

Introduction to Atmospheric Science Syllabus

Department of Physics & Atmospheric Science
PHYC/OCEA 4520/5520 Fall 2023

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Manuel Helbig	manuel.helbig@dal.ca	Scheduled via email

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 2140.03 or permission of instructor

Ability to integrate simple differential equations

Ability to manipulate data and plot graphs (by computer)

Course Exclusions

None

Student Resources

Office hours (room 131, Dunn Building): Wed 2pm – 3pm

Course Structure

Course Delivery

In-person lectures (lectures can be recorded upon individual request)

Lectures

Tue, Thu from 10:05am to 11:25pm in Sir James Dunn Building 101 starting Sept 5, 2023

Laboratories

None

Tutorials

None

Course Materials

- Lecture slides (posted on the Brightspace course website)
- Required textbook (free for download at https://www.eoas.ubc.ca/books/Practical_Meteorology/)
 - o Stull, R., 2017: "Practical Meteorology: An Algebra-based Survey of Atmospheric Science" -version 1.02b. Univ. of British Columbia. 940 pages. ISBN 978-0-88865-283-6.

Assessment

Assignments

<i>Assessment</i>	<i>Weight (% of final grade)</i>	<i>Dates</i>
Assignments	4 x 10%	Sep 22, Oct 13, Nov 17, Nov 24
Quizzes	3 x 10%	Sep 28, Oct 19, Nov 21
In-class presentation	5%	Nov 23
Final exam	20%	Exam period
Participation	5%	-

Participation

Students are strongly encouraged to ask questions and participate in class discussions. A student's level of engagement throughout the term will be reflected in their participation grade, comprising a maximum of 5 points toward their final mark.

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 requirement, they will be offered a make-up exam or alternate assignment.

Course Policies related to Academic Integrity

Students are welcome to discuss assignments but are not permitted to share written material. No collaboration is accepted for test 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.

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 feedbacks between various atmospheric processes.

Course Content

Below is a list of lecture topics along with an approximate schedule of their delivery.

Week	Date	Lesson Topic(s)	Assessment
1	Sep 5-8	Orientation	-
2	Sep 11-15	Brief Survey of the Atmosphere	-
3	Sep 18-22	Carbon and water cycle	Assignment 1
4	Sep 25-29	Atmospheric Thermodynamics I	Quiz 1
5	Oct 2-6	Atmospheric Thermodynamics II	-
6	Oct 11-13	Radiative Transfer I	Assignment 2
7	Oct 16-20	Radiative Transfer II	Quiz 2
8	Oct 23-27	Atmospheric Boundary Layer I	-
9	Oct 30-Nov 3	Atmospheric Boundary Layer II	-
10	Nov 6-10	Climate Dynamics	-
11	Nov 13-17	Fall Study Break	Assignment 4
12	Nov 20-24	Climate Feedbacks	Quiz 3, Presentation
12	Nov 27-Dec 1	Summary	-

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 the Indigenous Student Centre can be found at:

https://www.dal.ca/campus_life/communities/indigenous.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-dal/internationalization.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/about-dal/agricultural-campus/student-success-centre.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: <http://www.dal.ca/cultureofrespect.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/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

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.