

Syllabus & Information for 227-0145-00
"Solid State Electronics and Optics"
Fall Semester 2018

Lecture: Mondays 13:15 – 16:00 ETZ E8

Week	Date	Subject
1	September 24	Intro to class
2	October 1	Crystal structure and bonding <i>Quiz 1</i>
3	October 9	Bonding and vibrations <i>Quiz 2; sign up for final project</i>
4	October 15	Free electrons <i>Quiz 3</i>
5	October 22	<i>Final project preparation</i>
6	October 29	Mechanical and thermal properties <i>Quiz 4</i>
7	November 5	Electrons in a periodic potential <i>Quiz 5</i>
8	November 12	Electronic and thermal conductivity <i>Quiz 6</i>
9	November 19	Semiconductors and recombination <i>Quiz 7</i>
10	November 26	Absorption & luminescence <i>Quiz 8</i>
11	December 3	Light propagation <i>Quiz 9</i>
12	December 10	Final project presentations / exam review
13	December 17	Final project presentations / exam review

Class Structure:

This class will be run as an “flipped classroom”. Except for the first lecture, there will be no formal lecture during the Monday afternoon meeting time. Instead, you will get a script to read over before the class – you should budget about 1 hour per week for this. The 3 hours of in-class time will be made as interactive as possible. In the first period, there will be a 15-minute quiz. This is a *learning tool* for you to check if you retained and understood the key points from the reading. We will immediately go over the answers to the quiz and clarify any open questions. After a 10-minute break, we will begin two problem solving sessions of approximately 50 minutes each. You are allowed and encouraged to work and discuss with your classmates. Prof. Wood will move around the classroom and discuss your progress and questions with you. Periodically, we will all check in at the blackboard to discuss open questions, approaches, and answers. To class you should bring something to write with, paper, and a calculator.

Final Project:

You will have the option of completing a final project in a small group (3-5 students per group depending on the final enrollment numbers). Possible final project topics will be selected from a list and require you to apply your learnings from the course to explain how a material is used in a device. In the last two weeks of class, you will become the teachers and we will have the final presentations. Each group will give a 12-minute presentation and answer questions for 8 minutes. You will be graded on the scientific correctness as well as the presentation quality (clarity and didactic quality, keeping in time, correct level for your audience – i.e., your peers).

Class Grading:

You must sign up for and complete the final exam to pass and be given a grade for the course. However, there are two options for grading:

Option 1. 100% final exam, or

Option 2. 70% final exam, 30% final project

If you complete 8 of the quizzes with an average score of >60%, this can add an additional 0.25 to your final grade.

You do not need to decide up front which option you prefer. If you complete the quizzes and final project, they will be graded. The option that gives you the highest grade will be used to determine your final grade. In other words, you can only benefit (both intellectually and grade-wise from participating in class and in final project). No make-up quizzes will be offered, but only the 8 highest quiz grades will be factored into Option 2.