

Elementary University Physics I

PHYS 1007A and B

Fall term 2026

(0.500 Credit)

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Instructor: Mustafa Bahrán

How to address me: Professor Bahrán

Gender Pronouns: (he/him)

Email: mustafabahrán@cunet.carleton.ca

Note: If you have or question or would like to talk with me, you can send an email, visit me during student hours (see below), or approach me after lecture.

Best Ways to be in Touch: in class, via email, or during student hours (office hours)

Student Hours: To be announced in Brightspace announcements section.

Lab Supervisors:

Tamara Rozina

e-mail: tamara.rozina@carleton.ca

Julie Sutton

e-mail: jsutton@physics.carleton.ca

Office Location: Herzberg 3412

Class Location: See Brightspace course page

Class Times: Section A: M, W, 4:35 pm- 5:55 pm

Class Times: Section B: T, Th, 7:35 pm- 8:55 pm

Prerequisites:

(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.

Department/Unit: Physics

Class Web Page:

We will use Brightspace which you can access from <https://brighspace.carleton.ca>

Important dates and deadlines can be found here:

<https://carleton.ca/registrar/registration/dates/academic-dates/>, including class suspension for winter break, and statutory holidays.

1. Course description and prerequisites

This course is the first part of the general physics course with emphasis on mastering the basic concepts required by scientists in other disciplines. We will cover the fundamental laws of motion, dynamics, energy and momentum conservation, fluid dynamics and heat transfer. Applications in a variety of disciplines and real-world examples will be used frequently.

This course is intended for students who lack the prerequisites for PHYS 1001 or PHYS 1003, or who do not intend to take upper-year courses in physics. Precludes additional credit for BIT 1002, BIT 1203, PHYS 1001, PHYS 1003. Prerequisite(s): (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.

Lectures three hours a week; laboratory, or tutorial an additional three hours per week.

Office hours are posted on the respective Brightspace websites. All email communications must be done from your Carleton University account. Email early about any possible issue regarding this course work and grades, and please keep copies of all exchanges until the end of the term.

2. Textbook

Physics, Fifth Edition, Alan Giambattista, McGraw Ryerson Ltd., ISBN: 9781260570052

Can be bought at <https://www.bkstr.com/carletonstore>

Physical - \$129.95 / eBook 180 day \$69.00 / eBook Lifetime \$99.00

Giambattista - Physical - \$117.50 eBook – 180-day term \$ 69.00 or eBook lifetime purchase \$ 99.00

Course philosophy and objectives

Broadly speaking, physics provides the ideal opportunity to learn the art of quantitative thinking: to learn how to turn a concept into something that one can calculate and measure. In order to solve a problem, you must critically examine the information available in a given situation; determine an effective method to approach the problem, and carry through to the solution, including a critical examination of the final answer to see if it is reasonable. These skills will serve you throughout your future careers, indeed through your life. This course is a good step towards that end. The goal of physics is to understand the physical universe and be able to accurately describe and predict what is observed. Physics is based on critical thinking and hence helps to develop independence and free thinking. An understanding of physics may help you perceive the world around you in a more comprehensible, enjoyable, and fascinating way.

Some students believe that if they can follow the lectures in class, then they have learned physics. This is usually not true. Learning physics is not a spectator sport. To learn physics, a student must do work outside of class thinking about, and interacting with, the course material. ***No one ever learns physics by simply reading about it or listening to someone talk about it. You learn it by making the effort to understand the material and by solving problems using the principles learned.*** The standard requirement in a college class is that you spend two hours outside of class for every hour in class. There is no substitute for spending time learning the material.

3. Course websites

This course outline and a plethora of additional information will be published on various Brightspace websites. For both PHYS1007 A and B sections, lectures will be given in person according to class schedule. Lectures will not be recorded and attendance in person is preferred and encouraged since it allows the students to exchange with the instructor in addition to the fact that evidence shows that attending lecture increase class average grades.

In addition, there is a dedicated Brightspace website for the labs and tutorials. Please note that for this part of the course, students have been split in laboratory (same as tutorial) sections. Please, carefully identify to which group you have been assigned and follow the guidelines included below in the lab and tutorial sections.

