Hi Tiffany,

Here's mine:

**Physics 353: "Statistical Dynamics"**

*Ludwig Boltzman, who spent much of his life studying statistical mechanics, died in 1906, by his own hand. Paul Ehrenfest, carrying on the work, died similarly in 1933. Now it is our turn to study statistical mechanics. Perhaps it will be wise to approach the subject cautiously.*


**Instructor:** Eric Corwin <ecorwin@uoregon.edu>

**Office Hours (Wil 374):** TBD, or by appointment

**GTF Contact Information and Office Hours:**

Francesco Arceri <farceri@uoregon.edu>, TBD

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**Lectures:** Tuesdays 10-10:50am in Wil 110

**Topics and Aims:**

Physics 352 and Physics 353 cover Statistical Mechanics and Thermodynamics. Statistical Mechanics deals with the properties of many-body systems – gases in a star, electrons in a metal, molecules in a soap film – and reveals how “simple” properties such as temperature and phases of matter emerge from seemingly overwhelming complexity. Statistical mechanics is extremely useful not only within physics, but also beyond, and we'll see in the course connections to chemistry, biology, information theory, and more. Thermodynamics deals with thermal energy, and can be considered a topic in itself, but becomes much clearer and more powerful if thought of as a subset of statistical mechanics. Of all the “core” topics in physics (the others being mechanics, electromagnetism, and quantum mechanics), we and many others find statistical mechanics to be the most fascinating! In case you’d like to see how Physics 352-3 fits into the overall learning objectives of the Physics major, please see [https://provost.uoregon.edu/sites/provost2.uoregon.edu/files/phys-learning-outcomes.pdf](https://provost.uoregon.edu/sites/provost2.uoregon.edu/files/phys-learning-outcomes.pdf).

Other goals: We will develop reasoning and problem-solving skills. The problems encountered in this course are less transparent than those in introductory courses,
and tackling them helps us practice and expand our analytic abilities. An even broader aim of the entire Physics 351-3 series is to enable students to understand some of the issues and excitement of contemporary scientific research; we’ll apply this directly in the “Colloquium” exercise for the course. You’ll hopefully find, having explored optics and statistical mechanics, that doorways to a large fraction of current-day science are open to you.

Topics

- Thermodynamic work and heat engines (Chapter 4 of Schroeder)
- Phase transitions (Chapter 5 of Schroeder)
- The ideal gas, in detail (Chapter 6 of Schroeder)
- Quantum Statistics (parts of Chapter 7 of Schroeder)
- The Ising model (parts of Chapter 8 of Schroeder)

Textbook

*An Introduction to Thermal Physics* by Daniel V. Schroeder.

Assignments and Grading

**Reading Quizzes (5%):** Reading quizzes will *precede* many classes and will often have required "reading quizzes" associated with them. The reading quizzes will be assigned via Canvas and will be due 1 hour before the start of class. The reading quizzes are “open book” – i.e. you can look back at the text – but we strongly suggest first trying mentally to answer each question without consulting the book, to develop and assess your understanding.

**Missed Reading Quizzes.** We anticipate that people may miss a few classes due to illness or other unanticipated events, and we also anticipate that a few of the reading quiz questions will be unclear. We will therefore re-scale the reading quiz scores so that 90% becomes 100% (with a ceiling of 100%).

**Required minimum score.** The reading quizzes count for a small fraction of the overall grade, but keeping up with readings will help elevate the level of in-class discussion for everyone. Therefore, we will incentivize this by setting at the end of the term any overall reading quiz score below 50% (before re-scaling) to zero, i.e. requiring a minimum reading quiz score of 50%.

**Colloquium Report (5%):** One of the goals of this course is to guide you on your journey to becoming independent scientists. To this end it is important to expose yourself to contemporary research by going to the departmental colloquia or other similar talks. For this assignment you will write a short report, around 400-800 words, about any one of this term’s Physics Colloquia. More details can be found in the
specific assignment.

