Introduction to Physics Syllabus

Department of Physics and Atmospheric Science

Phyc1190 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
Simon de Vet	phyc1190@dal.ca	Dunn 121A Tuesdays, 1:00-2:30

Course Description

This course concentrates on mechanics (forces and motion). Primarily for students interested in Physical Sciences and Engineering. 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 Exclusions

Credit will be given for only one of 1190.03, 1280.03, or 1310.03.

Student Resources

Drop-In Sessions - drop in and talk with your instructor. No appointment required. Dunn 121A, Tuesday afternoons, 1:00-2:30

Resource Centre - visit Dunn 108 and talk with trained teaching assistants. Times to be announced.

Online Tutorials - watch as a teaching assistant solves problems while talking through their thinking. Times to be announced.

Discussion board - post questions on Brightspace and have them answered by your instructor or a teaching assistant.

Course Structure

Course Delivery

Phyc1190 is an in-person course. It cannot be taken online or remotely.

Lectures

Lectures are on Monday-Wednesday-Friday mornings. Each lecture is 50 minutes long. Students are expected to attend lectures to learn the material.

Laboratories

Labs are in-person. There are six labs, two per month. A detailed lab schedule can be found on Brightspace and In your lab manual.

Tutorials

Tutorial sessions are run online. Times and days will be announced after the start of class.

Course Materials

- OpenStax University Physics Volume 1
    - https://openstax.org/details/books/university-physics-volume-1
    - 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

Assessment

Assessment

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

Scheme A		**Scheme B**	
Labs	20%	Labs	20%
Self-Assessments	5%	Self-Assessments	5%
Midterm 1	15%	Best Midterm	18%
Midterm 2	15%	Middle Midterm	18%
Midterm 3	15%	Worst Midterm	0%
Final Exam	30%	Final Exam	39%

Assignments

Students are expected to complete "Self-Assessment" (SA) quizzes. These are generally conceptual problems, or simple calculations. Students have unlimited attempts to get the right answer. The purpose of these quizzes is to help students gauge their understanding of the material, to better know what material they need to review. It is not a test.

Labs

There are six labs in total, completed during your scheduled lab time. Labs do not take more than the scheduled three hours.

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

Tests/quizzes

Midterm 1	September 27 (In class)
Midterm 2	October 18 (In class)
Midterm 3	November 8 (In class)
Final Exam	Exam period (to be scheduled by registrar)

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

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 (Self-Assessments): All homework assignments are due at 11:59pm on Fridays. Extensions will not be given in most circumstances. We drop the lowest 10% of individual homework questions when calculating the homework grade, so a student can miss up to 10% 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!

Learning Objectives

- At the end of the class, students will be able to do the following:
- Identify forces, draw a free body diagram, identify the net force, use Newton's 2nd law to solve for the acceleration of an object.
- Describe the motion of an object moving under the effect of a uniform force.
- Describe the motion of an object traveling in a circular path and identify the forces that allow this motion.
- Analyze forces in a system of ropes and pulleys.
- Use momentum to analyze the motion of one or more objects.
- Use kinetic and potential energy to study objects in motion, in particular systems that cannot be easily studied using other means.
- Describe how work relates to energy and use this to describe the motion of an object moving under the effect of a non-uniform force.
- Find the net torque on a body subject to multiple forces.
- Use principles of static equilibrium to analyze a structure at rest.
- Analyze, in detail, the stability of a bridge or other static structure using the Method of Joints and the Method of Sections
- Use the moment of inertia to describe rotational motion.
- Identify the forces acting on a fluid at rest and use this to calculate pressure and buoyancy.

Course Content

Week	Date	Lecture	Lecture material	Homework deadlines
1	September 6	1	Introduction, vectors	
	September 8	2	Motion in 1D	
2	September 11	3	Forces and Newton's 2nd Law	
	September 13	4	Tension and ropes	
	September 15	5	Friction	SA 1 due
3	September 18	6	Motion in 2D or 3D	
	September 20	7	Projectile motion	
	September 22	8	Uniform circular motion	SA 2 due
4	September 25	9	Non-uniform circular motion	
	September 27		**Midterm 1, Covers lectures 1-7**	
	September 29	10	Static pulleys	SA 3 due
5	October 2		***Truth and Reconciliation Day*, no class**	
	October 4	11	Moving pulley systems	
	October 6	12	Center of mass	SA 4 due
6	October 9		***Thanksgiving*, no class**	
	October 11	13	Conservation of Momentum	
	October 13	14	Conservation of Energy	SA 5 due
7	October 16	15	Collisions	
	October 18		**Midterm 2, Covers lectures 8-13**	
	October 20	16	Work and Energy	SA 6 due
8	October 23	17	Constant force, curved path	
	October 25	18	Variable forces and springs	
	October 27	19	Adding PE and Energy diagrams	SA 7 due
9	October 30	20	Simple Harmonic Motion, spring	
	November 1	21	Simple Harmonic Motion, pendulum	
	November 3	22	Torque	SA 8 due
10	November 6	23	Static Equilibrium	
	November 8		**Midterm 3, Covers lectures 14-21**	
	November 10	24	Structural analysis	SA 9 due
November 13-17 Reading week				
11	November 20	25	Method of Joints	
	November 22	26	Method of Sections	
	November 24	27	KE of Rotation, moment of inertia	SA 10 due
12	November 27	28	Rolling motion	
	November 29	29	Newton's 2nd Law of rotation	
	December 1	30	Angular momentum	SA 11 due
13	December 4	31	Static fluids and pressure	
	December 6	32	Buoyancy	SA 12 due

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.