ECE 4070, Spring Semester 2017
Physics of Semiconductors and Nanostructures
Handout 0: Course Information

Instructor:
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Course Website:
https://djena.engineering.cornell.edu/2017_ece4070_mse6050.htm
Homework assignments and postings will appear on this website. Please bookmark it.

Class Hours:
Tuesdays and Thursdays 11:40 am - 12:55 pm.
Location: Hollister Hall 312.
Office hours: To Be Decided.

Prerequisites:
AEP 3610 and AEP 4230 or permission of instructor.

Course contents:
Covers basic solid state and semiconductor physics relevant for understanding electronic and optical devices. Topics include crystalline structures, bonding in atoms and solids, energy bands in solids, electron statistics and dynamics in energy bands, effective mass equation, carrier transport in solids, Boltzmann transport equation, semiconductor homo- and hetero-junctions, optical processes in semiconductors, electronic and optical properties of semiconductor nanostructures, semiconductor quantum wells, wires, and dots, electron transport in reduced dimensions, semiconductor lasers and optoelectronics, high-frequency response of electrons in solids and plasmons.

Outcomes:

- Learn basic principles of solid state and semiconductor physics needed to understand modern electronic and photonic devices.
- Learn how engineering materials and structures at the nanoscale enables novel electronic and photonic properties for a wide variety of engineering applications.
- Learn the relationship between basic science and engineering applications.

Homeworks:

- Homework assignments are an integral part of learning in this course. Approximately one problem set will be assigned every two weeks.
- You are allowed to work with other students in the class on your homeworks. The name(s) of the student(s) you worked with must be included in your homework. But what you turn in must be in your *own* writing, and have your *own* plots and figures. Turning in plots/figures/text that are exact replicas of others *is considered cheating* (see below).
- Assignments must be turned in before class on the due date. The time the assignment is turned in should be written. There will be a 10% penalty each day of delay, and assignments will not be accepted beyond 3 days after the due date. There will be no exceptions to this rule.

- Present your solutions *neatly*. Do not turn in rough unreadable worksheets - learn to **take pride in your presentation**. Show the relevant steps, so that partial points can be awarded. BOX your final answers where applicable. Draw figures wherever necessary. Please print out the question sheet(s) and staple to the top of your homework. Write your name, email address, and date/time the assignment is turned in on the cover.
- Grading of the ECE 4070 / MSE 6050 assignments will be done by a course grader, with support from the instructor.

Cheating Policy:
Collaboration in homework assignments is allowed, but you must adhere to the requirements described in the homeworks section above. Collaboration in exams is considered cheating. Please read Cornell's policy on cheating here: `http://cuinfo.cornell.edu/aic.cfm`. Let's approach the course in a spirit of discovery!

Exams and Grades:
Other than the assignments, there will be two written prelim exams, and a written final exam. Here is the approximate breakup of scores that will go towards your final grade:

35% Assignments
15% Prelim 1 [Tuesday February 28th, 2017]
20% Prelim 2 [Thursday, March 30th, 2017]
30% Final [TBD]

Demonstrations and Laboratories:
A few demonstrations will be performed in the course. Some of the course assignments will include laboratory components or demonstrations.

Textbooks:
The **required reading** will be the posted handouts. No text is required, but you are strongly encouraged to refer to the following texts:
-Ashcroft and Mermin (Solid State Physics)
-Kittel (Introduction to Solid State Physics)
-Davies (The Physics of Low Dimensional Semiconductors)
-Kroemer (Quantum Mechanics)
-Griffiths (Quantum Mechanics, if you have not had quantum before)