

**Faculty of Science Course Syllabus (Sections A and B)**  
**Department of Physics and Atmospheric Science**  
**PHYC/OCEA 4412**  
**Atmospheric Dynamics 2**  
**Winter 2023**

*Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.*

*We acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.*

**Instructor(s):** Ian Folkins, [ian.folkins@dal.ca](mailto:ian.folkins@dal.ca), Dunn 119A, *No specific office hours, but free to visit at any time.*

**Lectures:** To be determined from class discussion. There will be three 50 minute lectures per week.

**Laboratories:** None

**Tutorials:** As needed

**Course delivery:** In person. Lectures will not be recorded

**Course Description**

The approach is the same as for [PHYC 4411.03](#), with emphasis on synoptic-scale wave phenomena, frontal motions and the global circulation. Additional topics including tropical meteorology, middle atmospheric dynamics, severe storms, mesoscale meteorology and numerical weather prediction may be included.

**Course Prerequisites**

PHYC 2140.03 or [PHYC 2060.03](#) or permission of the instructor

**Course Exclusion**

Not applicable

**Learning Objectives**

- (1) Knowledge of the Quasi Geostrophic equations and their derivation.
- (2) Knowledge of Q Vectors
- (3) Knowledge of Jet Streaks
- (4) The Sutcliffe Low
- (5) Jets and Frontogenesis
- (6) The Isallobaric Wind
- (7) Methods of Diagnosing Vertical Motion
- (8) Inertial Instability
- (9) QG Height Tendency Equation
- (10) TROWAL
- (11) Mid-latitude Cyclone Structure

- (12) PV Anomalies and Cyclogenesis
- (13) Rossby and Kelvin Waves
- (14) Modes of Climate Variability (NAO)

### Course Materials

Mid-Latitude Atmospheric Dynamics, Jonathan Martin. This text was also used in Atmospheric Dynamics 1, so most students should already have. Assignments will be posted on the class website.

### Course Assessment

Assessment	Weight (% of final grade)	Date
<i>Assignments</i> <sup>1</sup>	20%	Weekly
<i>Tests/quizzes</i> <sup>2,5</sup>	3 Quizzes worth 10% each.	Typically, Classes 11, 22, and 33
<i>Final exam</i> <sup>3,4,5</sup>	50 %	During the Exam Period

### Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

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

### Course Policies on Missed or Late Academic Requirements

Late Assignments will lose 10% of their value per day. Students do not need to use the Absence Form. All assignments, quizzes, and the exam must be completed.

### Course Policies related to Academic Integrity

Students are welcome to discuss assignments but are not permitted to share written material.

### Course Content

The first third of the course will focus on Learning Objectives (1), (3), and (4). The second third will focus on Objectives (2), (5), (6), and (7). The final third will focus on Objectives (8) through (14).

## University Policies and Statements

**This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

### Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

**Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

### **Accessibility**

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

**Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.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.

**Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

### **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

**Statement:** <http://www.dal.ca/cultureofrespect.html>

### **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 (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

### **Important Dates in the Academic Year (including add/drop dates)**

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loadusercredits=False>

### **University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

## **Student Resources and Support**

### **Advising**

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

**Science Program Advisors:** <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

**Indigenous Student Centre:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

### **Academic supports**

**Library:** <https://libraries.dal.ca/>

**Writing Centre:** [https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)



**Studying for Success:** [https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

**Copyright Office:** <https://libraries.dal.ca/services/copyright-office.html>

**Fair Dealing Guidelines** <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

### **Other supports and services**

**Student Health & Wellness Centre:** [https://www.dal.ca/campus\\_life/health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness.html)

**Student Advocacy:** <https://dsu.ca/dsas>

**Ombudsperson:** [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

### **Safety**

**Biosafety:** <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

**Chemical Safety:** <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

**Radiation Safety:** <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

**Scent-Free Program:** <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

**Dalhousie COVID-19 information and updates:** <https://www.dal.ca/covid-19-information-and-updates.html>