4. Brightspace Weekly Home-Work Assignments (HWs)

There will be 1 or 2 weekly online HW assignments that will be used as part of the overall term marks. These will be administered through the respective Brightspace website. The assignments will be based on material studied during the lectures. The assignments will become available at the beginning of the week for the students to attempt. You will have 2 attempts during the week before the assignment closes (see calendar within this document).

If there is any discrepancy between the marks posted in Brightspace grade and your calculated values notify the instructor immediately.

Numerical Answers

In answering the assignment calculation questions enter the answer when appropriate in scientific notation with three significant figures, e.g. 1.60×10^{-19} . You are allowed a 5% variance between your answer and the one calculated within Brightspace to account for rounding errors, and so on. If you do not your answer with three significant figures your answer will be outside of this 5% threshold and will therefore be marked as incorrect. Answers of this sort will not be eligible for reassessment by the professor.

Ensure to always take careful note of the units for your answer, typically it is expected that the answer will follow SI units (e.g. m, s, J) however there are occasions in which non-standard units will be required for

specific questions. Generally, these instances will be noted in the question itself, e.g. “Express your answer in km”. Also, units are not to be entered with the numerical answer for these assignments!

5. Pre-Class Reading Quizzes (RQs)

In addition to the weekly online assignments through the Brightspace website, there will be a reading quiz due before the lecture, as indicated in the calendar below. For details, please see the calendar for all the RQs along with lectures and HWs. These quizzes aim to ensure that you have read the designated chapter(s) from the textbook prior to attending class. There will only be one attempt at these quizzes and all quizzes will count toward the final grade (with the time allocated about 45 to 60 minutes). The questions will be, in general, conceptually oriented but sometimes calculations will be needed to complete an individual question.

6. Tutorials

There will be a tutorial on each alternating week with the labs (for details, please see lab and tutorial schedule below).

The structure of the tutorial is as follows:

A set of tutorial problems will be posted on the lab/tutorial Brightspace website at least a week before the tutorial session. Students should attempt to solve all 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 15 minutes. Then the TAs will demonstrate solving example problems and answering questions about the tutorial problem set. During the last hour of the tutorial will be a closed-book test consisting of two long-answer problems. ***Closed book means that you can use 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 four 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 these marks. There are no retakes possible.

Students must attend the tutorial session only in the lab section they are registered in. The final grade for tutorials is based on best 4 out of 5 sessions. If a student missed a session, then this session will automatically be dropped and the other 4 will count towards the final grade. If a student had to miss a second session, they must reach out to the Lab Coordinator, Ms. Tamara Rozina (tamara.rozina@carleton.ca) **immediately** to discuss possible options.

Tutorial #	Title	Weight (%)	Week of
1	<i>Vectors and kinematics</i>	25	September 28, 2026
2	<i>Newton's laws and Circular Motion</i>	25	October 12, 2026
3	<i>Energy and momentum conservation</i>	25	November 2, 2026
4	<i>Torque and angular momentum</i>	25	November 16, 2026
5	<i>Fluids, Oscillations and waves</i>	25	November 30, 2026

After your tutorial tests are returned, you are expected to keep them at least until the end of term. Please verify their marks entry on Brightspace and bring any clerical errors to our attention as soon as you can during the term.

7. Final Examination

There is a mid-term examination in this course. Nevertheless, as seen below, grades are distributed along a variety of course components, stimulating the students to study and practice continuously, which is definitely the key to success in this course. There is a final examination which will be scheduled officially by the university for a date in December, to be announced toward the end of the term.

It is the responsibility of the student to be available during the final examination period. The final exam will be comprehensive and might include course material seen in the lab or tutorial sessions.

8. Grade distribution

Reading quizzes (best 10 out of 14)	10%
Homework assignments (best 10 out of 14)	15%
Tutorials (best 4 out of 5)	15%
Labs	35%
Final examination	25%
TOTAL	100%

Attending all labs and tutorials is mandatory.

9. Passing Condition

In order to pass the course, students must meet the following conditions:

An overall mark must be ***greater than 50%***, AND

Must achieve ***40% or above*** on *BOTH* the Theory ($\geq 26/65$ marks) *AND*

the Lab ($\geq 14/35$ marks) components of the course. Achieving more the 40% but less than 50% in either Lab or Theory while achieving 50% or more overall will translate into a grade of D-.

(**NOTE:** Theory includes Assignments, Reading Quizzes, Tutorial Tests, and the Final Exam)

Final Exam must be attempted to pass the course, even if you manage to achieve 50% overall mark without the final exam.

