

Office: G-10 Allen Hall (press buzzer—we can't hear you if you just knock)

Office hours: Tuesday and Thursday after class, or by appointment: email is the best way to contact me.

Email: snoke@pitt.edu

Phone: 412-624-9007

Textbook: Snoke, *Solid State Physics*, (Addison Wesley/Pearson).

Errata are posted at www.phyast.pitt.edu/~snoke and on the Courseweb site.

Other resources:

The university has a site license for Mathematica, a program which is used in many of the homework assignments. You should get this program and install it on your own computer and learn it. If you prefer, you can use another equivalent program, but solutions will be given in Mathematica code.

Schedule:

Sept 1, 3	Sections 1.1-1.3 Electron bands, Kronig-Penny model, Bloch theorem
Sept 8, 10	Sections 1.4-1.8 Crystal structure, x-ray scattering, density of states
Sept 15,17	Section 1.9 Tight binding, nearly free, k·p models (Pekker)
Sept 22, 24	Sections 1.10, 2.1-2.5 Semiconductors, excitons, Fermi gas model of metals
Sept 29, Oct 1	Sections 2.6-2.8 Nanostructures, band bending at interfaces, Landau levels
Oct 6, 8, 13	Sections 3.1-3.6, 3.7.1, 3.7.2, 3.8, 3.9 (Pekker) Classical anisotropic waves, electro-optics, piezoelectrics
Oct 15	MIDTERM on chapters 1-3
Oct 22, 27, 29	Sections 4.1-4.7 Second quantization: phonons and photons
Oct 27, 29	Sections 4.9, 5.1 Heat capacity, phonon scattering
Nov 3, 5	Sections 5.2, 7.1, 7.3, 7.5 Optical transitions
Nov 10, 12	Sections 5.3-5.8 Heat flow, resistivity, diffusion equation
Nov 18, 20	Sections 8.1-8.5, 11.2.2 Elements of many-body theory: polarons, band gap shift
Nov 24	Sections 11.2.1, 11.2.2 Cooper pairs, bosonization
Dec 1, 3	Section 11.1.1-11.1.4, 11.2.3-11.2.4 Bose-Einstein condensation, BCS superconductors
Dec 8, 10	Section 11.2.5, 11.2.6, extra handout Superconductor magnetic effects, Josephson junctions

Grade distribution:

Homework: 30%

Special topic paper: 15%

Midterm exam: 25%

Final exam: 30%

A special topic paper (~5 pages, 4000 words) will be assigned toward the end of the semester; instructions on this paper will be given at that time. If you have a preferred topic to write about, please clear this well in advance.

Special Accomodations

If any special accomodations are needed to make this class more accessible to you, just let me know.