Course Outline
Physics 1003: Fall 2018

Introductory Mechanics and Thermodynamics

Introduction

Physics 1003 is an overview of mechanics and discusses laws of conservation in mechanics, oscillations, and thermodynamics, emphasising applications of physics in various engineering and computing applications. The course is calculus-based

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We recognize the Algonquin peoples as the traditional custodians of the land in which the campus is located. Carleton faculty, professional service staff, students, representatives and members are encouraged to acknowledge the First Peoples on whose traditional territory we work. Acknowledging territory shows recognition of and respect for the host nation, the *Kitchissippi Omàmiwininì Anishinabeg* (*Algonquin peoples of the big river,* in the Algonquin language).

Lectures will take place at 1305- 14.30 on Tuesdays and Thursdays in Southam Hall, Lecture Theatre B

Learning Objectives

1. Make you think
2. Teach you how to learn
3. Introduce you to calculus-based physics using problem solving

Notice that subject content is only number three on the list. The first two objectives are common to any degree subject, in any discipline. To flourish in a Higher Education environment, it is essential to be able to engage in independent learning.

The Course Basics

The course syllabus contains a lot of material, and we will move at a much faster pace than you may be used to from high-school. It is important that you keep up as new material is introduced. You should include time for review of lecture notes and solving of physics problems as part of the time necessary to

succeed. Physics is a subject where knowledge is acquired by *doing* problems yourself. Watching the instructor solve problems is not a substitute for this. You should note that a formula sheet for basic equations is provided. A strategy of memorization of formulae and "plugging numbers into equations" is NOT sufficient to pass this course. You are to apply your knowledge of basic physical principles to derive new equations to deal with specific situations.

cuLearn

This class is based around the cuLearn homepage for this class. All students must access cuLearn in to receive course information and carry out the online assignments. You should log onto the class website regularly to check for posted course information and check emails for information regarding the course.

Email

Every student must use their Carleton email in any communication to University academic staff. Emails sent from external e-mail accounts will **not** be answered (this is a University policy). Please do not forward your emails from Carleton connect accounts to external emails. The University will not be responsible if important communications from the University, including the class instructors and academic staff, are not delivered due to a failure in the forwarding process. E-mail to members of the academic staff should be treated as professional communications, and you should always quote your name, student number and course.

Lectures

Lectures are held from 13.05 – 14.25 on Tuesdays and Thursdays in Lecture Theatre B, Southam Hall. They are an important part of the course work and attendance is mandatory. Lecture notes will be posted online before the class as PowerPoint and PDF files.

I will also record the lectures to video, so you can replay them later if need be. Do **not** take this as an excuse to skip the lectures, as the recording is a pale imitation of the real thing. You should also be aware that the lecture recording system is NOT perfect and sometimes fails to record the class. So please don't count on getting video replay.

In Class Problems

Before each class, I will set a problem for you to solve on a sheet which will be posted online in cuLearn. When you come to class, it will be marked by another student, as I review the problem on the board. You will then give in the sheet, and I will record an attendance mark. There are 23 lectures where a set problem will be posed, and I will award a total of 5% of your final grade for participation. You will be able to obtain maximum attendance grade if you hand in the solutions for 19 of the 23 classes.

Handing in a sheet for another student who is absent will constitute an academic offense, both for the absent student and the student who is attempting to falsify the attendance record. Both students will be reported to the Dean of the appropriate faculty.

Lecture Timetable

The lecture timetable is in Appendix 1. The exact schedule of topics is subject to revision during the term. The definitive version will be posted on cuLearn.

Tutorials, Tests and Online Assignments

Tutorial Sessions alternate with laboratory experiments. A week before the tutorial, problems will be set. You are expected to attempt these questions and bring your solutions to the tutorial session. At the start of the tutorial session, there will be a 15- minute multiple choice quiz. This counts for part of the tutorial grade. If you arrive late to the tutorial, you will miss this quiz. A retake at anther time or date is not allowed, because we do not have the resources to do this. During the session Teaching Assistants will work through problems on the board as examples, and you will continue to solve the problems as group work. This session will last about 90 minutes. After this time, there will be a 45-minute test carried out under examination conditions. The test will be on similar topics to the problems worked on during the tutorials.

Attendance is **mandatory** at these tests, which are in place of a mid-term exam. If you are unable to attend a tutorial test, you must contact Dr Robinson immediately. There will not be any make up tests. Reasons for absence must be documented and must be presented before the end of the lecture course. The best 4 scores out of 5 tests will be used to determine your average grade.

Online assignments will be set in the weeks alternating with the tutorials. They will be tests based on the lecture coursework. These will always have a deadline of Mondays at 11.59 pm. The best 4 scores out of the 5 tests will be used to calculate the average grade. Students with a medical or other legitimate reason for missing an online assignment must contact Dr Robinson immediately. I will grant extensions if there are extenuating circumstances.

