Thermodynamics and Statistical Mechanics

Phys 370 Course Information - Spring 2009

Instructor: Jeff Greensite − Thornton 304, 338-1600, greensit@stars.sfsu.edu

Office Hours: TBA

Prerequisites: Phys 240 (Physics with Calculus III), Phys 320 (Modern Physics I), and Math 228 (Calculus III)

Text: *Thermal Physics* by Schroeder.

CONTENT: We will cover the basic elements of thermodynamics and statistical mechanics. This includes the concept of entropy and the first, second, and third laws of thermodynamics, with illustrations drawn from ideal gases, the Einstein model of solids, and paramagnetism. We will cover the elements of "classical" thermodynamics, i.e. heat engines and the Carnot cycle, as well as free energy, chemical potential and phase transitions. The crucial concepts of statistical mechanics (Boltzman distribution and partition function) will be introduced towards the end of the semester, along with the special features of identical particles (bosons and fermions). Blackbody radiation, the Debye theory of solids, and Bose-Einstein condensation will be treated as time permits.

COURSE ORGANIZATION:

Lectures: Tu and Th 15:35-16:50 in TH 425.

Homework: There will be eleven homework assignments to be handed in during the semester. You may ask me for assistance during office hours. Otherwise, your homework solutions should be your own work.

Exams: There will be a midterm exam and a take-home final. These may be either in-class or take-home, or a little of each.

Grades:

1. Final - 45%
2. Midterm - 35%
3. Homework - 20%