10. Lab sessions

Labs start the week of **September 22, 2026**.

All the experiments will be held in-person in room **HP 4160**.

Information about the labs can be found on the LAB Brightspace page:

Merged PHYS1007 L1-L6 University Physics I (LAB) Fall 2026 [33834:33835:33836:33837:33838:33839].

It is imperative that all students attend the first lab. You must attend only the section that you are registered in. If you missed a laboratory session, you must contact the Lab Coordinator, Ms. Tamara Rozina (tamara.rozina@carleton.ca) **immediately**. A make-up session may be arranged at the end of term in these cases. Make-up sessions are reserved for emergency situations only and no more than one session per student is possible. Failure to reach out regarding a missed laboratory session will result in a grade of zero for the experiment in question.

Students who are repeating the course might be exempt from the Lab. You are not automatically given a lab exemption – you must apply for it no later than **September 25, 2026**. Lab exemptions will be considered on a case-by-case basis at the discretion of the Lab Coordinator.

The grade for every lab will be based on a **report**. All reports count toward your total lab grade for the course. **No grade will be dropped.**

All reports must be submitted by the appointed time: **1 week** after the start of the lab session. The penalty for a late lab report is **20% up to the End Date** specified on Brightspace for every lab section report submission. It is the student's responsibility to check when the End Date is for each report. **No reports will be accepted for grading past their End Date.**

Please see the Lab Policy document available on the LAB Brightspace page for further details regarding the labs.

Lab Schedule

Lab #	Title	Deadline for report	Weight (%)	Week of
1	Reaction Time	1 week	10	September 21, 2026
2	Density	1 week	15	October 5, 2026
3	Spring Constant	1 week	25	October 19, 2026
4	Atwood's Machine	1 week	25	November 9, 2026
5	Simple Pendulum	1 week	25	November 23, 2026

11. Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline/>).

Statement on Chat GPT/Generative AI usage (See the *Sample Syllabus Statements for AI use in Courses* [document](#) for examples)

As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Statement on Academic Integrity

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that compromise these values include but are not limited to plagiarism, accessing unauthorized sites for assignments or tests, unauthorized collaboration on assignments or exams, and using artificial intelligence tools such as ChatGPT when your assessment instructions say it is not permitted.

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](#).

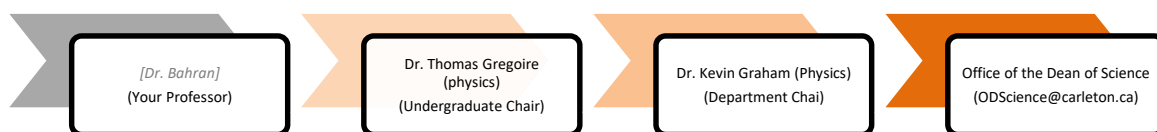
Student Rights & Responsibilities

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](#).



12. Outline Changes

The professor may occasionally make changes or corrections to the content of this outline. All changes or corrections will be announced on the class web page.

13. University policies

Academic Regulations, Accommodations, Plagiarism

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/>

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.

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.

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 carleton.ca/sexual-violence-support.

Accommodations 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.

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at carleton.ca/equity/.

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.

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/>

14. Calendar for PHYS 1007A, PHYS 1007B

14.1 Section: PHYS1007A

	Monday	Wednesday
1		09 Sep Lecture 1 – Ch 1 RQ1 Ch 1 due
2	14 Sep Lecture 2 – Ch 2 RQ2 Ch 2 due, HW1 Ch 1 due	16 Sep Lecture 2 – Ch 2
3	21 Sep Lecture 3 – Ch 3 RQ3 Ch 3 due, HW2 Ch 2 due	23 Sep Lecture 3 – Ch 3
4	28 Sep Lecture 4 – Ch 4 RQ4 Ch 4 due, HW3 Ch 3 due	30 Sep Lecture 4 – Ch 4
5	05 Oct Lecture 5 – Ch 5 RQ5 Ch 5 due, HW4 Ch 4 due	07 Oct Lecture 5 – Ch 5
6	12 Oct	14 Oct

