

PHYS 1001 - Fall 2026

Foundation of Physics 1

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: Prof. Thomas Grégoire
(He/Him)

Email: thomasgregoire@cunet.carleton.ca

Best Ways to be in Touch: email, student hours or stop by my office if my door is open.

Office: Herzberg (HP) 3378

Student Hours: TBA, HP 3378

Class Location: Check Carleton Central

Class Times: Tue/Th, 10:05 - 11:25
First class on Thursday Sept. 10, last Thursday Dec. 10

Preclusions: BIT 1002, BIT 1203, PHYS 1003, PHYS 1007, PHYS 1107

Prerequisites: Grade 12 Advanced Function, Grade 12 Calculus and Vectors, MATH 1004 or MATH 1052 (maybe taken concurrently)

Course TA: Check Brightspace

Topics to be Covered and Learning Outcomes

Welcome to Physics 1001! Here is the **calendar description** for the course:

“This calculus-based course on classical mechanics covers kinematics, dynamics, gravitation, and oscillatory motion. This is a specialist course for students intending to take further courses in physics.”

In this course we will explore the basics of classical mechanics. We will study how objects move when subjected to various kinds of forces and how to mathematically describe and analyse motion using concepts such as forces, energy conservation, momentum, angular

momentum and torque. This is a foundation course, many of the concepts and mathematical tools (calculus and linear algebra) that we will develop in this course will be used in more advanced physics courses.

I am committed to fostering an environment for learning that is inclusive for everyone regardless of gender identity, gender expression, sex, sexual orientation, race, ethnicity, ability, age, class, etc. Please feel free to contact me via email or in person to let me know about any experiences you have had related to this class that have made you feel uncomfortable. I will continually strive to create inclusive learning environments and would therefore appreciate your support and feedback. I welcome emails or in-person communications to let me know your preferred name or pronoun.

Week by week topics and reading schedule

Week	Topics	Reading
Week 0	Intro	
Week 1	Motion in 1D	Ch 1: Measurement, Ch 2: Motion Along a Straight Line
Week 2	Motion in 2D	Ch 3.1,3.2: Vectors, Ch 4: Motion in 2D & 3D
Week 3	Forces	Ch 5: Force and Motion I, Ch 6: Force and Motion II
Week 4	Kinetic Energy	Ch 7: Kinetic Energy and Work
Week 5	Conservation of Energy	Ch 8: Potential of Energy and Conservation of Energy
Week 6	Momentum	Ch 9: Centre of Mass and Linear Momentum
Week 7	Rotations	Ch 3.3: Vectors, Ch 10: Rotation
Week 8	Angular Momentum	Ch 11: Rolling, Torque and Angular Momentum
Week 9	Gravity	Ch 13.1 - 13.4: Newton's Gravity
Week 10	Gravity	Ch 13.5 - 13.8: Orbits
Week 11	Oscillations	Ch. 15: Oscillations
Week 12	Review	

A course-by-course schedule will be posted on Brightspace. Important dates *and deadlines* can be found here: <https://calendar.carleton.ca/academicyear/>, including class suspension for fall, winter breaks, and statutory holidays.

Course Level Learning Outcomes

At the end of the course, students are expected to:

- At an introductory level, students will be able to recall and utilize foundational knowledge in calculus-based classical mechanics, including kinematics, dynamics, gravitation, and oscillatory motion. In more details, the students will be able to:
 - Analyse motion using calculus and linear algebra (vectors)
 - Understand Newton's laws of motion and be able to apply them to solve simple kinematic problems with constant force such as friction forces, tension forces, normal forces and gravitational forces.
 - Be able to analyze to solve problems using the concept of conservation of energy and momentum
 - Be able to analyze rotational motion using angular coordinates and conservation of angular momentum
 - Be able to analyze oscillatory motion such as the motion produced by a spring.
- students will have developed basic problem solving skills in calculus-based mechanics, and be able to use appropriately the tools of physics, calculus, and algebra.
- In the lab, students will be able to perform measurements following a given laboratory procedure and generate justifiable uncertainty estimates for experimental results.
- Students will have developed basic written communication skills for reporting lab work and their analysis of solved problems.

Assessments

Letter Grade Conversion

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

90%-100%	A+	67%-69%	C+
85%-89%	A	63%-66%	C
80%-84%	A-	60%-62%	C-
77%-79%	B+	57%-59%	D+
73%-76%	B	53%-56%	D
70%-72%	B-	50%-52%	D-
<50%	F		

Grade Breakdown

Weekly Assignment	20%
Reading Quizzes and in-class Evaluations	10%
Midterms	15%
Final Exam	20%
Lab Reports	25%
Tutorials	10%

Weekly Assignments (20%)

Assignments will be distributed weekly on Brightspace and will be due one week after distribution. During the week, one problem will be added, from the list of problems worked on in class. Students are encouraged to discuss concepts and strategies related to solving the assignment problems, but the submitted work must be your own.

