

Elementary University Physics I

PHYS 1007A/PHYS 1007B/BIT 1203A

Fall 2020 Course Outline

1. Course calendar description and pre-requisites

This is the first part of a two-term physics course with an emphasis on essentials for scientists in other disciplines. This first part of the course covers the basic laws of physics, such as Motion, Force, Newton's Laws of Motion, Energy, Rotational Motion, Collisions, Fluids and Heat Transfer. Applications to other scientific disciplines and real-world examples will be used whenever possible.

Pre-requisites: (i) Grade 12 Mathematics: Advanced Functions or equivalent, or MATH 0107 (may be taken concurrently); or (ii) Grade 12 Mathematics: Calculus and Vectors or equivalent, or MATH 1007 (may be taken concurrently); or (iii) permission of the Physics Department.

2. Instructors contact information

Instructor office hours will be posted on CuLearn

Emily Heath (course coordinator)	PHYS 1007A lecturer	emily.heath@carleton.ca
Andrew Robinson	PHYS 1007B lecturer	andrew.robinson@carleton.ca
Tamara Rozina (lab coordinator)	Lab Supervisor	tamara.rozina@carleton.ca
Benjamin Freestone	Lab Supervisor	benjamin.freestone@carleton.ca

In accordance with University policy, all communication with instructors and TAs must be via your Carleton email account. To get your Carleton Email you will need to activate your MyCarletonOne account through Carleton Central. Once you have activated your MyCarletonOne account, log into the MyCarleton Portal.

To help resolve issues related to any missing term work, students must save all of their email correspondence with instructors and TAs until the course grades are finalized.

3. Course textbook

'Physics', Fifth Edition (US Edition), Giambattista, McGraw Ryerson Ltd,
ISBN: 9781260570052 (hardcover), 9781260486964 (e-text), 9781260327762 (hardcover
+ e-text)

The hardcover versions of the textbook can be purchased from the Carleton University Bookstore in the University Centre (<https://www.bkstr.com/carletonstore>)
To purchase access to the e-text only please go to the McGraw Hill website
(<https://www.mheducation.ca/connect-online-access-2-semester-for-physics-9781260486964-can>)

The previous version of the textbook (3rd edition, ISBN 9780073512150) is also sufficient. We will not be using the Publisher's website for assignments, so no access code is required.

4. Course website

The course outline and other course information will be posted on cuLearn. We reserve the right to amend the course outline on cuLearn and will inform you if that version changes. In the event of any discrepancy between this document, and the version currently posted on the website, then the website version on cuLearn will be taken as the definitive version.

If you are unable to access cuLearn or need help with your computing account, please contact the ITS Service Desk at 613-520-3700 or email its.service.desk@carleton.ca

5. Course modality

This course is an online course where there is a mixture of synchronous meetings (lectures, tutorials and labs) and asynchronous activities (pre-recorded lecture modules). Students need to be prepared to meet online via web conferencing tools at scheduled days and times. The specific dates and activities are described further on in this course outline. The asynchronous activities are intended to provide flexibility to students when the class is not meeting synchronously. Students are expected to remain up to date with the deadlines and due dates provided by the instructor. These courses require reliable high-speed Internet access and a computer.

6. Lecture schedule

Section	Time Slot	Platform
PHYS 1007A/ BIT 1203A	Mondays & Wednesday 08:35 – 09:55	Via BigBlueButton link on Dr. Heath's section of CuLearn
PHYS 1007B	Tuesdays & Thursdays 13:05 – 14:25	Via BigBlueButton link on Dr. Robinson's section of CuLearn

* All timeslots are in the Eastern Time zone

Web conferencing sessions in this course may be recorded and made available only to those within the class. Sessions may be recorded to enable access to students with internet connectivity problems, who are based in different time zone, and/or who have conflicting commitments. If students wish not to be recorded, they need to leave your camera and microphone turned off.

You will be notified at the start of the session when the recording will start.

Please note that recordings are protected by copyright. The recordings are for your own educational use, but you are not permitted to publish to third party sites, such as social media sites and course materials sites.

7. Labs

Labs start the week of **September 14, 2020**.

Information about the labs can be found on the LAB cuLearn page.

All the sessions will be held via a BigBlueButton (BBB) session available on the lab CuLearn page. The lab/tutorial timetable is shown on the next page (all timeslots are in the Eastern Time zone).

Information on using BBB can be found at:

<https://carleton.ca/culearnsupport/students/bigbluebutton/>

Lab section	Time slot	Lab Supervisor
L1	Mondays 14:35 – 17:25	Tamara
L2	Tuesdays 08:35 – 11:25	Tamara
L3	Thursdays 08:35 – 11:25	Tamara
L4	Tuesdays 14:35 – 17:25	Ben
L5	Wednesdays 11:35 – 14:25	Ben
L6	Fridays 08:35 – 11:25	Tamara
L7	Fridays 14:35 – 17:25	Tamara
L9	Thursdays 14:35 – 17:25	Ben
A1	Fridays 14:35 – 17:25	Tamara

It is imperative that all students attend the first lab. You may attend only the section that you are registered in. All changes (exemptions, etc.) must be arranged with the Lab Coordinator, Ms. Tamara Rozina at the start of term. Students who might be exempt from the Lab (if they are repeating the course, for example) must contact the Lab Supervisor. You are not automatically given a lab exemption - you must apply for it no later than **September 18, 2020**. Lab exemptions will be considered on a case-by-case basis.

