



PHYS 1905 FALL 2022

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: Monday & Wednesday 11:30-12:30 via Big Blue Button

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).

Please note that Faculty of Science students may only take this course as a free elective.

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

the last day for Academic WD: 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

SUPPLEMENTARY READING

If you would like to seek further readings, I recommend “Physics Beyond the Comfort Zone” by Peter Watson. This is an e-text book available from IBooks for \$9.99:

https://itunes.apple.com/us/book/physics-beyond-comfort-zone/id902018641?mt=13&uo=4%22%20target=%22itunes_store%22%3EPhysics%20Beyond%20the%20Comfort%20Zone%20-%20Watson,%20Peter%3C/a%3E

It is not required.

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 choose 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

Thematic Modules	Expected completion dates of lecture videos	Physics topics Covered
1. Transportation	Sept 21	Linear motion, Speed, velocity, acceleration, Force, Newton's laws, circular motion, friction, collision, energy and momentum
2. Sports	Oct. 5	Force, energy, projectile motion, rotation, moment of inertia, angular momentum
3. Weather and climate	Oct 26	Energy, heat and temperature, the first law thermodynamics, heat transfer, black body radiation
4. Home Electricity	Nov 9	Electrostatics, electric potential, current, and resistance, ohm's law, electric power, refrigeration, electric safety.
5. Green Energy	Nov 23	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.

Thematic Module	Module quiz due dates (always on Sunday nights)
1. Transportation	Sept. 25, 11:55 pm
2. Sports	Oct. 9, 11:55 pm
3. Weather and climate	Oct. 30, 11:55 pm
4. Home Electricity	Nov. 13, 11:55 pm
5. Green Energy	Nov. 27, 11:55 pm

2. (40%) Two writing projects

Each thematic module has suggested essay topics and/or a lab you can perform using materials or devices that are available in your home.

You are required to write **two** essays or lab reports on two of the five topics of your choice. The first (essay or lab) must be chosen from the first two thematic Modules (Transportation and Sport). The second (essay or lab) must be chosen from the last three modules (Weather and climate, Home Electricity, and Green Energy). **At least one of the two writing projects has to be an essay, i.e. you can chose (one essay + one lab), or two essays.**

The due dates at listed in this table:

	Thematic Modules	Module essay or lab report due dates
1 st Essay or Lab Must pick one of the two topics	1. Transportation	The first Essay or Lab report due on Sunday Oct 23, 11:55pm
	2. Sports	
2 nd Essay or Lab Must pick one of the three topics	3. Weather and climate	The 2 nd Essay or Lab report due on Friday Dec 9th, 11:55pm
	4. Home Electricity	
	5. Green Energy	

For the lab report, a write up template will be provided. The essay (excluding the bibliography) must be at least **800 words**. **And please kept it under 1000 words (a little more is ok)**. Both essays and lab reports should be written using word processing software and submitted as **PDF**. **Hand written essays will NOT be accepted and will be given zero mark.** Essays or lab reports should be uploaded via BrightSpace.

3. (20%) Final online exam

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

Eligibility for applying for deferred final exam: a student must achieve an accumulated term marks that at least 30% of the total course mark.

ACADEMIC INTEGRITY

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<https://carleton.ca/registrar/wp-content/uploads/Academic-Integrity-policy-June-2021.pdf>

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;**
- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in “substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.”

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>