Tutorial Test and Laboratory Schedule:

Week Beginning	Lab and Tutorials Schedule
Wednesday 5th September 2018	**No Labs or Tutorials this week**
Monday 10th September 2018	Tutorials: Estimation Problems
Monday 17th September 2018	Lab 1 (Reaction Time)
Monday 24th September 2018	Tutorial Test 1
Monday 1st October 2018	Lab 2 (Motion on an Incline)
Monday 8thth October 2018	**Thanksgiving Holiday (No labs or tutorials this week)**
Monday 15th October 2018	Tutorial Test 2
Mon 22th October 2018	Fall Break (No labs or tutorials this week)
Mon 29th October 2018	Lab 3 (Spring Constant)
Mon 5th November 2018	Tutorial Test 3
Mon 12th November 2018	Lab 4 (Atwood's Machine)
Mon 19st November 2018	Tutorial Test 4
Mon 26th November 2018	Lab 5 (Thermocouple)
Mon 3rd December 2018	Review Sessions

Incentive Program

This course has been registered in the Incentive Program offered through the Centre for Student Academic Support (CSAS). CSAS Learning Support Workshops are designed to help students cultivate and refine their academic skills for a university environment. To earn X% marks towards attendance/participation you are expected to attend # of workshops throughout the term.

Learning Support Workshops for the Fall 2018 term will be available starting September 10th, 2018 and must be completed by **December 7th, 2018** to receive credit for the Incentive Program. To see the complete Learning Support Workshop schedule, please visit mySuccess via Carleton Central. You can also view your CSAS Workshop attendance history at any time by logging into mySuccess.

In addition to the CSAS Learning Support Workshops hosted on campus, CSAS offers several online workshops. If you are interested in participating in an online workshop, you can enroll through the CSAS website: carleton.ca/csas. Please also remember to review the Incentive Program participation policies here: carleton.ca/csas/incentive-program/.

If you have any questions related to the Incentive Program or the Learning Support Workshops, please contact the Centre for Student Academic Support at csas@carleton.ca or 613-520-3822.

Please note that CSAS track the participation of both the face-to-face and video workshops. They only pass the information to me at the end of term (after December 7th). **Your participation score on cuLearn does not update in real time when you complete a module or attend a seminar.**

Drop In-Centre

To help students with the material in the course, a lunch-time Drop-In Centre will be organized and held in the Lab. Senior undergraduate or graduate students will be there to help you to solve problems and prepare for tests and the final exam. We will open an internet poll to determine which opening times suit the schedules of the students in this course and the other physics courses, Physics 1001 and Physics 1007.

Prerequisites

Students in this course must have GRADE 12 U in Physics and Calculus (or equivalents). You must either have passed MATH 1004 (or MATH 1007) or MATH 1002, or you must be registered in these courses concurrently with this course. Otherwise students **must** check with Dr Robinson and obtain permission from the Physics Department to remain in the course.

Required materials

The required textbook is available at the University Bookstore

Textbook Title: Fundamentals of Physics
Textbook Edition: 11th (Loose leaf version)
Textbook Author: Halliday, Resnick and Walker
Textbook Publisher: Wiley
The ISBN number: 9781119459170

The same textbook is needed for Physics 1004 in the winter term. If you already have this book in the 10th edition, you do not need to get the 11th edition

You may be able to find second hand versions of the 10th edition textbook, as it was the course textbook for Physics 1003 for the last several years. However, before buying a second-hand copy, make sure that you are getting chapters 1-20 in the book. **There may be special editions for students who only took Physics 1004 and not Physics 1003, and these do not contain all the material for Physics 1003**. It is your responsibility when buying a second-hand textbook, to verify that it does contain the chapters that you need! You do not need to have the access code to the publisher's website.

Academic Accommodations

Requests for 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
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: **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: **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. **carleton.ca/pmc**

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 is 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**

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. **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**

Laboratory and Tutorial Schedule

Tutorials start the week of **September 10th, 2018.**

Labs start the week of **September 17th, 2018**.

All the experiments and tutorial tests will be held in **HP 4130**, unless otherwise specified.

You must attend the first lab session. You can only attend the section that you are registered in. All changes (exemptions, etc.) must be arranged with Ms. Rozina at the start of term. You must pass the laboratory component of the course to pass the entire course. If you have a documented reason for missing a laboratory session, you must contact Ms. Rozina **immediately**. A make-up session may be arranged at the end of term in these cases. If you do not have documentation, you will not be permitted to take a makeup session, and you will receive a mark of zero for that experiment.

All experiments must be handed in on the appointed day. The penalties for late submission of the lab reports are: for 1-7 days late, **-30%** of the grade. Reports submitted later than this will receive a mark of zero.

Every experiment will be preceded by an in-class pre-lab quiz. Read the lab information posted on cuLearn to prepare for these quizzes. **All** lab reports and quizzes will count towards your total lab grade for the course. The lowest quiz or lab grade will **NOT** be dropped.

You must retain a hard copy of all your course work (tests, lab reports, etc.) until the end of the term. In the event of any dispute over grades, we will need to see the work in question.

