

Introduction to Atmospheric Science Syllabus

Department of Physics and Atmospheric Science
PHYC/OCEA 4520/5520 Fall 2025

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982, recognizes and affirms Aboriginal and Treaty rights in Canada.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Jeff Langille	jalangil@dal.ca	Wednesdays 1-2 pm, Room 130 Sir James Dunn

Course Description

The general overview of the atmosphere provides the student with an understanding of the composition and thermal structure of the atmosphere, air mass and frontal theory and weather generating physical processes and their consequences. Other topics include atmospheric radiation, dynamic meteorology, climatology and the physics of clouds and storms.

Course Prerequisites

PHYC 2060.03 or permission of instructor

CROSS-LISTING: OCEA 4520.03/

Ability to integrate simple differential equations

Ability to manipulate data and plot graphs (by computer)

Exclusions

PHYC 5520.03, OCEA5520.03

Student Resources

Office hours will be held on Wednesdays from 1 pm - 2 pm or by appointment via email.

Course Structure

Course Delivery: In person lectures.

Lectures: Tue, Thu 4:00 pm - 5:30 pm in Sir James Dunn Building 101 starting Sept 8, 2026.

Laboratories: none.

Tutorials: none.

Course Materials

1. Lecture slides (posted on the Brightspace course website after each lecture)
2. Notes (posted on the Brightspace course website after each lecture)
3. Textbook: Atmospheric Science: An Introductory Survey by John Wallace and Peter Hobbs, 2nd Edition (Amazon or VitalSource; Killam Memorial Library has one paper copy reserved for the class).
4. Supplementary Course Materials
 - Practical Meteorology, Roland Stull.- (https://www.eoas.ubc.ca/books/Practical_Meteorology/).
 - Atmosphere, Clouds, and Climate, David Randall (2012). Princeton University Press.

Assessment

Assignments/Quizzes

Component	Weight	Date
Assignments (4 in total)	20%	Throughout
Quiz #1 (~40 mins)	10%	October 8, 2026 (in class)
Quiz #2 (~40 mins)	10%	Oct 29, 2026 (in class)
Quiz #3 (~40 mins)	10%	November 26, 2026 (in class)
Project Presentation	10%	December 1 & 3, 2026 (in class)
Participation	10%	Throughout
Final Exam	30%	During Exam Period (TBD)

Conversion of numerical grades to final letter grades follows the
Dalhousie Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

Students do not need to use the Absence Form.

Late Assignments will lose 10% of value per day.

All assignments, quizzes, and test must be completed. If students must miss a quiz, no makeup quiz will be offered. The final grade will be calculated based on either 30% from quizzes combined with 30% from the final exam, or 60% from the final exam alone, whichever is higher

Course Policies related to Academic Integrity & Artificial Intelligence

Students are welcome to discuss assignments but are not permitted to share written material. No collaboration is accepted for tests and quizzes. In-class presentations will be prepared and given in teams of 2-3 students.

Where possible, plagiarism software will be used to identify cases of copying work from uncited sources.

Generative AI and large language models (e.g., ChatGPT) cannot be used for assignments **unless specified by the instructor**. In cases where the instructor explicitly allows the use of generative AI tools, the student must include all queries and responses in an appendix.

Learning Objectives

After completing the course, students are expected to:

- understand key concepts in atmospheric science,
- connect key concepts to real-world problems,
- solve simple problems related to atmospheric processes,
- identify interactions and feedback's between various atmospheric processes.

Week	Date	Topics	Reading	Assessment
1	Sept 8 & 10	Orientation		
2	Sept 15 & 17	A Brief Survey of the Atmosphere	Ch.1	
3	Sept 22 & 24	Thermodynamics I	Ch.3 (sec 3.1-3.4)	
4	Sept 29 & Oct 1	Thermodynamics II	Ch.3 (sec 3.5 – 3.7)	Assignment #1
5	Oct 6 & 8	Radiative Transfer I	Ch.4 (sec 4.1 – 4.3)	Quiz #1 (Oct 8)
6	Oct 13 & 15	Radiative Transfer II	Ch. 4 (sec 4.4 – 4.6)	
7	Oct 20 & 22	Cloud Microphysics	Handouts	Assignment #2
8	Oct 27	Aerosols and Clouds	Handouts	
	Oct 29			Quiz #2
9	Nov 3 & Nov 5	Atmospheric Boundary Layer I	Handouts	
10	Nov 10 & 12	Atmospheric Boundary Layer II	Handouts	Assignment #3
11	Nov 17 & 19	Fall Break	No Classes	No Classes
12	Nov 24 & 26	Climate I	Ch.10 (sec 10.1-10.2)	Quiz #3
13	Dec 1 & 3	Climate II	Ch.10 (sec 10.3-10.5)	Class Presentations, Assignment #4
14	Dec 8th	Review	Handouts	

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding Mi'kmaq and Indigenous Relations (including the Elders in Residence program, Land Acknowledgements, Understanding Our Roots, and much more) can be found at: <https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.html>

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about/mission-vision-values/global-relations.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (https://www.dal.ca/campus_life/ssc.html).

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view.

Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: <https://www.dal.ca/content/dam/www/about/leadership-and-governance/governing-bodies/code-student-conduct.pdf>

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: <https://www.dal.ca/content/dam/www/about/leadership-and-governance/university-policies/fair-dealing-policy.pdf>

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.