Use of generative AI for doing assignments is strictly forbidden. The goal of the assignments is to develop your problem solving skills and reinforce your understanding of the material. Using AI in this context will defeat the purpose.

You are asked to upload your solutions to the assignments as a single pdf file on Brightspace before the due date. The worst assignment will be dropped from the final grade.

Reading Quizzes and in-class Evaluations (10%)

There will be reading quizzes at the beginning of the week and in-class questions during most classes. They will be short multiple choice questions to be answered using the Wooclap platform. You must attempt at least 50% of the questions to receive a non zero grade. Then the grade will be assigned based on the number of correct answers: 5% for less than $\frac{1}{3}$ of correct answers, 7% for less than $\frac{2}{3}$ but more than $\frac{1}{3}$ correct answers, and 10% for more than $\frac{2}{3}$ correct answers.

Midterm Exams (15%)

There will be two midterm exams during class time, both with equal weight. The midterms will cover only a portion of the material and will be similar in style to problem set questions. We will discuss the exams in more detail during class.

Final Exam (20%)

The final exam will be scheduled by Exam Services during the final examination period (Dec 12 - Dec 23) and will be 3h long. It will be summative (will cover all material seen in class) and closed book, but you will be allowed a formula sheet. More details will be given in class.

Labs (25%) and Tutorials (10%)

Labs are run independently from the lecture section. There are 3 lab sections under the supervision of lab superintendent **Igor Ivanovich**. During the lab timeslot you will either perform an experiment (a lab report will be due some time after the experiment) or participate in a tutorial during which you will work on problems with the assistance of the lab staff and TAs. A short test will be administered at the end of the tutorial. Further details can be found on your lab section Brightspace page.

Late and Missed Work Policies

If you are forced to miss part of the course for a short period of time (5 days or less) which will lead you to not submit a graded component of the course, you should advise me promptly and submit the [academic consideration form](#). If you need to submit this form more than twice during the term, you should consult with me

For longer term absence, you should discuss with me and submit the [longer-term accommodation form](#).

For missed labs and tutorial, arrangements should be made with the lab supervisor.

Weekly Assignments

One late assignment during the semester will be accepted without penalty if it is submitted within 3 calendar days from the due date. Otherwise the following penalty will be applied: 10% if submitted within one day of the due date, 20% if submitted within 2 days and 30% if submitted within 3 days. No assignments will be accepted after 3 days.

Midterm Exams

If one midterm is missed for valid reason by submitting an academic consideration form, the weight of that midterm will be applied to the other midterm. If both midterms are missed, a makeup midterm will be arranged and will carry the weight of both midterms.

Final Exam

Request for deferred final exam should be addressed to the [Registrar's office](#).

Learning Material and Other Course related material

Textbook for the course: "Fundamentals of Physics", Halliday & Resnick, Volume 1, 12th edition, Wiley.

Volume 2 of the text will be used in physics 1002.

Prices of the text:

Volume 1, physical copy, Carleton Bookstore	91.95\$
Volume 1&2, physical copy, Carleton Bookstore	153.95
Volume 1, ebook, Carleton bookstore	52\$
Volume 1&2, ebook, Carleton bookstore	57\$

Reading will be assigned from the text. Other texts, and other editions will have similar content, but might not match exactly.

Lab manual: The lab manual will be available on Brightspace.

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, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website ([Course Outline Information - Current Students](#)).

Statement on Generative Artificial Intelligence

Generative AI can be used to deepen and expand your understanding of the material by asking general questions about the material.

However, it cannot be used in any way when completing assignments or lab reports, besides basic grammar and spell check (e.g. Grammarly, Microsoft Word Editor). As mentioned above, assignments are training exercises given to build your problem solving skills and deepen your understanding of the material. Those are core learning objective of the course and using AI undermine this training by substituting for a lot of the thought process that is required to solve a problem your own.

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 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 Generative Artificial Intelligence (GenAI) tools when course assessment instructions indicate such use 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 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):

- In general the undergraduate Chair, which this year is also me
- The department Chair, [Kevin Graham](#)
- The [Office of the Dean of Science](#)

Note: You can also bring your concerns to [Ombuds services](#).