

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

Carleton University  
Department of Geography & Environmental Studies  
Winter 2019

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Office Hours: Thursday (10:00am-11:00am) or by appointment

### **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**

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 will be available on the cuLearn course site.

### **SCHEDULE**

**Lectures:** Monday and Wednesday 1:05am- 2:25pm in Mackenzie Building 3275

**Lab sessions:**

- section A01: Thursday 8:35am-11:25am in Loeb Building A120
- section A02: Thursday 2:35pm-5:25pm in Loeb Building A120
- section A03: Friday 2:35pm-5:25pm in Loeb Building A120
- section A04: Wednesday 2:35pm-5:25pm in Loeb Building A120
- section A05: Thursday 11:35am-2:25pm in Loeb Building A120

Note the labs will run in the following order: A04→A01→ A05→A02→ A03

### **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

### Office Hours, Email and Appointments

If you have questions pertaining to lecture material I encourage you to come to my office hours or to meet me at the end of class to make an appointment.

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 1010 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. You need to supplement these notes by attending the class lectures or 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	5%
Lab Exam 1	15%
Midterm Lecture Exam	25%
Assignment (mini-project)	10%
Lab Exam 2	15%
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

Students are expected to attend classes and to discuss the materials for each topic. Your attendance, asking questions, participation in class discussions, and timely submission of assignments will count towards your participation mark. Students who miss more than 4 classes without a medical note will forfeit their participation mark. A student who is consistently late for classes will be marked as absent.

### Lab exercises and lab exams

In addition to regular class supplies (text and lecture notes), each student must bring a scientific calculator, ruler, a protractor (and a few pencil crayons) to each lab class. To get the most benefit from the labs, you should look at the next exercise in the sequence before coming to the lab. The TA will outline the exercise and give appropriate hints to get you started or break through any sticking points. You will gain most from doing the exercises in collaboration with your peers and making use of the TA's expertise. At the end of the week the correct solution will be posted so you can learn from any mistakes. If you are still not feeling on top of the material, then you should consult the TA/instructor. Your work **WILL NOT** be handed in or graded. Grading will be limited to the two lab exams each of which will pose questions similar to, and based

on the same topics, those discussed in the preceding labs. **Lab exam 1 (15%) will be based on lab exercises 2, 3, and 4. Lab exam 2 (15%) will be based on lab exercises 5, 6, and 7.**

### **Assignment (mini-project)**

You are required to keep a logbook (journal) of ten weather and climate entries. These should be events that occurred in the last two years. These can be a combination of photos taken locally (clouds, dew, frost, storm, wind gust, etc.) and local/global news (Paris climate change conference, carbon tax, Canadian/BC response to Paris agreement to climate change, weather forecast burst, etc.). Each entry should be described within the broader atmospheric context (more details are provided in the mini-project handout).

### **Exams**

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 exam with a valid doctor's note explaining why they missed the exam will be permitted to write the makeup exam. There will be no makeup final exam.

## **COURSE POLICIES**

### **Missed Midterm or Lab Exams**

Students who fail to write the midterm or lab exams 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 printed 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/>

## 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 2019 Course Outline**

<b>Week</b>	<b>Lecture</b>	<b>Lab</b>	<b>Readings</b>
Jan 7-11	Introduction to Course Atmospheric Composition and Structure & Air Pressure	<i>NO LAB</i>	Ch. 1 (13-16) Ch. 2 (20-39) Ch. 3 (53-56)
Jan 14-18	Energy and Radiation laws Shortwave radiation	Introduction to lab Lab exercise 1: Units, Dimensions and Graphing	Ch. 4 Ch. 5 (88-96) Ch. 5 (105-117)
Jan 21-25	Shortwave radiation and Longwave radiation	Lab exercise 2: Solar Radiation Input	Ch. 5 (96-105) Ch. 6 (124-137)
Jan 28-Feb 1	Net radiation and Heat balance	Lab exercise 3: Longwave (IR) and Net Radiation	Ch. 6 (139-145)
Feb 4-8	Humidity and condensation	Lab exercise 4: Atmospheric Humidity, Energy and Water Budgets	Ch. 7 Ch. 9 (216-236) Ch. 10 (242-247)
Feb 11-15	Clouds and precipitation <b>Review and tips for midterm</b>	Review and tips for lab exam 1	
Feb 18-22	<i>NO CLASSES-READING BREAK</i>	<i>NO CLASSES-READING BREAK</i>	
Feb 25- March 1	<b>Feb 25: MIDTERM EXAM (25%)</b> Feb 27: Buoyancy and stability	<b>Lab Exam 1 (15%)</b>	
March 4-8	Buoyancy and stability Thermodynamic diagrams: tephigram	Lab exercise 5: Atmospheric Stability and the Thermodynamic Diagram	Ch. 8 (185-209)
March 11-15	Thermodynamic diagrams: tephigram (cont'd) Atmospheric motion	Lab exercise 5: Atmospheric Stability and the Thermodynamic Diagram (Cont'd)	Ch. 11
March 18-22	Atmospheric motion (cont'd) Wind systems: Global wind systems	Lab exercise 6: Geostrophic Wind	Ch. 12 (294-302)
March 25-29	Vorticity and Rossby Wave Air masses and fronts	Lab exercise 7: Synoptic systems	Ch. 12 (310-314) Ch. 13
April 1-5	Cyclogenesis	<b>Lab exam 2 (15%)</b>	Ch. 14: (341-357)
April 8	<b>NO CLASS</b> <b>Submission of mini-project logbook</b> <b>(journal)</b>		
April	<b>FINAL EXAM (30%).</b>		