

Thermodynamics & Statistical Mechanics

Spring 2017 PHY 2541 (Section 11309)

Tuesday/Thursday 9:30am—10:50am in 106 Allen Hall

Instructor: Roger Mong
Email: rmong@pitt.edu
Office: 202 Allen Hall
Office Hours: Tuesday 11—12am
Thursday 11—12am
& By Appointment

References

R. K. Pathria and P. D. Beale, "Statistical Mechanics"
H. B. Callen, "Thermodynamics and an Introduction to Thermostatistics"
Kerson Huang, "Statistical Mechanics"

Course Description

This course will cover the statistics of interacting particles, phases and phase transitions.

Topics include:

Classical Thermodynamics: Heat, work, entropy, heat engines, equations of state.

Ensembles, Partition function, equivalence of ensembles.

Quantum statistical mechanics, density matrix.

Paramagnetism, symmetry-breaking, mean-field theory.

Bose statistics, Bose-Einstein condensate, blackbody radiation, phonons.

Fermi statistics, Fermi degenerate gas.

If time permits, we may cover

Shannon entropy, von Neumann entropy.

Eigenstate thermalization hypothesis, ergodicity breaking.

Homework Policy

Homework are due a week after being posted/handed out, at the *beginning* of class. Homework must be clearly written out and presented in an organized manner—no credit will be given out if the solutions are difficult to read! Students must contact instructor regarding late homework prior to the due date. Students may discuss homework problems with each other, but homework solutions must be written individually. If students do work together, they must acknowledge each other on their homework.

Late homework may be accepted for partial credit. Homework will not be accepted after the solutions have been posted.

Grading

50% Homework
20% Midterm
30% Final

Schedule

First day of class is Thursday, Jan 5. There will be no class on March 7, 9 (Spring Recess), and 14, 16 (tentatively cancelled). The last class is scheduled on Thursday, Apr 20.

The midterm exam will take place Thursday, Feb 23.

The final exam will be scheduled in the week of Apr 24—28.

University Policies

Academic Integrity

Students in this course will be expected to comply with the *University of Pittsburgh's Policy on Academic Integrity*. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Statement on Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.