

Solid State Physics (Phys 1374)

Fall 2013

Instructor: Hrvoje Petek

Class: 106 Allen Hall; Tu, Th 1:00-2:15

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Objectives: The course will cover the basic topics of solid state physics including chemical bonding, crystalline structure, electronic band structure, the electronic properties of semiconductors and metals, lattice dynamics, optical properties, superconductivity, and magnetism.

Policies: Students are required to attend and participate in the class discussion. Grades will be determined by class participation, homework assignments, examinations, and in class presentations.

Textbook: Solid State Physics, by Ibach and Lüth

Schedule:

Week 1 (Aug. 27)	Intro to Quantum mechanics; Chemical bonding
Week 2 (Sept. 3)	Periodic lattice; Structure determination
Week 3 (Sept. 10)	Review
Week 4 (Sept. 17)	Mechanical properties of solids
Week 5 (Sept. 24)	Lattice vibrations
Week 6 (Oct. 1)	Drude model of metals
Week 7 (Oct. 8)	The free electron model of metals
Week 8 (Oct. 15)	Semiconductors; band properties and applications
Week 9 (Oct. 22)	Review
Week 10 (Oct. 29)	Midterm
Week 11 (Nov. 5)	Magnetism
Week 12 (Nov. 12)	Dielectric properties of solids
Week 13 (Nov. 19)	Optical properties of solids
Week 14 (Nov. 26)	Superconductors
Week 15 (Dec. 3)	Nanoscience and low dimensional structures
Week 16 (Dec. 10)	Student led topics, Endterm

Grading: Class participation 10%, Homework 40%, Midterm 20%, Endterm 20%, Final projects 20%

Final projects: Students will select a current topic of solid state physics and present an in class 20 min power point presentation.