Physics 211A Fall 2009 R.C. Dynes

Lectures Tuesday and Thursday 11:00 am -12:20 pm HSS 1305

Final (If we have one) 12/09/2009

The books that I find useful when I am trying to learn about stuff in condensed matter physics are

Kittel: Introduction to Condensed Matter Physics

Kittel: Quantum Theory of Solids

Ziman: Electrons and Phonons

Ashcroft & Mermin: Solid State Physics

Marder: Condensed Matter Physics

Ibach and Luth: Solid State Physics

Pines: Elementary Excitations in Solids

Wannier: Solid State Theory

I have copies of these books and you can borrow them (for 1 day). Please return them as they are the only ones I have.

At the time of preparing this, my office is Mayer Hall 3561.

The easiest way to reach me is by coming to my office or via email rdynes@ucsd.edu

The good news is that I have been engaged in condensed matter physics (previously known as solid state physics) for a long time. The most effective way I have learned is by either actively engaged in experiments or having to prepare presentations for my colleagues. I hope we can spend a large fraction of this course learning together. I will prepare lectures to transmit the basic underlying physics that is necessary for anyone in the field. A major part of your efforts will be to prepare a presentation, followed by a backup written paper on a subject of your choice. I will list some suggestions of topics but don't feel confined to them. If you are already engaged in a research group, it might be that you want to talk about, and submit a written description on an effect, phenomenon, or research program in that area. It is also very useful to learn about an adjacent phenomenon. If you are planning a career in condensed matter physics or engineering, you will do this kind of thing for the rest of your life. I intend this class to be a group of people to act as a friendly audience.

Possible Research Topics

Carbon Nanotubes; Electron Localization and Metal-Insulator Transition; Fullerenes; Giant Magnetoresistance; Graphene; Nanostructures; Quantum Dots; Quantum Corrals; Quantum Hall Effect (fractional); Quantum Hall Effect (integer); Quasicrystals; Superconductors (conventional); Superconductors (high-Tc); Superlattices; Superfluid; Supersolid; Ultracold Atoms; Glasses (metallic and/or insulating); Research Integrity and Misconduct (I am referring to Schoen at Bell Labs). Perovskite Oxides (electronic and/or magnetic properties) Any significant applications from the above topics; and any topic of your choice.