

PHYS 334

Tentative Schedule

Exam-1: (Ch 1, 2 and 3)

Macroscopic behavior, Fundamental quantities, Math refresher, Thermal Equilibrium, Ideal Gas, Equipartition of Energy, Heat and Work, energy and 1st law of thermodynamics, Temperature, Models of Matter, Thermodynamic equation of states, Heat Capacities, Enthalpy, Heat Conduction, Conductivity of Ideal gas, Viscosity, Diffusion, Fick's Law, 2nd law of thermodynamics, Entropy and Heat, Paramagnetism, Mechanical Equilibrium and Pressure, Diffusive Equilibrium and Chemical Potential.

Exam-2: (Ch 4 & 5) Heat engine, refrigerator, Free energies, Fuel Cells and batteries, Thermodynamic Identities, Phase Transformations, Chemical Equilibrium.

Exam-3: (Ch 6 & Ch. 7)

Boltzmann Statistics: Boltzmann Factor, Average Values, Paramagnetism, Equipartition Theorem, Partition functions and Free energy, Ideal Gas Revisited.

Quantum Statistics: The Gibbs Factor, Bosons and Fermions, Degenerate Fermi Gas, Density of states, Black body radiation,

Rules of probability, Mean values, Uncertainty, Probability distribution, Introduction to statistics, Simple Thermal interactions, Microstates of simple magnetic systems, a particle in one-, two- and three-dimensional box, Non-interacting identical particles in semi classical limit, Micro canonical, canonical and grand canonical ensembles, Debye Theory of Solids, Bose-Einstein Condensation (if time allows).