

PHYSICS 4302

Statistical and Thermal Physics (Spring 2009)

Schedule: MWF, 2:00-2:50 in Sci 112

Instructor: Mahdi Sanati, m.sanati@ttu.edu

Office and office hours: Sci 46, open door policy

Course Objectives and Coverage: This is a course for undergraduate students in physics. It is also open to interested students in engineering, chemistry, mathematics, and other fields. The purpose of this course is to introduce students to introduction to probability, statistical mechanics, and thermodynamics. Specific topics in probability include random variables, joint and conditional probability densities, and functions of a random variable. Concepts in statistical mechanics include macroscopic variables and thermodynamic equilibrium, fundamental assumptions of statistical mechanics, and microcanonical and canonical ensembles. First, second, and third laws of thermodynamics. Numerous examples illustrating a wide variety of physical phenomena such as magnetism, polyatomic gases, thermal radiation, electrons in solids, and noise in electronic devices

Expected Learning Outcomes: After completing this course students should (1) have a working knowledge of the foundations, techniques and key results of statistical mechanics and thermodynamics; (2) be able to comprehend their basic applications at the research level, e.g., in research articles; (3) be able to read any other related statistical and thermal physics material as they need it.

Text: “*Statistical Physics*”, by Mandl, John-Wiley, Second Edition. We will follow the material from the textbook rather closely, but departures from it occur. Therefore, I encourage you to take notes.

Learning Assessment: Certain problems on the exams will explicitly require facility with the course objectives and be used as learning assessments tools.

Homework: Problem sets are assigned for each chapter. Part of these problems will be used in your exams. The grades on your exams reflect how well you can do the homework problems on your own.

Exams: three midterm exams (25% each), final exam (25%)

Grades: 100-A-88, 87.9-B-76, 75.9-C-64, 63.9-D-50, 49.9-F-0

Attendance: Required, except for excused emergencies. Each recorded absence counts as -1% and will be deducted from the course total.

Any person who, because of a disabling condition may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible, so that necessary accommodation can be made. Proper documentation must be presented from the Dean of Students' Office.