

Weather and Water GEOG 2013

[0.5 credit]

Winter 2024

Lecture: Tuesday and Thursday, 10:05-11:25

Instructor: Elyn Humphreys, elyn.humphreys@carleton.ca

Instructor office hours: Tuesday 11:35 – 12:25

Labs: A01 Thursday 18:05 – 20:55; A02 Friday 11:35 – 14:25; A03 Tuesday 14:35 – 17:25

Teaching assistants: Olivia Meier-Legault OliviaMeierLegault@cmail.carleton.ca & TBD

TA office hours: TBD

1. Calendar Description: Introduction to 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.

Course Objectives: The objective of the course is to provide fundamental understanding of the processes operating in the atmosphere and the hydrosphere. Topics will include (yet are not restricted to) the physical properties of the atmosphere, radiation laws, radiation and energy balances, global circulation, atmospheric moisture and precipitation, stability and adiabatic processes, weather systems, and weather forecasting.

2. Prerequisites: None

3. Textbook, lecture notes, and laboratory manual:

1) Ross, Sheila Loudon. (2017) *Weather & Climate: an introduction*, 2nd Edition. Oxford University Press, Don Mills, Ont. 544 pp. Will be available from Carleton University Bookstore.

2) Lecture notes will be made available on Brightspace*.

3) Laboratory assignments will be available on Brightspace*.

*Student or professor materials created for this course (including presentations and posted notes, labs, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

4. Lecture and Lab schedule:

Tentative schedule:

Week	Lecture & Text book reference	Lab
W1. Jan 8-12	L1. Introduction & structure of the atmosphere – Ch 1 & 2 L2. Behaviour of the atmosphere – Ch 3	<i>No labs this week</i>
W2. Jan 15-19	L3. Behaviour of the atmosphere (part 2) – Ch 3 L4. Energy – Ch 4	Lab 1. Pressure & the atmosphere
W3. Jan 22-26	L5. Energy (part 2) – Ch 4 L6. Atmospheric stability – Ch 8	Lab 2. Measures of atmospheric temperature (<i>Lab 1 due</i>)
W4. Jan 29-Feb 2	L7. Radiation – Ch 5 L8. Energy fluxes and budgets – Ch 6	Lab 3. Measures of energy fluxes (<i>Lab 2 due</i>)
W5. Feb 5-9	L9. Clouds and precipitation – Ch 9 & 10	Lab 4. Clouds and humidity – Ch

	L10. Clouds and precipitation (part 2) – Ch 9 & 10	7 (<i>Lab 3 due</i>)
W6. Feb 12-16	L11. Midterm review <i>Midterm in class (Feb 15)</i>	<i>No labs this week</i>
<i>Feb 19-23</i>	<i>Reading Break – no lectures this week</i>	<i>No labs this week</i>
W7. Feb 26-Mar 1	L12. Dynamics – Ch 11 L13. Dynamics (part 2) & Global circulation– Ch 12	Lab 5. Precipitation measurements (<i>Lab 4 due</i>)
W8. Mar 4-8	L14. Global circulation (part 2) – Ch 12 L15. Jets & Rossby waves – Ch 11 & Ch 12	Lab 6. Wind (<i>Lab 5 due</i>)
W9. Mar 11-15	<i>No class Mar 12</i> L16. Air masses and fronts – Ch 13	Lab 7. Weather maps part 1 (<i>Lab 6 due</i>)
W10. Mar 18-22	L17. Mid-latitude cyclones – Ch 14 L18. Mid-latitude cyclones (part 2) – Ch 14	Lab 8. Weather maps part 2 (<i>Lab 7 due</i>)
W11. Mar 25-29	L19. Hurricanes – Ch 14 L20. Thunderstorms – Ch 14	<i>No labs this week</i>
W12. Apr 1-5	L21. Lightning – Ch 14 L22. Tornadoes – Ch 14	<i>No labs this week (Lab 8 due)</i>
W13. Apr 8-10	L23. Final Review	

5. Evaluation:

In-class activities & quizzes	10%	
Laboratory assignments	40%	(8 x 5%)
Midterm test	25%	(held in class, Feb 15)
Final exam	25%	(held during the exam period)

In-class activities & quizzes: Up to 10% of the final grade will be available through participation during in-class activities & quizzes (worth 0.5% per lecture). There will be 23 lectures with opportunities to receive these marks. No marks will be given if absent.

Laboratory assignments:

Eight mandatory laboratory sessions will be held during which you will explore instrumentation used to study weather and water and further develop the concepts introduced during the lectures through hands-on activities and problem sets. Each lab assignment will be given equal weight towards the lab grade.

Collaborative effort in working out assignments is encouraged, and often required, although individual reports must be submitted. This means that you may submit the same group-derived tables or data sheets (these will be identified by your teaching assistants in the labs), but all answers to questions, analyses and discussion points must be your own work (see note about Plagiarism below).

Except under special circumstances, you must pass the lab section in order to pass the course.

Policy on lateness:

Assignments generally are due at the beginning of your lab one week after distribution, unless otherwise indicated. Late assignments will be penalized unless you have been granted an extension. If handed in any time after the beginning of your lab period, your assignment will be penalized by 5% and then 5% for every additional day (5% per weekend) and will not be accepted after assignments have been returned to

the first lab section of the week. If you are having difficulty meeting the deadlines, contact Elyn Humphreys **in advance** of the due date.

Examinations:

There will be a midterm test given during the lecture period and a final exam held during the scheduled exam period at the end of term. The exact content of the tests will be discussed in class prior to their respective dates.

6. Statement on Plagiarism:

Plagiarism will not be tolerated. Students should consult the [Academic Integrity Policy](#).

The University Academic Integrity Policy defines plagiarism as “*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.*” This includes 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. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, art works, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own; and
- failing to acknowledge sources through the use of proper citations when using another’s work and/or failing to use quotations marks.

Plagiarism is a serious offence that cannot be resolved directly by 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 or even suspension or expulsion from the University.

7. Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you.

[You may include the following list or reference this link (<https://carleton.ca/wellness/>)] :

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- Mental Health and Wellbeing: <https://carleton.ca/wellness/>
- Health & Counselling Services: <https://carleton.ca/health/>
- Paul Menton Centre: <https://carleton.ca/pmc/>

- Academic Advising Centre (AAC): <https://carleton.ca/academicadvising/>
- Centre for Student Academic Support (CSAS): <https://carleton.ca/csas/>
- Equity & Inclusivity Communities: <https://carleton.ca/equity/>

Off Campus Resources:

- Distress Centre of Ottawa and Region: (613) 238-3311 or TEXT: 343-306-5550, <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/>
- Empower Me: 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: 1-866-925-5454, <https://good2talk.ca/>
- The Walk-In Counselling Clinic: <https://walkincounselling.com>

8. Requests for Academic Accommodations

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

Academic consideration for medical or other extenuating circumstances: If you require an extension for assignments or the midterm, please contact me in advance of the deadline and include in your request the Self-Declaration for Academic Considerations form (<https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>). Note: final exam deferrals must be arranged through the Registrar's Office (<https://carleton.ca/registrar/deferral>).

Pregnancy and Family-Status Related Accommodation: Please write to me with any requests for academic accommodation during the first few weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details about the accommodation policy, visit the Equity and Inclusive Communities (EIC) website.

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 [click here](#).

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 for a formal evaluation. If you are already registered with the PMC, please request your accommodations for this course through the [Ventus Student Portal](#) 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*). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the [University Academic Calendars](#). 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).

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>

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation will be provided to students who compete or perform at the national or international level. 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>