Lab #	Title	Type	Weight (%)
1	Reaction Time	Regular	20
2	Motion on Incline	Regular	20
3	Spring Constant	Regular	20
4	Atwood's Machine	Regular	20
5	Thermocouple	In-class	10
	Prelab quizzes	In-class	10

Laboratory Waivers

For those repeating the course. If the lab component of the course has been completed previously, then credit for this may be carried forward, and only the theory sections of the course need be repeated. This means that the Lab mark from your previous registration for the course will be used in calculating your final grade for this term. **Students must confirm their eligibility with the Lab Supervisor. This is not automatically granted, and so you must contact the lab supervisor to arrange it.** You are not excused from the cuLearn assignments or tutorial evaluations

Grades

The final course grade is calculated as follows:

Tutorial Tests (3 best scores out of 4) 15%

Online Assignments (4 best scores out of 5) 10%

In class problem hand in (19 out of 23 gives 5%) 5%

Attendance at 5 Workshops from Incentive Program 5% (1% per workshop attended)

Final Exam 30%

Laboratory 35% (See the weighting of individual experiments in the laboratory and tutorial schedule).

This marking scheme will be used to evaluate the performance of all students, unless there are special circumstances, such as illness. Requests to increase the weighting on the final exam to compensate for poor performance on work during the term will be denied, unless there are good reasons.

Passing Conditions

Students must pass *both* the lab course and the lecture course separately. Note: This requirement above will be **strictly applied**. A student will receive a maximum grade of (D-) if the lab is failed, no matter how good the marks from the lecture course are, or how high the total average is. Students will be given all information in the first lab session on the requirements for obtaining a passing grade in the laboratory course. **To pass the lecture course, you must attend the final exam.**

Students who, due to illness, did not write the final exam in the scheduled time, may apply for a deferred exam only if their term work in the lecture course material is over an average of 25%.

Academic Honesty Policy

The attention of all students is drawn to the section 12 of the Academic Regulations of the University:

calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/academicintegrity/

Any attempt to plagiarize the work of another is a serious academic offence. In this course, such offenses will result in a mark of zero for the online assignment, test, lab report or exam in question. A report will automatically be sent to the Dean of Science, for possible further disciplinary action. Knowingly allowing another student to copy your own work is also an academic offence and will be referred to the Dean's office.

Absence from Tests or Laboratory

Students are supposed to attend all the labs and tutorial tests in the assigned sections; in case of a genuine reason for absence, a student may write a test or do an experiment with another section, but only after obtaining permission from the lab-coordinator. The labs are operating at capacity, and there may not be sufficient places for you to carry out your experiment if you try to attend another session.

If a Lab was missed for a genuine reason, with documentation, arrangements for a make-up lab must be made with the lab-coordinator as soon as possible.

All travelling arrangements for the end of term should be made only after the exam schedule is announced. Travel plans do not constitute an adequate reason for a deferred exam, and the University will refuse any deferral request in such cases. This policy is not determined by the instructor, but by the Office of the Registrar. I do not control the exam scheduling and have no say in when the exam will be held.

Appendix 1: Lecture Timetable

Date	Class	Topic	
Thursday 6th Sept	1	Basic Physics skills. Error Analysis and Estimation	Ch 1
Tuesday 11th Sept	2	Description of motion using differential calculus	Ch 2 and 3
Thursday 13th Sept	3	Vector operators and motion	Ch 2 and 3
Tuesday 18th Sept	4	Motion in multiple Dimensions	Ch 4
Thursday 20th Sept	5	Force and Motion I	Ch 5
Tuesday 25th Sept	6	Force and Motion II	Ch 6
Thursday 27th Sept	7	Work and Kinetic Energy I	Ch 7
Tuesday 2nd Oct	8	Work and Kinetic Energy II;	Ch 7
Thursday 4th Oct	9	Power and Potential Energy	Ch 7 and 8
Tuesday 9th Oct	10	Conservation of Energy; non-conservative forces;	Ch 8
Thursday 11th Oct	11	Centre of Mass	Ch 9
Tuesday 16th Oct	12	COM of complex shapes; linear momentum	Ch 9 and 10
Thursday 18th Oct	13	Collision Processes	Ch 10
Tuesday 23rd Oct		Fall Break (no classes)	
Thursday 25th Oct		Fall Break (no classes)	
Tuesday 30th Oct	14	Rotational Motion	Ch 10 and Ch 11
Thursday 1st Nov	15	Rotational Dynamics, Rolling Motion	Ch 11
Tuesday 6th Nov	16	Angular Momentum. Stress and Strain; Young's Modulus;	Ch 11 and 12
Thursday 8th Nov	17	Gravitation and Fields I	Ch 13
Tuesday 13th Nov	18	Gravitation and Fields II	Ch 13
Thursday 15th Nov	19	Oscillations: Simple Harmonic Motion	Ch 15
Tuesday 20th Nov	20	Oscillations; damped oscillations; driven oscillations; waves	Ch 15 and 16
Thursday 22rd Nov	21	Waves: interference; phasors; standing waves	Ch 16
Tuesday 27th Nov	22	Heat and the First Law of Thermodynamics	Ch 18
Thursday 29th Nov	23	Heat Transfer Mechanisms	Ch 18
Tuesday 4th Dec	24	Second Law of Thermodynamics	Ch 18 and 20
Thursday 6th Dec	25	Review	
9th- 21st December		Exam Period	