Physics 115: Statistical Mechanics

Joint Science Department — Spring 2008
TTh 1:15 PM — Keck 101

Professor Steuard Jensen

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Office Hours: M **1:30–2:30**–3:30; T 3–4; W 10:30–11:30; Th 3–4, or by appointment.

Course description:
In this course you will learn to bridge the gap between the simple physical systems considered in most of the curriculum and the complicated systems of enormously many particles that we encounter in the everyday world. We will explore both the thermodynamic approach (based on macroscopic properties of a system) and the statistical mechanics approach (based on a probabilistic treatment of large numbers of atoms) to the subject. A number of class examples will make use of computational or numerical methods.

Textbook: *An Introduction to Thermal Physics* by Daniel Schroeder
Discussion and handouts on **Sakai:** https://sakai.claremont.edu:8443/portal
Website: http://faculty.jsd.claremont.edu/sjensen/teaching/classes/phys115/

Midterm Exams: There will be **two take-home exams** during the semester: one in late February mainly covering chapters 1–2 (but possibly getting into chapter 3 if we're quick), and one in April probably covering chapters 3–6. I will give more details as the exams approach.

Cumulative Final Exam: Tuesday, May 13, 2:00pm–5:00pm

Grading: Your work will contribute to your final grade with the following weights:

2 Midterms:	20%, 25%
Homework & Class Participation:	20%
Final Exam:	35%

Grades may be scaled up, but never down. You are welcome to ask me for your overall grade at any time. The correspondence between percentages and letter grades is as follows:

A	A-	B+	B	B-	C+	C	C-	D+	D	F
92–100	88–92	84–88	80–84	76–80	72–76	68–72	64–68	60–64	52–60	< 52

Grading philosophy
In this class, the focus in grading is on your methods, explanation, and understanding, not simply on whether you got the right answer in the end. You can expect substantial partial credit if you make an effort. The details are on a separate handout. Pay special attention to the fact that part of your grade depends on the *clarity* of your work.

Homework policies
Unless I announce otherwise, homework will be **due Tuesdays in class at the beginning of class**. I strongly encourage you to discuss the assignments with other students in the class, but all work that you turn in must be your own: do not simply copy someone else's work. Also, I ask that you make a serious effort to start each problem on your own before talking to your classmates. Late homework assignments will receive half credit and should be turned in with the following week's assignment. Assignments over one week late will not be accepted. Your lowest homework score will be dropped from your final grade.

If you feel that any grade on a homework or an exam is unfair, you may ask me to **re-grade** the problem. (Not all grades go up; some go down.) I don't expect any issues of academic honesty to arise, but I will follow your campus policy in cases of suspected cheating on homework or exams. That certainly means zero credit for that assignment and may also include reporting the issue to your Dean of Students or Registrar.

Class discussion and presentations
This is a small class, so it would feel a bit silly for me to spend the whole time lecturing as if there were fifty of you. I expect to do some of that, but I also expect that much of the discussion in class will be driven by you and your questions about the material. With that in mind, it is important that you complete the assigned reading before class and come prepared with questions. While the broad outlines of the subject are well-defined, I hope that together we can choose examples and applications that are of the greatest interest to you.

As one way of engaging with the material during class, most weeks you will spend some time at the end of class on Thursday discussing how to begin one of the more interesting or challenging homework problems. At that time, I will ask for a volunteer to give a ten minute presentation explaining the solution at the start of class the following Tuesday. (The fun of volunteering will be shared as equally as possible over the course of the semester.) [I reserve the right to adjust this plan as necessary.] Your participation in these activities will form part of your homework grade. Please let me know if you must be absent (in advance if possible).

Tentative schedule: In general, we will follow Schroeder's textbook. It is likely that we will not have time to cover every topic in the book, so I expect to omit sections 1.7, 4.3–4, 5.4–6, and 8.1. If we are particularly efficient, we can decide as a class what other topics to return to or to explore elsewhere.