PHYS 1905 FALL 2025

PHYSICS IN EVERYDAY LIFE

An on-line course based on the

Open Physics Education Module

Instructor: Tong Xu

Email: txu@physics.carleton.ca

Office Hour: TBA via Zoom through BrightSpace

OVERVIEW

This course is intended for students with little or no background in Science. It introduces physics through a set of modules that closely connected to our everyday life.

This course is only available on-line via BrightSpace. The course is delivered asynchronously, i.e. does NOT have set lecture times. The students should take the online lessons following the course timeline (see Page 3).

Important dates and deadlines: https://calendar.carleton.ca/academicyear/

The last day for Academic withdraw from the course to avoid an F grade or low mark: Nov. 15

COURSE LEVEL LEARNING OUTCOMES

By the end of the course, students should be able to:

1. Explain physics related phenomenon using basic physics principles and terminology
2. Perform basic calculation/estimations to solve simple physics related problems
3. Make correct judgement/decisions on physics related issues in their daily life based on basic physics principles

CONTENT

The following thematic modules will be covered in this course. Each module will help you answer a series of questions listed below.

1. Transportation

   If you drive a car and take a bus to get from point A to B. How to estimate your travel time and average speed? Have you wondered what forces are involved to keep the cars moving? What is the physics behind the safety rules on the road, especially in winter? Can physics help you pick a car that is safer during collision? What are the physical factors that determine the fuel economy of a car?

2. Sports

   Physics is at the very heart of every sport. A good understanding of physics will help athletes maximize their potential. What forces are involved in cycling? Can a cyclist out-run a car? How strong a rope should you chose for rock climbing? How do figure skaters control their spins? What is the best projection angle for shot put?

3. Weather and climate

   Global warming is almost too well-known to require discussion, but most people have a very limited understanding on the underlying science. If we cannot predict the weather over more than a week, how can we hope to predict climate change of a century? If there are equations that describe the weather, why can't we predict where hurricanes will go? Why is carbon dioxide so important?

4. Home Electricity

   Our civilization is very dependent on electrical power. But what is electricity? How is electricity generated and transferred? How do light bulbs work? How efficient are some of the common appliances? How to estimate the electricity consumptions of a household? What are the preclusions for electrical safety?

5. Green Energy

   From human body, to cars, to factories, to the whole human society, nothing will function without energy. As our demand increases, what are the GREEN energy sources? How is the energy generated from these sources? How efficient are they? What are the environment impacts of different energy sources?

MODULE COMPLETION DATES AND PHYSICS TOPICS COVERED

The each module contains a series of interactive lecture videos. You must answer the questions throughout the lecture with 75% mark before you can move on to the next lecture video.

Thematic Modules	Expected completion dates of lecture videos	Physics topics Covered
1. Transportation	Sept 17	Linear motion, Speed, velocity, acceleration, Force, Newton's laws, circular motion, friction, collision, energy and momentum
2. Sports	Oct. 1	Force, energy, projectile motion, rotation, moment of inertia, angular momentum
3. Weather and climate	Oct 22	Energy, heat and temperature, the first law thermodynamics, heat transfer, black body radiation
4. Home Electricity	Nov 5	Electrostatics, electric potential, current, and resistance, ohm's law, electric power, refrigeration, electric safety.
5. Green Energy	Nov 19	Electricity as energy, Electromagnetic Induction, thermal power generation, heat engine, nuclear power, solar power, wind power, biofuels

EVALUATION

1. (40%) Module quizzes

At the end of each thematic modules, there will be an online quiz of 15 questions. **Quizzes will always open on Tuesday and must be completed before Sunday mid night (11:55pm).** Each quiz account for 8% of the final mark.

You must complete all the interactive lecture videos of a module with a mark of 75% on each lecture to gain the access to quiz of that module.

Thematic Module	Module quiz due dates (always on Sunday nights)
1. Transportation	Sept. 21, 11:55 pm
2. Sports	Oct. 5, 11:55 pm
3. Weather and climate	Oct. 26, 11:55 pm
4. Home Electricity	Nov. 9, 11:55 pm
5. Green Energy	Nov. 23, 11:55 pm

2. (40%) Two home lab projects

Each thematic module has an associated lab. You can perform the lab with material that can find at home . You are required to do two home labs of your choice, following the following requirements.

	Possible labs	**Due dates of the lab report**
1st Lab Pick one of the two labs	1. Transportation	The first Lab report **due on Sunday Oct 19,** 11:55pm
	2. Projectile motion (virtual lab)	
2nd Lab Pick one of the three labs	3. Greenhouse gas & climate	The 2nd Lab report **due on Friday Dec 5th**, 11:55pm
	4. Home Electricity (**recommended**)	
	5. Green Energy & Solar heating	

For the lab report, a write up template will be provided. The lab reports should be written using word processing software, for example, M.S. Word or Google Doc. The reports must be submitted as **PDF file**. The lab reports should be uploaded via BrightSpace.

Each lab report account for 20% of the final mark

3. (20%) Final online exam

During the final exam period, there will be a formally scheduled online exam (2 hours with 30 questions) that covers all the content of the course.

ACADEMIC INTEGRITY

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.
Additional details about this process can be found on the Faculty of Science Academic Integrity website.
Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.e

COPYING, PLAGIARISM AND OTHER FORMS OF CHEATING

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- **using online tutorial services (such as Chegg) or discussion forum/chats to solve quiz or exam problems;**
- **collaborating on solving problems during a quiz or the exam;**
- **using AI tools, such as ChatGPT, to solve problem for you.**
- **Copy other's lab report or lab data.**

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

COURSE COPYRIGHT

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copyright protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s).

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

ACADEMIC ACCOMMODATIONS

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation:

write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form.

Religious obligation:

write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details click here.

Academic Accommodations for Students with Disabilities:

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or

pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in- class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally- scheduled exam (if applicable).

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: https://carleton.ca/equity/sexual-assault-support-services

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation will be provided to students who compete or perform at the national or international level. Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

STUDENT RIGHTS & RESPONSIBILITIES

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

STUDENT CONCERNS

If a concern arises regarding this course, your first point of contact is me: Email or drop in during student hours and I will do my best to address your concern. If I am unable to address your concern, the next points of contact are (in this order):

Note: You can also bring your concerns to Ombuds services.