

Physics 880.06 (Autumn 2011)

Condensed Matter Physics I

Lectures: Tue. & Thu. 1:00 - 2:18 in Scott Lab E0241

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This is the first of a three-quarter sequence designed primarily for graduate students in Physics, both theorists and experimentalists.

Prerequisites: Quantum and Statistical Mechanics (graduate level) and E&M (Griffiths' book)

Syllabus: Here is an outline of topics to be covered in the first quarter.

- States of matter, Structure and Scattering
- Crystal lattices & Reciprocal Lattices
- Electrons in a Periodic Potential
- Metals & Insulators
- Metals: thermodynamics and transport
- Phonons

I will discuss throughout the course various experimental probes that have been used to understand and measure the properties being discussed.

The **Text Book** will be:

N. W. Ashcroft and N. D. Mermin, "Solid State Physics" (Brooks/Cole, 1976). [ISBN-10: 0030839939; ISBN-13: 978-0030839931]

I may not follow this classic text book very closely in class, but I would strongly recommend it to anyone with a serious interest in condensed matter physics.

References:

Two other classics that I have found very useful are:

C. Kittel, "Introduction to Solid State Physics" (Wiley), and
J. M. Ziman, "Principles of the Theory of Solids" (Cambridge)

A useful reference, with a very different emphasis from that taken in this class, is P. M. Chaikin and T. C. Lubensky, "Principles of Condensed Matter Physics" (Cambridge)

Grading:

- Home work: 70%
- Term-Paper: 30%;

Home Work Assignments:

Home work will be assigned on a regular basis throughout the quarter. You will be able to download the problem sets from the **Course Website:**

[www.physics.ohio-state.edu/~randeria/
courses/CMP880.06Autumn/physics_880.06Autumn.htm](http://www.physics.ohio-state.edu/~randeria/courses/CMP880.06Autumn/physics_880.06Autumn.htm)

Grader: Austin Carter

Term paper: Topics, requirements and deadlines will be discussed in class.

If you have any questions about this Class, please do not hesitate to contact me by email (randeria@mps.ohio-state.edu) or phone (292 2457), or come to my office (Physics Research Building, Room 2024).