The grade for every lab will be based on a **quiz (10%)** and a **report (90%)**. All lab work (reports and quizzes) count towards your total lab grade for the course. **No grade will be dropped.**

All lab work must be completed by the appointed time: **1 week** after the lab session for reports and 24 hours after the lab session for the quizzes. Exceptions to this will be announced (see below). The penalties for late submission of the lab report is **30% of the grade**.

If you miss a lab, contact Ms. Rozina immediately.

Lab schedule and report deadlines

Lab #	Title	Deadline for report	Weight (%)	Week of
1	Reaction Time	1 week	10	September 14, 2020
2	Density	1 week	15	September 28, 2020
3	Spring Constant	1 week	25	October 19, 2020
4	Simple Pulley System	1 week	25	November 9, 2020
5	Simple Pendulum	1 week	25	November 23, 2020

8. Tutorials

There will be a tutorial on each alternating week with the labs (see lab and tutorial schedule below). All the sessions will be held via a BigBlueButton (BBB) session available on the CuLearn Lab page.

The structure of the tutorial is as follows:

A set of tutorial problems will be posted on CuLearn at least a week before the tutorial session. Students should attempt to solve these problems in order to prepare for the tutorial. At the start of the tutorial session students will individually complete a multiple choice quiz consisting of 4 questions. This is open book and lasts for 30 minutes. Next, the TAs will demonstrate solving example problems and answering questions about the tutorial problem set. The last hour of the tutorial will be an open-book tutorial test consisting of two long-answer problems. **Open book means that you can use your notes, textbook, the formula sheet and a scientific calculator. No other aids are permitted.**

The grade for the tutorial test and the multiple choice quiz will be combined to provide the final Tutorial Test grade for each of the 5 tutorial sessions this semester. The 4 highest test grades will be used to determine the final Tutorial Test score.

Note that if you are late for the tutorial, you will miss the multiple-choice quiz, and forfeit marks. There are no retakes possible.

Students must normally attend the tutorial only in the lab section to which they belong. To be able to attend a different section, students must obtain permission from the lab coordinator (tamara.rozina@carleton.ca). Such permission will usually be granted only for emergencies or medical reasons. So, if you cannot attend your own lab section one week due to e.g. medical reasons, let us know AS SOON AS POSSIBLE so that you can be rescheduled to a different section.

Lab and Tutorial schedule

Week of	Lab/Tutorial
September 7, 2020	NO Labs/Tutorials
September 14, 2020	Reaction Time
September 21, 2020	Tutorial 1
September 28, 2020	Density
October 5, 2020	Tutorial 2
October 12, 2020	Thanksgiving: NO Labs/Tutorials
October 19, 2020	Spring Constant
October 26, 2020	Fall Break
November 2, 2020	Tutorial 3
November 9, 2020	Simple Pulley System
November 16, 2020	Tutorial 4
November 23, 2020	Simple Pendulum
November 30, 2020	Tutorial 5
December 7, 2020	Review

9. Lectures

The lectures from the previous year have been recorded to video and will be available online. The course will be divided into 12 modules, which roughly cover a three-hour traditional lecture. The pre-recorded lecture modules have been divided into a number of individual units, so that individual units are typically 10-15 minutes long. In addition to the pre-recorded lecture, each instructor will have synchronous discussion/question and answer sessions (via BigBlueButton) every week according to the schedule in Section 6 of this course outline. In Section 13 of the course outline is a schedule for the

topics that will be covered each week and the corresponding lecture modules. Students should view the pre-recorded lectures prior to the synchronous lecture sessions.

Each module will contain a short “Checkpoint Quiz”, to allow the student to check on their understanding of the material in the module. You will have an unlimited number of attempts on these quizzes. Doing these checkpoint quizzes will count as a participation grade in the final course grade.

In addition to the checkpoint quizzes, some modules have a “Module Quiz”. Doing these module quizzes will count as the assignment grade in the final course grade. You will get one attempt on the assignments.

10. Final Exam

There is no mid-term examination. We regard the five tutorial tests as a way of providing feedback and guidance on your performance. If you do not perform to your own satisfaction on a tutorial test, it is imperative to discuss this with your lecturer during office hours or by email. Do not leave this consultation until the end of the course. Effective intervention and assistance is best applied at the beginning of term.

The final examination will be scheduled during the regular December examination period at the end of the term. It is the responsibility of the student to be present during this period; in particular, holiday travel arrangements must not be made before the examination schedule is known.

