

Faculty of Science Course Syllabus (Section A)
Department of *Physics and Atmospheric Science*
PHYC 1290
Introduction to Physics
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.

Instructors: *Dr. Simon de Vet (primary instructor)*
Dr. Kevin Hewitt (10:35 instructor)

Class email: phyc1290@dal.ca

Lectures: *Monday/Wednesday/Friday*
8:35am (section 01 and 03)
9:35am (section 02 and 04)
10:35am (section 05 and 06)

Laboratories: *Six in-person labs, three hours each*

Tutorials: *Weekly online tutorials, Wednesday evenings*
Resource centre, Thursday/Friday afternoons

Course delivery: *In-person*

Course Description

This course concentrates on oscillations and waves, optics, electricity and magnetism. Primarily for students interested in Physical Sciences and Engineering. This course is required for all Engineering programs. Students entering this course must be familiar with algebra, graphs, and trigonometry, and should be taking calculus (MATH 1000.03/1010.03 or MATH 1280.03/1290.03) concurrently. Ideas are introduced through in-class demonstrations enabling students to relate physical theory to events in the real world. Students explore many concepts via hands-on labs.

Course Prerequisites

High School Physics equivalent to the Nova Scotia 12 level. Students not having a physics credit equivalent to Nova Scotia Grade 12 Physics are strongly advised to take PHYC 0010.00 available in the summer and in the fall term. See the College of Continuing Education at:

<http://collegeofcontinuinged.dal.ca>

Course Exclusion

Credit will be given for only one of 1290.03, 1290.03, 1300X/Y.06, or 1320.03

Learning Objectives

Students will learn to analyze and perform calculations involving the properties and behaviour of:

- waves, including sound and light
- light rays and optical systems
- electric and magnetic fields and their interactions with matter
- electronic components (resistors, capacitors and inductors); and
- circuits (e.g., RC, RL and LC circuits)

Course Materials

- OpenStax University Physics Volume 1,2,3
 - <https://openstax.org/details/books/university-physics-volume-1>
 - <https://openstax.org/details/books/university-physics-volume-2>
 - <https://openstax.org/details/books/university-physics-volume-3>
 - This textbook is free! It is an excellent resource, but we will not follow it closely
- Lab manual
- Course Brightspace page at <https://dal.brightspace.ca>
- Online homework (CAPA) at <http://www.learning.physics.dal.ca/>

Course Assessment

This course has two marking schemes. We calculate grades using both schemes, and students will automatically receive the higher grade.

Scheme A

Labs	15%
Homework (CAPA)	10%
Midterm 1	15%
Midterm 2	15%
Midterm 3	15%
Final Exam	30%

Scheme B

Labs	15%
Homework (CAPA)	10%
Best Midterm	18%
Middle Midterm	18%
Worst Midterm	0%
Final Exam	39%

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)	

Test Schedule

Midterm 1	Wednesday, Feb.1 (in class)
Midterm 2	Wednesday, Mar. 1 (in class)
Midterm 3	Wednesday, Mar. 22 (in class)
Final Exam	Exam period (to be scheduled by registrar)

Homework (CAPA) schedule

There will be one homework assignment per week of class, due on Friday evenings at 11:59pm.

The deadline for each assignment can be found at the top of the assignment.

Lab schedule

There are six labs in total, completed during your scheduled lab time.

See lab manual or Brightspace for detailed lab schedule. **Students do not have lab every week.**

Course Policies on Missed or Late Academic Requirements

Midterms: Marking “Scheme B” drops the lowest midterm, so **a student can miss one midterm with no penalty**. Students do not need to provide an excuse for a missed midterm. There are no make-up midterms. This policy exists for situations where missing a test is unavoidable. You should plan to attend all the tests.

Exam: If a student misses the final exam, they must immediately contact the instructor and provide documentation. It will be possible to write a make-up exam if the exam is missed for a valid reason. A grade of **F** will be given if a student misses the make-up exam or misses the final exam without a valid explanation.