	Statuary Holyday	Lecture 6 – Ch 6 RQ6 Ch 6 due, HW5 Ch 5 due
7	19 Oct Lecture 6 – Ch 6	21 Oct Lecture 7 – Ch 7 RQ7 Ch 7 due, HW6 Ch 6 due
8	26 oct - 30 oct Fall Break Week	
9	02 Nov Lecture 7 – Ch 7	04 Nov Lecture 8 – Ch 8 RQ8 Ch 8 due, HW7 Ch 7 due
10	09 Nov Lecture 8 ch 8	11 Nov Lecture 9 – Ch 9 RQ9 Ch 9 due, HW8 Ch 8 due
11	16 Nov Lecture 9 – Ch 9	18 Nov Lecture 10 – Ch 10 RQ10 Ch 10 due, HW9 Ch 9 due
12	23 Nov Lecture 10 -Ch 10	25 Nov. Lecture 11 – Ch 11 RQ11 Ch 11 due, HW10 Ch 10 due

	30 Nov Lecture 11 – Ch 11	02 Dec Lecture 12 – Parts of Ch 12 RQ12 Ch 12 due, HW11 Ch 11 due
	07 Dec Lecture 13 – Parts of Ch 13 RQ13 Ch 13 due, HW12 Ch 12 due	09 Dec Lecture 14 – Parts of Ch 14 RQ14 Ch 14 due, HW13 Ch 13 due
	11 Dec (HW14 Ch 14 is due)	

Important Note: this outline is subject to change by the professor any time, but if changes take place the students will be duly informed

Final Exam Details to be announced in due time.

Lecture number corresponds to book chapter number covered.

RQ Ch = Reading Quiz for Chapter

HW Ch = Homework for Chapter

Final Note: This outline is subject to change by the professor any time, but if changes take place the students will be duly informed

14.2 Section: PHYS1007B

	Tuesday	Thursday
1		10 Sep Lecture 1 – Ch 1 RQ1 Ch 1 due
2	15 Sep Lecture 2 – Ch 2 RQ2 Ch 2 due, HW1 Ch 1 due	17 Sep Lecture 2 – Ch 2
3	22 Sep Lecture 3 – Ch 3 RQ3 Ch 3 due, HW2 Ch 2 due	24 Sep Lecture 3 – Ch 3
4	29 Sep Lecture 4 – Ch 4 RQ4 Ch 4 due, HW3 Ch 3 due	01 Oct Lecture 4 – Ch 4
5	06 Oct Lecture 5 – Ch 5 RQ5 Ch 5 due, HW4 Ch 4 due	08 Oct Lecture 5 – Ch 5
6	13 Oct No Class	15 Oct Lecture 6 – Ch 6 RQ6 Ch 6 due, HW5 Ch 5 due

7	20 Oct Lecture 6 – Ch 6	22 Oct Lecture 7 – Ch 7 RQ7 Ch 7 due, HW6 Ch 6 due
8	26 oct - 30 oct Fall Break Week	
9	03 Nov Lecture 7 – Ch 7	05 Nov Lecture 8 – Ch 8 RQ8 Ch 8 due, HW7 Ch 7 due
10	10 Nov Lecture 8 ch 8	12 Nov Lecture 9 – Ch 9 RQ9 Ch 9 due, HW8 Ch 8 due
11	17 Nov Lecture 9 – Ch 9	19 Nov Lecture 10 – Ch 10 RQ10 Ch 10 due, HW9 Ch 9 due
12	24 Nov Lecture 10 -Ch 10	26 Nov. Lecture 11 – Ch 11 RQ11 Ch 11 due, HW10 Ch 10 due
	01 Dec Lecture 11 – Ch 11	03 Dec Lecture 12 – Parts of Ch 12 RQ12 Ch 12 due, HW11 Ch 11 due

08 Dec Lecture 13 – Parts of Ch 13 RQ13 Ch 13 due, HW12 Ch 12 due	10 Dec Lecture 14 – Parts of Ch 14 RQ14 Ch 14 due, HW13 Ch 13 due
12 Dec (HW14 Ch 14 is due)	

Important Note: this outline is subject to change by the professor any time, but if changes take place the students will be duly informed

Final Exam Details to be announced in due time.

Lecture number corresponds to book chapter number covered.

RQ Ch = Reading Quiz for Chapter

HW Ch = Homework for Chapter

Final Note: This outline is subject to change by the professor any time, but if changes take place the students will be duly informed