Statistical Mechanics

PHYS4600.01, Fall 2025

I. General Class Information

Class schedule: T/Th, 10:30 – 11:45 AM, Higgins 275
W, 3:00 – 3:45 PM, Higgins 260

Office hour: W, 5:15 – 6 PM, Higgins 330A
Th, 4:00 – 4:45 PM, Higgins 210

II. Rationale and Goals

This is a senior-level course for physics majors. It will offer a general survey on the methods of statistical mechanics to understand the physical properties of many-particle systems. The topics are summarized below as they will be taught week by week.

Topics	Weeks through the semester	Chapters in Fitzpatrick
Probability theory	1	Chapters 1 and 2
Statistical Mechanics	2	Chapters 2 and 3
Heat and Work	3	Chapter 4
Statistical Thermodynamics	4	Chapter 5
Classical Thermodynamics	5, 6	Chapter 6
Multiphase Systems	7, 8	Chapter 7
Applications of Thermodynamics	9, 10, 11	Chapter 8
Chemical Equilibrium	12	Chapter 9
Quantum Statistics	13, 14	Chapter 10

III. Required Background

The student must have a working knowledge of advanced calculus and introductory quantum mechanics.

IV. Course Readings

Required text: "Thermodynamics and Statistical Mechanics" by Richard Fitzpatrick
Suggested text: "Fundamentals of Statistical and Thermal Physics" by Frederick Reif

V. Canvas

All information for the course including announcements, discussions, up to date syllabus, assignments and grade will be posted at the Canvas course website. The homework should be submitted online too.