

PHYS4409: Thermodynamics and statistical physics

Winter, 2023

Instructor: Hassan Easa (he/him)

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Website: <https://carleton.brightspace.com>

Class Time: Mondays and Wednesdays, 4:05 – 5:25 pm

Class Room: University Centre, Room # 279

First day of class: Monday January 09, 2023

Office: TBD

Office Hours: TBD

Teaching Assistant: TBD

Official Course Description

The three Laws of Thermodynamics, enthalpy, Helmholtz and Gibbs functions. Equilibrium statistical mechanics and its relation to thermodynamics. Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac statistics.

Prerequisites

PHYS 3701, MATH 2004, and MATH 3705 or permission of the department.

Required Textbook

An Introduction to Thermal Physics by Daniel V. Schroeder. This book was first published by Addison-Wesley, 2000.

Supplementary material

There are many other excellent textbooks covering some of the materials in this course such as:

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

Baierlein: Thermal Physics

Marks Distribution

Assignments: 40%

Midterm Examination: 20%

Final Examination: 40%

- Assignments will be posted on Brightspace, with the due date and time noted there. Assignments will be given roughly every other week. There will be approximately 6-8 assignments in total and please consult the TA about any questions regarding their marking. Working through problems is an essential part of developing a deep understanding of the material in this course. Students are encouraged to work together to understand the problems; however, the work handed in must be original. Late assignments will not be accepted unless permission is received from the instructor for documented reasons (illness, injury or other extraordinary circumstances beyond the student's control).
- The midterm exam will be 1.5 hours long and will be given during the regular class period.
- The final exam will be 3 hours long, given during the final examination period in April. The exact format of the final exam will be discussed further well in advance.

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 A = 85-89 A- = 80-84

B+ = 77-79 B = 73-76 B- = 70-72

C+ = 67-69 C = 63-66 C- = 60-62

D+ = 57-59 D = 53-56 D- = 50-52

F < 50

WDN = Withdrawn from the course

ABS = Student absent from final exam

DEF = Deferred

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.

Inclusive teaching statement

Science is for everyone. I am committed to fostering an environment for learning that is inclusive for everyone. All students in the class, the instructor, and any guests should be treated with respect during all interactions. I would appreciate any feedback related to class throughout the course.

The Faculty of Science EDI statement: <https://science.carleton.ca/about/edi/>

Academic Accommodations, Regulations, Plagiarism, Etc.

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. More information can be found here. 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.

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.

Addressing Human Rights Concerns

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the Department of Equity and Inclusive Communities at equity@carleton.ca

Religious Obligations

Please contact me 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, please review the [Student Guide to Academic Accommodation](#).

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/>

Accommodations for Missed Work

Carleton recognizes that these are unprecedented times during the COVID-19 pandemic and that students may be experiencing greater stress and other life factors that are not in their control. As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>

For Pregnancy

Please contact me 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, please review the [Student Guide to Academic Accommodation](#).

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 me 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 [Senate Policy on Accommodation for Student Activities](#).

Academic Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. Carleton University provides support such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity. (adapted from Carleton University's Academic Integrity Policy, 2021). Examples of actions that do not adhere to Carleton's Academic Integrity Policy include:

- Plagiarism
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignments and exams

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students. For more information, please see [Carleton's academic integrity page](#).

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).

Assistance for Students

Academic and Career Development Services Writing Services: <https://carleton.ca/career/>
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/>

1 Important Dates

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

<https://carleton.ca/registrar/registration/dates/>