

University of Maryland

Department of Physics

Fall 2011

Prof. Ian Appelbaum

Physics 731

Title: PHYS 731 Solid-State Physics: A variety of topics such as crystal structure, mechanical, thermal, electrical, and magnetic properties of solids, band structure, the Fermi surface, and superconductivity will be treated. Although the emphasis will be on the phenomena, the methods of quantum mechanics are freely employed in this description. This is a 3 credit course.

Prerequisite: Undergraduate-level Quantum Mechanics, Statistical Mechanics, and Electrostatics.

Instructor: Prof. Ian Appelbaum, Room 1368 (Physics / Center for Nanophysics and Advanced Materials). You can find the Center either by 1) going through the blue door labeled “Center for Nanophysics and Advanced Materials” in the basement of the Physics building, or 2) entering from the plaza between the Math and Physics buildings. My office is right next to those of Profs. Lobb, Anlage, Ouyang, and Paglione on the second floor. A map is available at:

<http://appelbaumlabor.umd.edu/images/officemap.jpg>

Please note that the doors to the Center lock after 6:00 PM on weekdays, and remain locked all weekend.

Phone: x5-0890

e-mail: appelbaum@physics.umd.edu, or appeli@umd.edu

WWW: <http://appelbaumlabor.umd.edu/appelbaum.html>

Office Hours: While I won't be scheduling regular office hours, please feel free to arrange a meeting time, or just stop by my office to ask questions about the course material or just talk about physics in general.

Schedule: Two meetings weekly:

Tues and Thurs..... 11:00am- 12:15pm ([PHY 1219](#))

Text: *Solid State Physics*, by Ibach and Luth, 4th edition. Available online at <http://www.springerlink.com/content/978-3-540-93804-0#section=617036&page=1>

You can also buy a (softcover) hardcopy through this website for \$24.95.

Overview: PHYS731 is a graduate course on solid-state physics. The primary objective consists of understanding several fundamental topics of condensed matter physics: physical properties, bandstructure, phonons, transport phenomena, and simple solid-state devices. There will be two 1.25-hour lectures per week. You will be required to submit homework assignments approximately bi-weekly. There will be a midterm and a final.

Grading:

Midterm	40%
Final	40%
Homework	20%

This is a graduate course. As such, I expect to give only As and Bs. However, failure to complete assignments and consistent poor performance on exams will put you in danger of a C, which is considered unsatisfactory for continuation in the graduate program.

Homework: Homework is assigned approximately every other week and will be due before lecture begins.

Dropping the Course: Note: the last day to drop the course is Nov. 9.

Academic Dishonesty (cheating): Academic dishonesty is a serious offense that may result in suspension or expulsion from the university. In addition to any other action taken, the normal sanction is a grade of “XF”, denoting “failure due to academic dishonesty,” and will normally be recorded on the transcript of the offending student.

Course Web Site: Course materials, including syllabus, contact info, useful links, and PDFs of in-class notes, will be regularly posted to the course website at:

<http://www.physics.umd.edu/courses/Phys731/appelbaum/>