

ECE 308 - Spring 2005

Physics and Models of Electronics and Optoelectronics Devices (3)

Lecture Time: Spring 2005, Tuesday and Thursday at 2:35-3:50 pm

Location: Packard Lab 317

Instructor: Nelson Tansu, Ph.D.  
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Required Readings:

1. H. Craig Casey, Jr., Devices for Integrated Circuits, Silicon and III-V Compound Semiconductors, Wiley (1999).
2. Additional handouts and lecture notes

The course will cover all the chapters in the above textbook with the following topics:

1. Introduction: Integrated Circuits (Chapter 1)
2. Electrons in Solids (Chapter 2)
3. Carrier Transport and Recombination (Chapter 3)
4. p-n junctions (Chapter 4 & 5)
5. Schottky Barrier Devices (Chapter 6)
6. MOS Devices: Capacitors, CCD, and FETs (Chapter 7, 8)
7. Bipolar Transistors (Chapter 9) - Optional
8. Semiconductor Heterostructure (Lecture Notes)
9. Semiconductor Optoelectronic Devices: Lasers, LEDs, Photodiodes, and Solar Cells (Handouts and Lecture notes)

The structure of the course will consist of weekly homework assignments, a midterm exam, and a final exam with the following proportion toward the final grade:

1. Problems – 50 %
2. Midterm Exam – 20 %
3. Final Exam – 30 %

The goals from this course:

1. You would be able to understand the device physics and the operating principles of basic semiconductor electronic devices in microelectronic integrated circuits.
2. You would be introduced to the basic device physics of semiconductor optoelectronic devices.

Homework Policy:

1. Homework is given on every Thursday, and due on the following Thursday before class. (a week later)
2. No late homework is accepted, unless there is a medical emergency or permissions given in advance.
3. Working together in homework is encouraged, but not copying!