The final exam may include questions related to material contained within the lab portion of the course.

11. Marking Scheme

Module Quizzes (best 8 out of 10)	20%
Tutorials (best 4 out of 5)	20%
Labs (5)	35%
Participation	5%
Final Exam	20%
Total	100%

12. Passing Condition

Students must obtain a minimum of 50% for the lab grade in order to pass the course. Students are expected to attend all labs and tutorials and complete all lab reports and tests.

13. Lecture module schedule

Week starting	Module(s)	Topics	Textbook Sections
September 7 th	1-3	Course intro, scientific notation, units, significant figures, dimensional analysis. Position, displacement, velocity, acceleration.	1.4 – 1.6, 2.1 – 2.3
September 14 th	2, 3	Motion along a line with constant acceleration, free fall. Review of vectors.	2.4 - 2.6, 3.1 – 3.2
September 21 st	4	Motion in a plane with constant acceleration.	3.3 - 3.5
September 28 th	5	Force, Newton's laws, gravitation, contact forces, tension, applications, reference frames, apparent weight	4.1 - 4.10
October 5 th	6	Conservation of energy, work, kinetic energy, gravitational potential energy, variable forces, elastic potential energy, power	6.1 - 6.8
October 12 th	7	Uniform circular motion, radial acceleration, curves, rotational kinetic energy and inertia, torque,	5.1 – 5.3, 8.1 - 8.7
October 19 th	8	Momentum, impulse, conservation of momentum, centre of mass, collisions in one dimension, angular momentum	7.1 - 7.7, 8.8
November 2 nd	9	Pressure, Pascal's effect, gravity on a fluid, Buoyant Force, Flow, Bernoulli, Poiseuille, Viscosity	9.1 – 9.9
November 9 th	10	Simple Harmonic Motion, Pendulum, Damped Oscillations	10.5 – 10.6, 10.9
November 16 th	11	Waves and energy, longitudinal/transverse waves, superposition, reflection, refraction, interference and diffraction, standing waves	11.1 – 11.10
November 23 rd	11	Sound, Sound Intensity (dB), Standing Sound Waves, Beats, Doppler Effect	12.1, 12.3, 12.4, 12.7, 12.8
November 30 th	12	Temperature, thermal expansion, ideal gas law, Heat, First law of thermodynamics, thermodynamic processes, processes for ideal gas	13.1 – 13.5, 14.1 – 14.4, 15.1 – 15.3
December 7 th		Review	

14. University Policies

Grade Definition:

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100 B+ = 77-79 C+ = 67-69 D+ = 57-59

A = 85-89 B = 73-76 C = 63-66 D = 53-56

A- = 80-84 B- = 70-72 C- = 60-62 D- = 50-52

F = <50

WDN = Withdrawn from the course

ABS = Student absent from final exam

DEF = Deferred (See above)

Academic Regulations, Accommodations, Plagiarism, Etc.:

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 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 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*).

<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.

For Religious Obligations:

Students requesting academic accommodations on the basis of religious obligation should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory event.

Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student.

Students or instructors who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Equity Services website for a list of holy days and Carleton's Academic Accommodation policies, or may contact an Equity Services Advisor in the Equity Services Department for assistance.

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

For Pregnancy:

Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a letter of accommodation. The student must then make an appointment to discuss her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.

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

Plagiarism:

Plagiarism is the passing off of someone else's work as your own and is a serious academic offence. For the details of what constitutes plagiarism, the potential penalties and the procedures refer to the section on Instructional Offences in the Undergraduate Calendar.

What are the Penalties for Plagiarism?

A student found to have plagiarized an assignment may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; and/or a reprimand; a refusal of permission to continue or to register in a specific degree program; academic probation; award of an FNS, Fail, or an ABS.

What are the Procedures?

All allegations of plagiarism are reported to the Dean of Faculty of Science. Documentation is prepared by instructors and/or departmental chairs.

The Dean writes to the student and the University Ombudsperson about the alleged plagiarism.

The Dean reviews the allegation. If it is not resolved at this level then it is referred to a tribunal appointed by the Senate.

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy (see <https://carleton.ca/registrar/academic-integrity/>). The Policy is strictly enforced and is binding on all students. Plagiarism and cheating – presenting another’s ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the graduate degree. Academic dishonesty in any form will not be tolerated. Students who infringe the Policy may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; a refusal of permission to continue or to register in a specific degree program; academic probation; or a grade of Failure in the course.

Assistance for Students:

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>

Important Information:

- Student or professor materials created for this course (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).
- Students must always retain a hard copy of all work that is submitted.
- Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.
- Carleton University is committed to protecting the privacy of those who study or work here (currently and formerly). To that end, Carleton’s Privacy Office seeks to encourage the implementation of the privacy provisions of Ontario’s Freedom of Information and Protection of Privacy Act (FIPPA) within the university.

Important Dates for 2020/2021 academic year:

<https://carleton.ca/registrar/registration/dates-and-deadlines/>