

PHYSICS 927, Introduction to Solid States Physics, August 26, 2014

Time: 12:30 pm- 1:45 pm, Tue & Thurs

Place: JH247

Text: Introduction to Solid State Physics

by Charles Kittel, (8th edition) John Wiley and Sons, Inc, 2005

Instructor: Sy-Hwang Liou, 085 Jorgensen, (402)472-2405, sliou@unl.edu

Co-instructor: Xiaolu Yin, 084 Jorgensen, (402)472-5431, yinxiaolu@huskers.unl.edu

Office Hours: Tue & Thus 2:00 pm-4:00 pm or by appointment

Objective:

Crystal structures, Crystal bonding, Phonon, Energy Band, Semiconductor, Fermi surface and metal, Superconductors, Magnetism, Ferroelectrics, and Nanostructures.

References:

1. Solid State Physics by Gerald Burns, Academic Press, Inc.
2. Solid State Physics by Ashcroft/Mermin, Holt, Rinehart and Winston
3. Solid State Physics by J. S. Blakemore, Cambridge University Press
4. Elements of X-ray Diffraction by B. D. Cullity, Addison-Wesley
5. A Physicist's Desk Reference, Ed. By Herbert L. Anderson, American Institute of Physics

Structure and grading

The course will consist of two lectures per week and some reading assignments (Please read the chapter of the textbook before the each class). There will be weekly problem-sets, due at assigned date. You will have one week time to work on these problems.

The lectures in pdf format will be available over the Blackboard.

There will be 3 exams (2 mid-term exams and a final exam).

Grading will be:

- 20 % homework
- 40 % (20% each) mid-term exams
- 40 % final exam.

"Participation" is very important for this class that I'd like to encourage you to ask questions, particularly about the reading assignments. Talking about these topics with each other and/or with me is one of keys to learn the material than trying to do it in a vacuum.

The usual grading system will be employed, that is, A+ (95%), A(90%), A-(85%), B+(80%), B (75%), B- (70%), C+ (65%), C(60%), *etc.*

Physics 927 Schedule
Fall 2014

Week	Date	Contents	Homework
1	8/26	The focus of this class	
	8/28	Ch-1 Crystal structure	
2	9/2	Ch-2 Reciprocal Lattice	
	9/4		
3	9/9	Ch-3 Bonding and Elastic constants	
	9/11	Ch-4 Phonons-crystal vibration	
4	9/16		
	9/18	Exam I	
5	9/23	Ch-5 Phonons-Thermal properties	
	9/25		
6	9/30	Ch-6, Free electron Fermi gas	
	10/2		
7	10/7	Ch-7 Band energy	
	10/9		
8	10/14	Ch-8 semiconductor	
	10/16		
9	10/21	Fall Break (NIST)	
	10/23	Ch-9 Fermi surface	
10	10/28	Ch-10 Superconductivities	
	10/30		
11	11/4	(MMM)	
	11/6	(MMM) Exam II	
12	11/11	Ch-11 Diamagnetism and Paramagnetism	
	11/13	Ch-12 Ferromagnetism and antiferromagnetism	
13	11/18	Ch-13 Magnetic resonance	
	11/20	Ch-14 Plasmons, Polaritons, and Polarons	
14	11/25	Ch 15 Optical processes and excitations	
	11/27	Thanksgiving	
15	12/2	Ch-16 Dielectrics and Ferroelectrics	
	12/4	Ch-17 surface and interface,	
16	12/9	(last week) Ch-18, 19 Nanostructures, Nanocrystalline solid	
	12/11	Ch-20, 21, 22 defects, dislocation, alloys	
	12/19	Final Exam. 7:30am- 9:30am, Friday	

28 Lectures + 2 Hours exams and a Final