**Homework (20%)**: Completing and understanding homework is perhaps the most important part of the course (though not the easiest to assess). You’ll learn a lot by doing and thinking about the homework problems. There will be homework assignments approximately every week. You are encouraged to discuss the questions with others and to work with others, but of course, the work you submit should be your own. Solutions will be posted – study these. No late homework will be accepted. In this course we'll try out a novel grading scheme for homework, designed to encourage you to fully understand any mistakes that you may have made and to internalize the problem solving methods.

**Quizzes (40%)**: There will be short quizzes nearly every week, on Fridays. We’ll use these to assess understanding of key points without the heavy weight of an exam. In addition to relying on all of your knowledge of physics, the quizzes will also revisit homework problems. Each student’s lowest quiz score will be dropped from the overall total. There won’t be any make-up quizzes; if you miss one, this will be the quiz dropped from your overall grade calculation.

**Final Exam (30%)**: The final is scheduled for 10:15 Wednesday, June 12. This will be a cumulative test of everything that you know about statistical and thermal physics.

**Overall Grade**: A=[88,100); B=[76,88); C=[64,76); D=[55,64); F=[0,55]. *Note that these are minimum guarantees, which I may (likely) choose to loosen.*

**Absences**: Students with a serious and well-documented reason for missing an assignment or exam should contact me. If you contact me in advance of the missed work then it will be much more likely that we can work out a favorable agreement. Please see the descriptions of quizzes and reading quizzes for policies on missing any of those.

**How to Do Well in the Course**

**Plan ahead ans start early!** This applies to everything in the course - homework, reading assignments, and general studying. It will be crucial to keep up with the course and not fall behind; later topics build on earlier ones. Homework assignments, especially, will require considerable time spent thinking – the majority of your learning will come from this.

**Make use of resources!** If you have questions about lectures, assignments, readings, or other matters, come to office hours with questions! Also, we encourage communication by email or canvas (but won't promise to answer outside of normal work hours).

**Sleep!** Many studies show that sleeping helps memory and understanding.

**Student Conduct and Academic Integrity:**
Mutual respect in class is paramount. Academic Misconduct, as defined in the Student Conduct Code <https://studentlife.uoregon.edu/conduct>, including cheating, fabrication, facilitating academic dishonesty, and plagiarism, devalues the reputation of our institution, its faculty, its students, and the degrees we offer. Moreover, academic misconduct is particularly unfair for the students who do their work with integrity and honor. Violations of the student conduct code result in the incident being included on your student conduct record and can result in a failing grade on any course work related to the violation or a failing grade in the course. Every effort will be made in this class to deter dishonesty through classroom procedures. Suspected academic dishonesty will be reported.

**Campus Resources to Support Learning**

**Tutoring and Academic Engagement Center** <https://engage.uoregon.edu/services/> Drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located in the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu.

**Counseling Center** Call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541)346-3227.

**Accessible Education Center** The University of Oregon is working to create inclusive learning environments. The instructor believes strongly in creating inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify us as soon as possible. You are also encouraged to contact the Accessible Education Center. If you are not a student with a documented disability, but you would like for us to know about class issues that will impact your ability to learn, we encourage you to come visit during office hours so that we can strategize how you can get the most out of this course. Located on the 1st Floor of Oregon Hall (541) 346-1155, uoaec@uoregon.edu.

**Center for Multicultural Academic Excellence (CMAE)** Their mission is to promote student retention and persistence for historically underrepresented and underserved populations. We develop and implement programs and services that support retention, academic excellence, and success at the UO and beyond. We reaffirm our commitment to all students, including undocumented and tuition equity students. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu.

**The UO Access Shuttle** An on-campus ride service provided at no cost to students with conditions that limit mobility. More information and a sign-up form can be found on the parking & transportation department website: https://parking.uoregon.edu/content/access-shuttle.