PHYS 1905 FALL 2020

PHYSICS IN EVERYDAY LIFE

An on-line course based on the

Open Physics Education Module

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Office Hour: Tuesday 8pm-9pm, Friday 10am to 11pm 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 CULearn.

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

RECOMMENDED REFERENCE BOOK

The recommended reference book for the course is “Physics Beyond the Comfort Zone” by Peter Watson. This is an e-text book available from Amazon or IBooks for $9.99:
https://www.amazon.ca/Physics-Outside-Comfort-Peter-Watson-ebook/dp/B01KYX3A5O/ref=sr_1_3?s=books&ie=UTF8&qid=1472130768&sr=1-3&keywords=comfort+zone

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

If you have difficulties accessing both two formats, please let me know.

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

Thematic Modules	**Expected completion dates of lecture videos**	**Physics topics Covered**
1. Transportation	Sept 23	Linear motion, Speed, velocity, acceleration, Force, Newton's laws, circular motion, friction, collision, energy and momentum
2. Sports	Oct. 7	Force, energy, projectile motion, rotation, moment of inertia, angular momentum
3. Weather and climate	Oct 28	Energy, heat and temperature, the first law thermodynamics, heat transfer, black body radiation
4. Home Electricity	Nov 11	Electrostatics, electric potential, current, and resistance, ohm's law, electric power, refrigeration, electric safety.
5. Green Energy	Nov 25	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 (mostly multi-choice type). **Quizzes will always open on Thursday 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. 27, 11:55 pm
2. Sports	Oct. 11, 11:55 pm
3. Weather and climate	Nov. 1, 11:55 pm
4. Home Electricity	Nov. 15, 11:55 pm
5. Green Energy	Nov. 29, 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 one of the two writing project has to be 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**
1st Essay or Lab Must pick one of the two topics	1. Transportation 2. Sports	The first Essay or Lab report **due on Sunday Oct 18,** 11:55pm
2nd Essay or Lab Must pick one of the three topics	3. Weather and climate 4. Home Electricity 5. Green Energy	The 2nd Essay or Lab report **due on Sunday Dec 6th**, 11:55pm

For the lab report, a write up template will be provided. The essay has to be **800-1000 words**. The both essays or lab reports should be written using word processing software. **Hand written essays will NOT be accepted and will be given zero mark.** Essays or lab reports should be uploaded via CULearn.

3. (20%) Final online exam

During the final exam period, there will be an online exam that covers all the content of the course.

COPYING, PLAGIARISM AND OTHER FORMS OF CHEATING

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: http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/

ACADEMIC INTEGRITY

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.

Pregnancy Obligation:

Please contact your instructor 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, visit the Equity Services website

https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious Obligation:

Please contact your instructor 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, visit the Equity Services website

https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities:

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC 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 your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website https://carleton.ca/pmc

- The deadlines for contacting the Paul Menton Centre regarding accommodation for final exams for the Fall exam period is **November 13, 2020** and for the Winter exam period is **March 12, 2021**.

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/sexual-violence-support

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 must be provided to students who compete or perform at the national or international level. Please contact your instructor 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, see the policy at

https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

For more information on academic accommodation, please contact the departmental administrator or visit: **students.carleton.ca/course-outline**