

PHYSICS 140A--SOLID STATE PHYSICS
WINTER QUARTER, 2015-16
SYLLABUS

Instructor: Professor Charles S. Fadley, Physics 241
Office hours: 1:30-2:30 Tuesdays and Thursdays, or by appointment
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- Course website: <http://140a.physics.ucdavis.edu> . Regularly updated throughout the quarter.
- Class meetings: Tuesdays and Thursdays, 10:30 AM - 11:50 AM, 140 Physics

- Textbooks

-- M. Ali Omar, "Elementary Solid-State Physics", Revised Printing, Addison-Wesley-Longman, 1993. Primary text for lecture, reading, and homework problems. Clearly written, although older. Out of print, but can be purchased in international edition for \$18.50 from:

<http://www.valorebooks.com/textbooks/elementary-solid-state-physics-principles-and-applications/9780201607338>

--H. Ibach and H. Luth, "Solid-State Physics: An Introduction to Principles of Materials Science", 4th edition, Springer, 2009. Much more up-to-date and advanced. Will be used for some reading assignments as well.

Available as a free download from the Library or at the course website for UCD students, or in paperback for about \$50 or less.

- A couple good websites for viewing crystal structures, with others as we go along:

<http://www.dawgsdk.org/crystal/>

<http://www.fhi-berlin.mpg.de/KHsoftware/Balsac/pictures.html> (A downloadable program for creating your own structures)

- Course grading: Based on the following breakdown--

Graded problem sets:	25%
Midterm examination	25%
Final examination	50%
	100%

Exam crib sheet: You may bring in one 8.5" x 11" sheet with important equations and results written on it to both the midterm and the final.

- Tentative syllabus: Readings below are mostly from Omar, but complementary reading from Ibach and Luth will also be assigned throughout the quarter. Copies of viewgraphs and other supplementary material will be posted at the class website and will be an important component of study for the course and exams.

<u>Week</u>	<u>Dates</u>	<u>Topic [Reading: O = Omar, IL = Ibach and Luth]</u>
1	1/5-1/7	Course intro., Crystal bonding and structure [O-Ch.1, App A1-A8; IL-Ch. 1]
2	1/12-1/14	Crystal bonding and structure (continued)
3	1/19-1/21	Diffraction in Crystals [O-Ch. 2]
4	1/26-1/28	Diffraction (continued)
5	2/2-2/4	Lattice vibrations [O-Ch. 3]
6	2/9	Midterm Examination
	2/11	Lattice vibrations (continued)
7	2/16	Lattice vibrations (continued)
	2/18	The free-electron model [O-Ch. 4]
--Approximately here, optional tour of Lawrence Berkeley National Laboratory solid state research facilities--		
8	2/23-2/25	The free-electron model (continued)
9	3/1-3/3	Energy bands in solids [O-Ch. 5]
10	3/8-3/10	Energy bands in solid (continued)
Final	3/19, Saturday	Final Examination: 10:30 AM-12:30 PM, Physics/Geology 140