7%)	Ch. 6 (139-145)
Feb. 8-12	Humidity and condensation	Lab exercise 2: Longwave (IR) and Net Radiation <i>Lab exercise 1 is due at 11:59pm on the day of your lab period</i>	Ch. 7 Ch. 9 (216-236) Ch. 10 (242-247)
Feb. 15-19	Feb. 15: Statutory holiday. <i>NO CLASS</i>	<i>NO LAB – WINTER BREAK</i>	
Feb. 22-26	Clouds and precipitation	Lab exercise 3: Atmospheric Humidity, Energy and Water Budgets (8%) <i>Lab exercise 2 is due at 11:59pm on the day of your lab period</i>	
March 1-5	<b><i>March 1: MIDTERM EXAM (25%)</i></b>	Lab exercise 3: Atmospheric Humidity, Energy and Water Budgets <i>Lab exercise 3 is due at 11:59pm on the day of your lab period</i>	
March 8-12	Buoyancy and stability Thermodynamic diagrams: tephigram	Lab exercise 4: Atmospheric Stability and the Thermodynamic Diagram (8%)	Ch. 8 (185-209)
March 15-19	Thermodynamic diagrams: tephigram (cont'd)	Lab exercise 4: Atmospheric Stability and the Thermodynamic Diagram	Ch. 11
March 22-26	Atmospheric motion Wind systems	Lab exercise 5: Geostrophic Wind (7%) <i>Lab exercise 4 is due at the beginning of your lab period</i>	Ch. 12 (294-302)
March 29- April 2	Air masses and fronts	Lab exercise 5: Geostrophic Wind <i>Lab exercise 5 is due at 11:59pm on the day of your lab period</i>	Ch. 12 (310-314) Ch. 13
April 5-9	Cyclogenesis		Ch. 14: (341-357)
April 12-14	Cyclogenesis		Ch. 14: (341-357)
<b>April</b>	<b><i>FINAL EXAM (30%).</i></b>		