

Syllabus: Solid State Physics I

Fall 2013

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Office Hours: TBD

Course Description:

This is an introduction to solid state physics. No previous knowledge of solid state physics will be assumed, but a familiarity with basic quantum mechanics is required. Familiarity with Fourier transforms will be useful but not required.

Topics covered:

- lattice structure:
 - crystals, symmetry groups, X-ray diffraction
- transport theory:
 - Drude theory, Sommerfeld theory, electrical/thermal conductivity
- band theory:
 - Bloch states, tight binding models
- interactions:
 - Hartree-Fock approximation, phonons, screening
- if time permits:
 - second quantization, introduction to Fermi liquid theory, superfluidity

Textbook:

Neil W. Ashcroft and N. David Mermin, Solid State Physics

Grading:

Homework: 30%
Midterm 1: 20%
Midterm 2: 20%
Final: 30%