

PHYS 403 / 604

Solid-State Physics

Fall 2019

Lecture Hours: Tues. & Thurs. 10:00 – 11:15 AM, in Fine Arts 015
Instructor: Matthew Pelton
Office: Physics 313
Office Hours: Tues. & Thurs. 11:30 AM – 1:00 PM, or by appointment
E-mail: mpelton@umbc.edu
Text: Steven H. Simon, *The Oxford Solid State Basics*

Course Objectives

This course provides an introduction to the physics of solid matter. Solid-state physics, or more broadly condensed-matter physics, is the most active field of contemporary physics, with the most direct impact on modern technology. As well as enabling applications, condensed-matter physics has provided profound and fundamental insights and has connections to nearly all other fields of physics.

You will have succeeded in this course if, at the end of the semester, you

- are familiar with the language and terminology of solid-state physics
- understand basic classical and quantum-mechanical models to describe the thermal, mechanical, and electrical properties of solid-state systems
- understand the microscopic structure of solids, how it is described mathematically and determined experimentally, and how it is related to the physical properties of the materials
- can critically evaluate the approximations involved in models used to understand the solid state
- can apply knowledge of models to solve problems in solid-state physics using appropriate mathematical tools

Course Policies

Reading Assignments

Reading assignments will be given for each of the lectures. You are expected to come to class prepared, having read the assigned chapter of the textbook, and ready to ask questions. The lectures will cover key topics but will not go over all material in detail. You are responsible for all material in the assigned readings and in the lecture notes.

Homework

Homework assignments will be available on the Blackboard page by the beginning of class every Tuesday (except for the first week and last week of the course) and are due at the beginning of class next Tuesday, unless you are told otherwise. No late assignments will be accepted. Homework must be clearly written, and solutions must be clearly explained.

Homework assignments may be different for students enrolled in PHYS 403 and in PHYS 604. Quizzes and exams will be the same. Getting help from other students is allowed, but all of the work that you turn in must be your own.

Exams and Quizzes

Two mid-term exams will take place during the semester, during scheduled class time. The final exam will be at the date and time set by the University. Exams include all course material covered up to the day of the exam. Quizzes will take place at the beginning of class and will include material covered since the previous quiz.

All exams and quizzes are closed book, and no electronic devices of any kind may be used. You may bring one page of hand-written notes into the exams; no notes are allowed in the quizzes. Neatness and clarity are important on the exams, as they are on the homework assignments. Make-up exams will be given only if you miss the exam for a documented medical or legal problem or family emergency.

Grading

Your final grade will be determined by a numerical score, calculated as follows:

Final exam:	40%
2 mid-term exams:	30% (15% each)
Homework:	25%
Quizzes:	5% (1% each)

In order to convert this numerical score into a letter grade, I will first calculate the average of the scores for the top 15% of the students in the class. This score will be the benchmark for determining letter grades. The benchmark and your letter grade will be based on the final score. (*I.e.*, I will be comparing your grade to the benchmark only once, at the end of the semester, and not for every exam or homework.)

A:	$\geq 90\%$ of the benchmark
B:	80 – 89% of the benchmark
C:	70 – 79% of the benchmark
D:	50 – 69% of the benchmark
F:	$< 50\%$ of the benchmark

The homework assignment on which you got your lowest grade will be dropped, and the remaining assignments will be weighted equally in determining the homework portion of your score. This is meant to allow for things that come up unexpectedly, and additional accommodation will be possible only if there are valid extenuating circumstances.

Academic Integrity

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are

wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult UMBC policies, or the Faculty Handbook (Section 14.3).

Misconduct, such as cheating or plagiarism, will result at a minimum in a zero on the corresponding assignment or exam and a report to the Academic Misconduct Reporting Database.