

Yeshiva University Department of Physics

Introduction to Thermodynamics and Statistical Mechanics.

Lectures:

Monday 6:45 p.m. – 8:50 p.m., BH 1610
 Wednesday 6:45 p.m. – 8:50 p.m., BH 1610

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 Office hours:
 Tue.: 12:00 p.m. – 2:00 p.m.

Textbook:

Thermodynamics
 Enrico Fermi
 ISBN: 0-486-60361-X

Additional Reading:

Thermal Physics
 Daniel V. Schroeder
 ISBN: 0-201-38027-7
Introduction to Statistical Physics
 Kersong Huang
 ISBN: 0-7484-0942-4
Classical and Statistical Thermodynamics
 Ashley Carter
 ISBN: 0-13-779208-5

*Also, Chapters 18, 19 and 20 of
Fundamentals of Physics
 David Halliday, Robert Resnick, and Jearl Walker
 7th Edition
 ISBN: 0-471-21643-7*

This is an introductory course into thermodynamics and statistical physics.

The breakdown of the material week by week, including exams is on the following page.

Your grade for the lecture part of the course will be based on class participation, homework and exams.

Grade breakdown: homework and class participation – 40%

two tests – 40%

final (cumulative) – 20%

Dates	Topic	Textbook Chapters
August 31	Thermal Equilibrium	HRW, Chapter 18
September 7	Microscopic Model of an Ideal Gas, Van der Waals Equation	HRW, Chapter 19
September 12	Barometric Formula, Boltzmann Distribution	Hand-out

September 14	Maxwell Distribution	HRW, Chapter 19
September 19	First Law of Thermodynamics, Enthalpy	HRW, Chapter 18, Fermi Chapter II
September 21	Heat capacities, Adiabatic process, Sound	HRW Chapter 19, Fermi Chapter II
September 26	Reversible and irreversible processes, Carnot Cycle	Fermi, Chapter III
September 28	Test #1	
October 10	Second Law of Thermodynamics.	Fermi, Chapter III
October 31	Entropy, Entropy of Ideal Gas	Fermi, Chapter IV
November 2	Consequences of the Second Law	Fermi, Chapter IV
November 7	Free Energy and Gibbs Potential, Maxwell Relations	Fermi, Chapter V
November 9	Phase Transitions, condensation	Fermi, Chapter V
November 14	Triple point, Critical Point	Fermi, Chapter V
November 16	Thermodynamics of Dilute Solutions	Fermi Chapter VII
November 21	Entropy of Mixing, Osmotic Pressure	Fermi, Chapter VII
November 23	Gaseous Reactions, Chemical Equilibrium.	Fermi, Chapter VI
November 28	Test #2	
November 30	Entropy Constant, Third Law	Fermi, Chapter VIII
December 5	Statistical Interpretation of Entropy	Huang, Chapter 5
December 7	Random Walks and Polymers	Hand-Out
December 12	Boltzmann Statistics	Huang, Chapter 6
December 14	Canonical Ensemble, Partition Function	Huang, Chapter 12
December 19	Virial expansion, Weakly Interacting Gases	Hand-Out
December 21	Ising Model, Monte Carlo	Huang, Chapter 14
December 26	Quantum Statistics	Huang, Chapter 8