Physics 476, Physics of Solids and Materials II

Spring Quarter 2015, 1pm MWF

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Course goals, objectives, and outcomes:

A couple of important *goals* of Physics 476 are
(i) for the student to develop an understanding, at the microscopic level, of why the materials around us exhibit many of the diverse optical, electronic, chemical, and mechanical properties that they do. For example why are certain elements good electrical conductors and others not? Why are certain materials optically transparent?
(ii) to understand how these materials and properties may be put to use in modern high-tech engineering applications. For example how is a pn junction made and how does it work? How does a light emitting diode work?

Specific *objectives* for the course are to work through selected topics in the latter half of the standard text: *Introduction to Solid State Physics* by Charles Kittel. Topics covered may include thermal properties, the free electron Fermi gas, Fermi surfaces and metals, semiconductors, superconductivity, ferromagnetism, surface and interface physics, and nanostructures. An important component of Physics 476 is the weekly problem assignment where all students will be required to complete, and submit for grading, a number of problems closely related to the week's lecture material.

Assessment of how well the course objectives are being met will be by assignment grades, "spot-check" quizzes, a midterm test, and a final exam.

Reference Materials: The text for the course is "*Introduction to Solid State Physics*" (8th ed.) by Charles Kittel. We will cover selected topics in chapters 5-10, 12, and 17-18. Another very well written and useful textbook available in the library is *Solid State Physics* by J. S. Blakemore. A more advanced text, covering the same topics at more of a graduate level, is *Solid State Physics* by Ashcroft and Mermin.

The course website contains useful links including the course syllabus, weekly assignment listings, and assignment and test solutions. We will occasionally make use of *Mathematica* in class and in assignments. Please familiarize yourself with this software if you have not already used it in previous courses.

Approximate Schedule (Please see http://www.physics.wwu.edu/from/476.15s/syllabus.html for an up to date schedule!):

Week	Date	Text Chapter	Assignments		Tests
				Due	
1	April 1-3	5	5.3, 4	April 8	
2	April 6-10	5,6	A2	April 15	

3	April 13-17	6	6.1,2, 3, 5, 6	April 22	
4	April 20-24	6, 7	A4	April 29	
5	April 27-May 1	7	7.1	May 6	
	Fri. May 8				**Midterm**
6	May 4-8	7	7.2	May 13	
7	May 11-15	7	7.3, 7.4	May 20	
8	May 18-22	7,8	7.6	May 27	
9	May 27-29 (Holiday on Monday)	8	A9	(Don't hand in)	
10	June 1-5	8,12		-	
	Monday June 8 3:30-5:30				Final Exam

Homework: There will be a weekly assignment due at 5pm on Wednesdays. Web solutions will go up immediately after that time and therefore late assignments will not be accepted. Feel free to work on homework problems with others but be sure that you are learning the material by doing so. You will not have others to work with during the tests!

Tests: There will be a one-hour midterm test, and a final two-hour cumulative exam. These tests will be open-book/notes.

Quizzes: There will be 7 or 8 "spot-check" quizzes spaced randomly throughout the quarter. These will be open book/notes and will be allotted 10 minutes.

Grades:

7 Quizzes	15%
Assignments	25%
Midterm Test	25%
Final Exam	35%

LETTER GRADE SCALE

Percentage	90-100	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	<53
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F