Homework (CAPA): All homework assignments are due at 11:59pm on Fridays. Extensions will not be given in most circumstances. We drop the lowest 20% of individual homework questions when calculating the homework grade, so **a student can miss up to 20% of their work without any penalty**.

Labs: If a student cannot attend their scheduled lab, they must contact their instructor right away to reschedule. A student must attend their assigned lab section, unless given permission otherwise. We drop the lowest lab when calculating the final lab grade, so **a student can miss one lab at no penalty**. There are no make-up labs.

Course Policies related to Academic Integrity

Students are responsible for submitting work that demonstrates their understanding of the material.

Midterms and Exams: Everything submitted on a test must be 100% the student’s own work. Students will be permitted to bring a ‘cheat sheet’ (more information will be given in class), but the tests are not open notes, and no other resources are permitted. Students are not allowed to discuss tests with anyone until **everyone** has written the test. For example, students who wrote the test at 8:35am cannot discuss their experience with students who will write at 9:35am.

Homework: Students are encouraged to work together and help each other learn. Science progresses when scientists work together. However, students are responsible for doing their own work. Teaching someone how to solve a problem is helpful. Doing their work for them is not.

Labs: In-person labs are done in small groups. Students working in groups are expected to work together as a team and will usually get the same results. Any written answers must represent the student’s own thoughts and be in their own words. Copying written answers is strictly forbidden. A scientist’s first duty is to the truth, so falsification of experimental data is the most serious offence. “Bad” but honest data is always better than fake data!

Course Content

Week	Date	Lecture	Lecture material	Homework deadlines
1	Jan. 9	1	Introduction to Waves	
	Jan. 11	2	Mathematics of Waves	
	Jan. 13	3	Wave superposition and reflection	
2	Jan. 16	4	Harmonic waves	
	Jan. 18	5	Standing waves	
	Jan. 20	6	Sound and resonance	CAPA 1 due
3	Jan. 23	7	Interference	
	Jan. 25	8	Interference in 2D	
	Jan. 27	9	Light interference and diffraction	CAPA 2 due
4	Jan. 30	10	Reflection	
	Feb. 1		MIDTERM 1	
	Feb. 3		Munro day, university closed	
5	Feb. 6	11	Curved mirrors	CAPA 3 due
	Feb. 8	12	Refraction	
	Feb. 10	13	Lenses	CAPA 4 due
6	Feb. 13	14	Charges and Coulomb's Law	
	Feb. 15	15	The electric field	
	Feb. 17	16	Charge distributions	CAPA 5 due
Reading Week				
7	Feb. 27	17	Motion of a charge in an electric field	
	Mar. 1		MIDTERM 2	
	Mar. 3	18	Electric potential energy	CAPA 6 due
8	Mar. 6	19	Electric potential	
	Mar. 8	20	Electric potential and electric field	
	Mar. 10	21	Capacitance	CAPA 7 due
9	Mar. 13	22	Capacitors in series and parallel	
	Mar. 15	23	Current and Ohm's Law	
	Mar. 17	24	Resistors in series and parallel	CAPA 8 due
10	Mar. 20	25	Kirchhoff's Laws	
	Mar. 22		MIDTERM 3	
	Mar. 24	26	RC circuits	CAPA 9 due
11	Mar. 27	27	Magnetic fields and the Lorentz force	
	Mar. 29	28	Motion of a charge in a magnetic field	
	Mar. 31	29	Force on a current carrying wire (motors)	CAPA 10 due
12	Apr. 3	30	Biot-Savart law	
	Apr. 5	31	Faraday's Law and Lenz's Law	
	Apr. 7		Good Friday, university closed	
13	Apr. 10	32	Inductance	
	Apr. 11*	33	LC circuits	CAPA 11,12 due

*April 11 is a Tuesday, but it will follow a Friday schedule!

The final exam will be scheduled by the registrar. It will be sometime between April 13-25.