

Physics 450 Semiconductor Physics

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Class Meeting: TuTh 10:00 – 11:15 Fine Arts 301

Course Overview:

This course is a basic course in semiconductor physics.

It will cover:

- formation of semiconductor material
- intrinsic and extrinsic semiconductors
- various models of semiconductors and how energy bands are formed
- electrical and thermal conductivity in semiconductors
- pn and npn junctions in equilibrium and steady-state current situations
- solar cells, photodiodes, and photoconductive detectors
- LEDs and semiconductor lasers

I expect this to be an exciting class for everyone. As this is a small class, it will be a very active lecture. Students will be expected to describe material that is covered in the lecture, ala Dr. Deffner style. Each student will be expected to prepare a lecture for the end of the end of the semester, on a specific topic that is assigned to them in the middle of the semester.

Pre-requisite:

Phys324 and permission of instructor.

It will use material on quantum mechanics and statistical mechanics from Phys324.

Textbook:

Semiconductor Physics and Devices, D. Neamen

Semiconductor Device Fundamentals, R. Pierret

Solid State Electronic Devices, B. Streetman

Grading:

Class participation	25%
Homework	50%
Student lecture	25%

Homework:

There will be a homework sets approximately every week. You need not prove everything (such as re-deriving quantum mechanics) that you use. However, you do need to describe how you would go about doing these things, and cite any assistants you receive from individuals, textbooks, and the internet.

Student Lecture:

Students will be assigned a piece of the material to present near the end of the semester. These student lectures will be 30 minutes long, and should be at the level of the instructor lectures given during the semester.