

Eastern Nazarene College

PY 412 Statistical Thermodynamics

Fall 2007

Instructor: John U. Free

Course Goals:

In our study of the thermal properties of matter, we will need to make use of the statistical mechanical formalism developed in the last 100 years. We will study thermodynamics, statistical mechanics, and quantum mechanics in a unified approach that should give you a feeling for the nature of the macro and microscopic behavior of atomic systems.

Texts:

Course:

Kittel, **Thermal Physics**, Wiley, NY 1969

Reference:

Reif, **Statistical Mechanics and Thermodynamics**, McGraw-Hill, NY 1965

Jackson, **Equilibrium Statistical Mechanics**, Prentice Hall

Fermi, **Thermodynamics**, Dover, NY

Lee, et. al. **Statistical Thermodynamics**, 2nd ed., Addison Wesley, Reading, 1973

Lipschutz, **Probability**, Schaums Outline Series

Lapin, **Probability and Statistics for Modern Engineering**, PWS-Kent, 1990

Homework Assignments:

Homework problems that will reinforce the concepts of Statistical Mechanics and Thermodynamics will be assigned each week. The problems assigned are considered to be the minimum amount of work needed to master the material. Homework assignments must be presented for grading on time, as no late homework will be accepted for credit.

Project:

You will be required to perform 4 experiments during the term. You will have two or three weeks for each lab. The first week you will perform the experiment and the second week you will retake any data you need and write up the lab the third week.

Monte Carlo Simulations of a magnetic system

Nuclear Magnetic Resonance

Electron Spin Resonance

Temperature Dependence of Semiconductor and Hall Effect

Superconductivity

Exams:

There will be three exams during the semester. The exams will be in two parts: an in class part and a timed take-home open book part. The exams will be given on:

First Exam	March 17
Timed take-home	week of March 13
Second Exam	May 3
Timed take-home	week of May 1
Third Exam	May 23-25
Timed take-home	week of May 15

Final:

There is a multiple choice final exam. The questions are taken from old GRE exams.

Grading:

Homework	35%
Exams	35%
Project	20%
Final exam	10%