

Carleton University
Department Of Physics

Phys 2401: Thermal Physics

Fall 2020

Course aim

This course introduces students to methods and concepts used in thermodynamics and statistical mechanics. It aims to lay the groundwork for applying these methods and concepts in other areas of physics and in real life settings.

Scheduled lectures

Wednesday and Friday, 16:05-17:25

Only about half will be held synchronous as will be announced via email and on CU-learn.

Office hours by appointment

Instructor and TA

Dag Gillberg, dag@physics.carleton.ca

TA: Carlos Henrique de Lima (carloshenriquedelima@cmail.carleton.ca)

Textbooks

Required reading: Physics for Scientists and Engineers (10rd Edition), Chap 14+19-22
Serway, Jewett

Additional material that will be available as pdf files on the class CUlearn page.

Supplementary material

Previous textbook: Physics for Scientists and Engineers (3rd Edition), Chap 16-20 Fishbane
Concepts in Thermal Physics, Second Edition Stephen J. Blundell and Katherine M. Blundell
ISBN: 9780199562107

Shroeder: An introduction to Thermal Physics

Sears, Salinger: Thermodynamics, Kinetic Theory, and Statistical Thermodynamics

Learning outcomes

At the end of the course, the student should be able to:

1. Demonstrate a firm grasp of fundamental principles of thermal physics by being able to
 - a. identify whether to approach a situation from a microscopic or macroscopic perspective
 - b. simplify and model real systems
 - c. predict thermodynamic properties of a system
2. Communicate, verbally and in writing, thermodynamic principles found in a lab or natural setting.
3. Follow current research in fields where thermal physics plays a key role.

Prerequisites

PHYS 1001 & 1002, **or** PHYS 1003 & 1004, (or PHYS 1007 & 1008 with average grade of B-)
MATH 1004 & 1104 **or** MATH 1002 & 1102.

Course structure and marking scheme

Lecture videos will be posted on CU-learn and might be unlocked by completing quizzes. Instructions and lecture availability will be announced via email. Synchronous lectures will be more problem based, and include in-class polling.

Marking scheme

- CU-learn quizzes 5%
- Assignments 35%
- Project 15%
- Midterm exam 15%
- Final exam 15%
- Oral exam 15%

Quizzes: These will be available at CU-learn.

There will be approximately eight **assignments** that will be posted on the course' CUlearn page with the associated deadline. Late assignments are penalized (unless there is a valid reason). Assignments are marked by the TA. The worst assignment will be ignored in the grade calculation.

Project: Students pick a topic related to the class: either choosing from 3 suggested topics, or propose a topic related to thermal physics and discuss with the course instructor. The project will include some sort of analysis, either using computer code, we will look at some Jupyter notebook examples in class (see Google Colab), or using an "excel analysis" or other spreadsheet. Can hand in project report either as pdf file, with figures from your results, or as a code notebook.

Midterm and final examination

90 minutes tests that will be written during a lecture slot. Note that this is planned to be done using the e-proctoring system, i.e. you need to connect via BigBlueButton and have your video camera turned on. Statement from the university:

Use of e-Proctoring system: This course has timed written assessments, which may consist of tests, midterms and/or final examinations. The Carleton University e-Proctoring system may be used in your assessments, and requires the use of webcams, microphones, and smartphones.

Oral examination

This will be a 15 minute interview with each student, with questions on material in the course and potential clarification on the assignment questions.

Copyright

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by the instructor and by students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including pdf files 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. You may not allow others to reproduce or distribute course materials. You may not make your own recordings of lectures or office hours. Students are not permitted to reproduce or distribute course materials publicly for commercial or non-commercial purposes.

Plagiarism and other forms of cheating

Working through problems is essential in developing understanding of thermal physics. Students are permitted to discuss concepts and strategies related to solving the homework assignments. All work handed in, however, **must be their own**.

Viewing or searching for solutions in any form before your assignment is submitted is forbidden and will be considered an academic offence. This includes online resources like Chegg, solutions manuals, examples posted at Carleton or elsewhere, or from any other type of unauthorized source. Using any such resource for an examination of any kind (laboratory report, assignment, midterm, etc) is considered **plagiarism**, even if only part of the solution is used.

For more information see [Reg. 19 of the Grad calendar](#)

Note that the university policy of penalties for plagiarism is significant:

First offence (2nd-year student or higher): A grade of F in the course.

Second offence: A grade of F in the course and a one-term suspension from studies.

Third offence: Expulsion from the University.

Deferred exams

Deferred exams are generally only granted to students who cannot take the regularly scheduled exam due to illness.

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

FND = (Failed, no Deferred) = student could not pass even with 100% on final exam

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.

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 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:

- 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

Text from <https://students.carleton.ca/course-outline/>

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

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. 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>

Assistance for Students:

Career Services: <https://carleton.ca/career/>

Academic Advising: <https://carleton.ca/academicadvising/>

Co-operative Education: <https://carleton.ca/co-op/>

Centre for Student Academic Support: <https://carleton.ca/csas/>

Writing Services: <https://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/>

Freedom of Information and Protection of Privacy:

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.

In accordance with FIPPA, please ensure all email communication with staff/faculty is 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.

Important Dates:

<https://calendar.carleton.ca/academicyear/>

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