

Physics 831 – Statistical Mechanics I

Spring 2009

Phys 831 Statistical Mechanics I is a graduate level course in the theories of thermodynamics and statistical mechanics. We will discuss the foundations and relationships of both theories, and survey various applications.

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Class Hours: TR 11:00 – 12:15, Physics 210

Office Hours: Wednesday 3-5 PM

Webpage: <http://www.people.virginia.edu/~cas8m/classes/phys831/>

Includes links to lecture notes, the homework assignments, and homework solutions.

Texts: RK Pathria, *Statistical Mechanics*, 2nd edition

LE Reichl, *A Modern Course in Statistical Physics* (either edition)

I will use Reichl for thermodynamics, and Pathria for statistical mechanics proper. It is not necessary to have a copy of Reichl, but you may find it useful.

I hope to cover Chapters 2-4 of Reichl and Chapters 1-9 of Pathria.

Additional resources:

Callen, *Thermodynamics* (More extensive discussion of thermo)

Huang, *Statistical Mechanics* (Another popular graduate text)

Garrod, *Statistical Mechanics and Thermodynamics* (Graduate text with many examples)

Reif, *Fundamentals of Statistical and Thermal Physics* (Undergrad text)

Kittel and Kroemer, *Thermal Physics* (Undergrad text)

Course Outline:

- I. Thermodynamics
- II. Applications of thermodynamics
- III. Ensemble theory and applications
- IV. Quantum gases
- V. Interacting systems

Grading:

Homework 30%

Your lowest score will be dropped if you complete the course evaluation at the end of the semester

Midterm exams 20% each

Final exam 30%

Homework:

Assignments will be due weekly, normally on Thursdays. Students are encouraged to work together, but should write up their solutions independently. Assignments are due at the beginning of class. Late assignments will be assessed a 10% penalty, and will be accepted until the solutions are posted, typically on the following Tuesday. Assignments turned in after that will require approval from the instructor and will likely suffer a significant penalty.

Exams:

There will be two midterm exams and a final exam. The first midterm will be held in class February 17. The second midterm will be a take-home exam offered during the week of March 23. The final exam will be in class on Thursday April 30 from 9:00 AM to noon.