

PHYSICS 302
THERMODYNAMICS AND STATISTICAL MECHANICS
(3.0 ; 3 credits)

Textbook: To be decide by the instructor

Contents:

1. General Description of the Random Walk Problem
2. Quantum statistics: Density Matrix, Mocrocanonical Ensemble, Canonical Ensemble, Grand Canonical Ensemble.
3. Ideal Fermi-Dirac Gas: Equation of state, Thermodynamic properties, spin paramagnetism, Landan Levels, Diamagnetism, De Haas-Van-Alphen-Effect.
4. Ideal Bose-Einstein Gas: Equation of state, Thermodynamic properties Bose-Einstein Condensation, Photons ,Phonons.
5. Phase Transitions: first order phase transition, second order phase transition, order parameters, critical fluctuations, critical phenomena, correllation functions.
6. Mean-Field Theory: Bethe's Approximation, Landan Theory of phase transition
7. Ising Model.

Fall 2000