Oscillations and Waves Syllabus

Department of Physics and Atmospheric Science

PHYC 2060 Fall 2025

Course Instructors

Name	Email	Office Hours
Andrew Rutenberg	adr@dal.ca	MWF 11:30 or 2:30, and/or when "RutenHour" lights are on: Dunn223
TA: Gavin Kerr	gavin.kerr@dal.ca	Thurs 12:30pm, Dunn207

Course Description

Oscillations and waves occur in a wide range of physical, chemical and biological systems. The objective of this course is to quantitatively explore the physics of oscillation and waves in a variety of classical systems such as mechanical and electrical oscillators, sound, and electromagnetic waves.

Course Prerequisites: PHYC 1190/1290 or PHYC 1310/1320, and MATH 1000/1010 or MATH 1280/1290

Course Exclusions: PHYC 2140

Student Resources

Dropbox: https://tinyurl.com/5n7b4dsm

Discord: https://discord.gg/WF9Pemfs

Fox book: https://global.oup.com/us/companion.websites/9780195393491/weblinks/

Course Structure

Course Delivery

Lectures are in-person. Scanned notes will be distributed periodically (e.g. before tests), or by request.

Lectures

MWF 1:30-2:30 Dunn304

Tutorials

Th 1:30-2:30 LSC C332 (by TA)

Course Materials

Fox-Smith "Waves and Oscillations", should be available in bookstore, online, kindle, etc… No open book exams, so electronic copies should be fine.

There is currently no Brightspace page, but there is shared Dropbox (see above). Keep track of your grades.

Assessment

Assignments

10 assignments, approximately weekly, 3% each	30% total

Quizzes

15 pop quizes, 1-2 per week, 1% each	15% total

- These short (5min or so) in class quizzes will be P/F, and will be on the lecture material to that point of the course.

Tests

1 midterm (in class, closed book)	15%

- **Wednesday Nov 19** (after break) in class
- Extra time will be provided after midterm, as needed.

Final exam

1 exam (**Dec 17 3:30pm**, closed book)	40%

Other course requirements

Midterm and final will be on the material in the course (lectures, quizzes, problems, tests, and book) up until that point in the course.

Components that are missed or failed or poorly done (markwise) can be replaced by a larger exam weight (up to 30% more, to 70% total). e.g. missed midterm would be 15%, each assignment 3%, each quiz 1%. **This will be done automatically to your best benefit**.

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

Missed assignments, quizzes, and midterm will be moved to the exam weight (up to 30%, see above). Assignments will be accepted late with no penalty (apart from being marked even later) until solutions are returned. If you anticipate exceeding the 30% limit by missed/late components let me know ASAP. If you can't make the midterm date, also let me know ASAP so that alternative arrangements can be made.

Course Policies related to Academic Integrity

Learn from and teach your classmates, but all work should be your own. Acknowledge briefly where you were specifically helped ("Jo got me unstuck here", or "following the approach recommended by T"), including by any AI/LLM.

Learning Objectives

TBA

Course Content

Week	Topics	Skipped sections
1	Fox1: SHM, Taylor, Complex, AC circuits	1.11, 1.12
2	Fox2: Pendulum, elastic	
3	Fox3: Damped Oscillators	
4	Fox4: Driven Oscillators	
5	Fox5: Normal Modes (from few)	
6	Fox6: Normal Modes (to many)	
7	Fox7: String	
8	Fox8: Fourier (string modes)	
9	Fox 9: Compact waves (power, dispersion, group velocity)	
10	Catchup (also Fox 10.1)	

- Specific sections will be skipped, as noted through the course.

University Policies and Statements

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.

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.