PHYS 412 – MAT 502 Statistical Mechanics

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Schedule (preliminary): WILL LIKELY CHANGE IN THE FIRST LECTURE
Wednesday, 16:40 – 17:30 at FASS G025
Thursday, 14:40 – 1630 at FENS G029

Textbook:
Statistical Physics by F. Mandl

Recommended:
Statistical Mechanics by R.K. Pathria and P.D. Beale
Fundamentals of Statistics and Thermal Physics by F. Reif

Contents:
- Basic probability concepts in statistical mechanics:
  - random walk, mean values, probability distributions
- Statistical description of systems of particles:
  - state of a system, statistical ensemble, basic postulates, probability calculations, density of states
- The statistical basis of thermodynamics
  - equilibrium conditions, reversible and irreversible processes, the laws of thermodynamics, the maximum entropy
- Basic methods of statistical mechanics:
  - Ensemble representations, approximation methods, the partition function, the equipartition theorem,
- Quantum statistics of ideal gases:
  - Maxwell- Boltzmann Fermi-Dirac, Bose-Einstein statistics; Blackbody radiation

Grading:
Homework (one in two weeks, 5 total): 30%
Midterm: 30%
Final: 40%