Phys363
Condensed Matter Physics
Lecture Notes 2016-2017

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General Information about the Module

- **Lectures**: Semester 1, Weeks 7-12, Monday 9:00-11:00 (CHAD-BARK) and Tuesday 9:00-10:00 (CHEM-BRUN)
- **Tutorials**: W8 and W11
- **Assessment**: 1.5 hour written exam at the end of semester 2 50% 1 multi-part compulsory question covering broad aspects of the module 50% 1 detailed compulsory question (2 options)
- **Past exam papers**: Past exam papers are provided with this lecture note. As content of the module has been changed this year, the pattern of exam questions may be different.
- **Exam preparation**: The tutorial problems, previous exam papers and revision problems are a good guide to the type of problem that may be posed in the module examination.
- **Prerequisite**: Phys202
- **Contact**:
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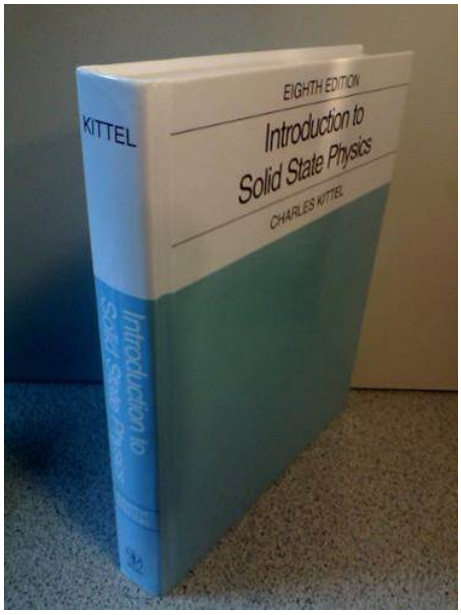
About Lecture Notes

- Lecture notes will be handed out at the beginning of the lecture and also uploaded to VITAL.
- Corrections on typos and minor errors, if any, will be given at the end of e-copy of the lecture note and be available in VITAL.
- Revision problems are given at the end of each chapter. Some of these problems will be solved in lectures or tutorials.
- Chapters are interlinked. So you do not want to miss any lecture.

Book recommendations

C. Kittel, Introduction to Solid State Physics



Solid state physics by C. Kittel

Other material:

H. P. Myers, Introductory Solid State Physics

H. Ibach and H. Luth, Solid State Physics

Preamble Condensed Matter Physics

- The branch of physics that studies the properties of large collections of atoms that compose both natural and synthetic materials.
- The properties of matter at everyday chemical and thermal energy scales, hence, a subfield of physics with the largest number of direct practical applications.
- Historically:
  Transistor, high-T superconductivity, integrated circuits, MRI, solid-state lasers, light-emitting diodes, magnetic recording disks
- Today:
  New capabilities in synchrotron and neutron research, atomic-scale visualisation, nanofabrication and computing

Aim of the Module

- To develop concepts introduced in Year 1 and Year 2 modules which relate to solids, especially Phys202.
- To consolidate concepts related to crystal structure.
- To extend the concept of reciprocal space and diffraction.
- To enable the students to apply these concepts to the description of crystals,transport properties and the electronic structure of condensed matter.
- To illustrate the use of these concepts in scientific research in condensed matter.

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