

Thermal Physics

PHY B52 - Winter 2017

Lecture Tuesday 1:00 pm - 3:00 pm IC 120
Tutorial Thursday 3:00 pm - 5:00 pm IC 208

"A theory is the more impressive the greater the simplicity of its premises, the more different kinds of things it relates, and the more extended its area of applicability. Therefore the deep impression that classical thermodynamics made upon me. It is the only physical theory of universal content which I am convinced will never be overthrown, within the framework of applicability of its basic concepts."

Albert Einstein

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Course Website: portal.utoronto.ca

Office Hours

Tuesday	03:30 pm - 04:30 pm
Wednesday	01:30 pm - 03:30pm
Thursday	10:30 am - 12:30 pm

Course Description and Requirements

The course will start with the idea of thermal equilibrium; an extension to the concepts of energy, heat, and work; and the definitions of temperature and entropy. We will continue with a study of mechanical and chemical equilibrium; the laws of thermodynamics; and examples and applications to heat engines, refrigerators, free energy, and chemical thermodynamics. We will conclude the course with an introduction to the statistical concepts which underlie macroscopic thermodynamics and provide the bridge between the microscopic and macroscopic pictures, using quantum ideal gases as our example.

By the end of the course you will be able to:

Identify and define the basic vocabulary used in Thermodynamics

Required Materials

Textbook: *An Introduction to Thermal Physics* by Daniel V. Schroeder (Pearson 2000)

The schedule provided at the end of this document indicates the chapters and sections you must read before each lecture. The textbook also provides the conceptual questions and detailed problems that will be the subject of the weekly problem sets, reading quizzes, and tutorial quizzes.

Calculator: A scientific non-programmable calculator is required.

Grading Scheme - Preliminary

Component	Points	Due Date
Reading Quizzes	5	Ongoing (Pre-Lecture)
Concept Maps	5	Ongoing (Post-Lecture)
Outcome Reflections	5	Ongoing (Post-Tutorial)
Tutorial Work	15	Ongoing (Weekly Tutorials)
Test #1	15	Week 5 (Tentative)
Test #2	20	Week 9 (Tentative)
Final Examination	35	Exam Period (April 05 - 22)

Grade Components

Reading Quizzes (5%)

Each week on the course website you will be asked a set of questions from the assigned readings for the upcoming week. You will have until 11:55 pm on Monday to submit your answers. Each quiz is worth 5 points, and your final grade is the total sum of all quizzes up to a maximum of 50 points. Use the Class Schedule found at the end of this document to prepare for the lectures and reading quizzes.

Concept Maps (5%)

At the start of each Tuesday lecture discussion and based on the previous week of lecture discussions you will submit a concept map. Each map is worth 2 points, and your final grade is the total sum of all maps up to a maximum of 20 points. There is an extra 2% bonus for each student that submits, no later than the last tutorial session, a Full-Course Map that includes all the course material from Chapters 1 - 6. All maps must be well designed in a useful, readable, and aesthetically

Test #1 (15%)

This 90-minute long test will be scheduled **tentatively** during Week 5 . Content includes all lecture discussions, textbook readings, and problem sets up to and including the material discussed in Week 4 .

Test #2 (20%)

This 2-hour long test will be scheduled **tentatively** during Week 9 . Content includes all lecture discussions, textbook readings, and problem sets up to and including the material discussed in Week 8 .

Both tests will include conceptual questions in multiple-choice or short-answer format, and detailed problems. The only aids allowed are your non-programmable scientific calculator, and a hand-written, double-sided, and letter-sized aid sheet. Note that photocopies or computer printouts are not allowed.

Final Examination (35%)

The final examination will be scheduled during the exam period of April 05 - 22 . Content for the final examination includes all the topics discussed in the assigned textbook readings, lecture presentations, problem sets, and tutorial quizzes. The final examination will be 3 hours long and the format includes conceptual multiple-choice and short answer questions as well as detailed problems. The only aids allowed are your non-programmable scientific calculator, and one hand-written, double-sided, and letter-sized aid sheet. Please note that photocopies or computer printouts are not allowed.

Class Policies

Absences

In order to ensure fairness in the assessment of all students, there will be no makeup options for tutorial work or the tests. In the case of a valid and documented problem that supports an absence to a tutorial, the grade will be calculated on the basis of all other work. In the case of a valid and documented problem that supports an absence to the first test, the second

In-class Conduct

Lectures start at 1:10 pm and end at 3:00 pm. Tutorials start at 3:10 pm and end at 5:00 pm. Late arrival or early departure from class is inappropriate and disruptive so please be considerate.

Regarding anything that you want to use in the classroom: if you are not using it to perform a task specifically related to what we are doing in class at that very

Class Schedule

This schedule is *tentative* and might change during the term in order to accommodate for variations in the lectures in response to performance and feedback from the students.

Some topics might be removed and others added to adjust for va