Physics 313 Course Information (Fall 2008)

Time and place: HEBB 12, Mondays, Wednesdays and Fridays, 11-11:50am.

Instructor: Joanna Karczmarek (office: Hennings 280, office phone: 2-2929, joanna@phas.ubc.ca)

TA: Chung-Yu Lo (office: AMPEL 145, office phone: 2-4334, cylo@phas.ubc.ca)

Office hours will be posted on the course website. Any changes in those will be posted to the website as well. Please contact me if you require an individual appointment.

Course web-page: http://www.physics.ubc.ca/~joanna/phys313

The website will be updated with all in-class handouts (homework, etc...), deadlines, test dates and additional study material. You will want to check it periodically, especially if you miss a class.

Required textbook: 'An Introduction to Thermal Physics' by Daniel V. Schroeder, 1st edition. Suggestions for other readings will be posted on the website when appropriate.

The final grade will be computed as follows:

Problem Sets	20%
Test 1	10%
Midterm	20%
Test 2	10%
Final Exam	40%
Total	100%

How the course will work

There will be weekly Problem Sets. Every week, most likely on Wednesday, you will get a handout with a brief summary of last week's important concepts and a Problem Set to practice those concepts.

The Problem Sets will be due one week after they are assigned, at the end of class. Late Problem Sets will not be accepted, as I will be posting solutions (on WebCT) right after the due date. Problem Sets will be graded using the attached grading rubric. Please read the rubric carefully.

I will ignore your worst Problem Set when computing the average.

There will be a mid-term, and two shorter tests, all to be written during regular class time, and a 2.5 hour final exam.

Your learning is the whole purpose of this course. I welcome your feedback at anytime; if there is anything about the course that is interfering with your learning, please do let me know. A few weeks into the course I will be doing a mini-course evaluation, and I will do my best to accommodate your concerns.

Please yell if I speak too fast, or scribble illegibly on the board.

Syllabus and course objectives

This course is an introduction to thermodynamics and statistical mechanics. We will discuss the basic concepts of thermodynamics: temperature, heat, entropy, free energy, etc... and learn how these can be used to study a variety of real life applications. We will also see how the universal laws of thermodynamics arise from statistical mechanics, by understanding the connection between disorder and entropy. As examples, we will study some many systems including the ideal gas, the Einstein solid, the paramagnet, black body radiation, and Fermi gases, and their applications.

The goal of the course is to acquire a conceptual understanding of thermal physics, and be able to apply this understanding to solve problems in a large variety of theoretical and real-life systems. In particular, you should:

- develop an understanding of the the basic concepts of thermodynamics (temperature, heat, entropy, free energy, etc...) and of the laws that govern them;
- develop an appreciation of the universality of the laws of thermodynamics;
- understand and be able to analyze qualitatively a variety of real life applications of thermodynamics, from phase transitions to engines, refrigerators and batteries;
- understand the interplay of thermodynamics and statistical mechanics: how the universal laws of thermodynamics arise from stat mech via the connection between disorder and entropy;
- understand and be able to apply to a new system the basic machinery of statistical mechanics (how to sum over all states with the appropriate weighting, and how to extract thermodynamic quantities from a stat mech calculation);
- be able to analyze several classical and quantum statistical systems (ideal gas, Einstein solid, paramagnet, black body radiation, Fermi gas) and understand their role in real life applications.

We will cover (approximately, time permitting) the following parts of the textbook: sections 1.1-1.6, all of chapters 2, 3, and 4, section 5.1-5.3, chapter 6, sections 7.2-7.4.

Assuming we have time at the end, I will spend at least one lecture talking about modern problems in thermal physics, such as the question of Black Hole entropy.

Missed work

Late Problem Sets will not be accepted for credit under any circumstances. If you do not hand in your Problem Set on time, you will get a zero on that Problem Set.

In exceptional circumstances the zero you get on a late Problem Set will not count towards your grade. I will require advance notice of such circumstances, a proof of the emergency (doctor's notes and police records are good proofs), and you must still finish the Problem Set. Excuses such as 'I was really busy with other courses' will not be accepted.

There will be no make-up midterms and tests. If you miss a midterm or a test for a valid reason (proof of illness, a family emergency), the other tests and the final will count for more to make up the total.

If a scheduled test falls on one of your religious holidays, please let me know as soon as possible so that I can make alternative arrangements. A notice of at least two weeks is required.

A note on plagiarism:

You are welcome to discuss your homework with your classmates, and figure out how 'the problem works', but everything you turn in must be your own work, in your own words, and in 'your own equations'.

UBC takes academic misconduct (this includes copying of homework, cheating on exams and plagiarism) very seriously, and the penalties are stiff. Please check pages 48-49 and 54-55 of the calendar for official university regulations.

Turn over for the Grading Rubric. $\longrightarrow$