PHYSICS 342/555
Spring 2015
Structure of matter/Solid state physics

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General Information

Lecture Hours 1:25 – 2:15 pm Mon/Wed/Fri
Location PHY306
Office Hours 5:00-6:00 pm Monday or by appointment PH407
Textbook Charles Kittel, *Introduction to solid state physics*, 8th edition

General Course Description

This course covers fundamental concepts and applications of crystal structure and bonding, phonon, energy band, metal, semiconductor, superconductivity, magnetism, and ferroelectricity, including chapters 1-12.

Prerequisites

The course and text presume a familiarity with calculus and calculus concepts. A background in mathematics up to the level of Math 141-142, or equivalent, is highly recommended and is probably necessary for success in the course. PHY231 and 232 is also highly recommended before this course.

Course Repetition Policy

If you are repeating the course, please refer to the Laboratory Policy Regarding Repeating a Course (http://www.phys.utk.edu/labs/Lab%20Repeat.pdf)

Announcements, Lecture Notes, Course Updates **https://bblearn.utk.edu**

Aside from in-class discussion, the primary method of communication between you and me will be via Blackboard and/or email. This syllabus and other important information and announcements will be posted there, as well as copies of the slides used in lecture. Your grades of in-class exams will be posted in the Blackboard Grade-book, and your grades will be available for only you to see.

Grading Policy

The semester Grade will be based on a Weighted Averages of the homework assignments, the attendance, two one-hour tests, and the final examination as follows:
Homework: 25%
Attendance: 10%
Two 1-hour in class testes: 35%
Final examination (2 hour test): 30%

Conversion to Letter Grades

A	90 - 100
A-	85 - 89
B+	80 - 84
B	75 - 79
B-	70 - 74
C+	65 - 69
C	60 - 64
C-	55 - 59
D+	50 - 54
D	45 - 49
D-	40 - 44
F	0 - 39

Homework Totally 8 homework will be assigned. The assignment date and the due date are listed in the schedule. **Due dates for problem sets are firm. Please note: No extensions or make-up problem sets will be given.**

Class attendance is expected. You are responsible for the material that will be covered in class and for all the homework problems assigned. The home work needs to be done independently. In this semester, I will institute a new method of teaching, where I will present a problem in each lecture, and ask you to help solving the problem. You can discuss with your peers and you should hand over your solutions to me after the class. The purpose of this excise is to make sure that you understand the concept of each lecture, and you are present in the class room. In class work will take a total of 10% of the final grade. **If you did the in-class problem entirely wrong, you will still get 50% of the credit for being there. Not submitting your in- class problem will be zero for that class.**

The **In-Class Tests** will be open book exams. Questions and Problems on the Short Tests and Final Exam will generally NOT require only a purely numerical answer (like the homework). Short Test and Final questions will generally be similar in character to example problems in the book and example problems given in lectures. For the Short Tests and Final Exam you are required to bring a pencil and a non-programmable pocket calculator. In particular, no laptops, cell phones, or other means of communication are allowed. The **Final Exam** is mandatory. Missing the final exam is very serious and may well result in failure of the course.

NO MAKE-UP 1-HOUR TESTS WILL BE GIVEN. However, if there are extremely serious circumstances supported by proper documentation, a make-up for Short Tests and/or Final may be considered at my discretion.

Questions and Appeals

I encourage you to ask questions during the lecture or/and talk to me during my office hours (Monday or by appointment – just ask after class) about the subject. You can discuss with me and/or complain to me about the grading of a given assignment, be it homework, Lab grade, Short Tests or Final Exam. Any appeal will be entertained if it is raised no later than one week after the date on which the graded Exam/ Lab/ Tests /HW are made available for return to the class. After this "appeal period" of one week, exam grades will be considered final and will not be altered. Any appeal concerning a grade in the Laboratory should directly be discussed with your Lab. instructor.

For students with disabilities

If you need course adaptations or accommodations because of a documented disability, please contact the Office of Disability Services at 2227 Dunford Hall (telephone/TTY 865-974-6087; e-mail ods@utk.edu) by January 16. This will ensure that you are properly registered for services.

Academic Honesty

All work submitted by a student is expected to represent his/her own work. Students are expected to enter their own homework without assistance from others. Students are expected to perform all work in conformance with the University policies regarding Academic Honesty.

Schedule: The class meets 39 times. There will be 37 class sessions, 2 midterm exams (administered at the normal class time) and a cumulative final exam. There is no class on Jan. 19 (MLK Day), Mar. 2, Mar. 4, Mar. 6 (APS meeting), and Mar. 16, Mar. 18, Mar. 20 (Spring break). The final will be given according to the university schedule (Wed, April 29, 12:30-2:30 pm PHY306.)

The class schedule is tentative: **I reserve the right to change the class sessions when content is taught or when midterms are administered; updates will be made in class and online. There are 8 homework, the assign day and due day are listed below.**

Class sessions:
1-5. Jan. 7, 9, 12, 14, 16 Crystal structure (Chapters 1, 2)
6-8. Jan. 21, 23, 26 Crystal bonding (Chapter 3)
9-13. Jan 28, 30, Feb. 2, 4, 6 Phonons (Chapters 4, 5)
14. Feb. 9 Review Session
15. Feb. 11, Wednesday, First midterm exam (Chapters 1-5)
16-20. Feb. 13, 16, 18, 20, 23 Energy band and semiconductor (Chapters 7, 8)
21-26. Feb. 25, 27, Mar. 9, 11, 13, 23 Metals (Chapters 6, 9)
27-29. Mar. 25, 27, 30 Superconductivity (Chapter 10)
30. Apr. 1 Review session
31. Apr. 3, Wednesday, Second midterm exam (Chapter 6-10)
32-38. Apr. 6, 8, 10, 13, 15, 17, 20 Magnetism (Chapters 11-12)
39. April 22 Review session
Wednesday April 29, 12:30-2:30 PM PHY306
TWO-HOUR CUMULATIVE FINAL

HW1: assigned Jan. 12, due Jan 21
HW2: assigned Jan 23, due Jan 30
HW3: assigned Jan. 30, due Feb 9
HW4: assigned Feb. 16, due Feb. 25
HW5: assigned Feb. 27, due Mar. 23
HW6: assigned Mar. 23, due Mar. 30
HW7: assigned Apr. 8, due Apr. 20