Department of Electrical and Computer Engineering

Course	**Solid State Electronics ECE 511**	**Fall, 2011**
Text:	**Physics of semiconductor devices (third edition) by S. M. Sze, Kwok K. Ng.**	

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ISBN-10: 0-471-14323-5

A. Course Description

The course provides an introduction to physics of semiconductor devices. It covers fundamental aspects of semiconductor physics necessary for understanding operation principles and characteristics of semiconductor diodes and photodetectors.

Grading principles: Class attendance (*30%*), Midterm test *(topics 1-5, 30%)*, Final (*topics 6-11, 40%*).

B. Prerequisites

Prerequisite: BS in Physical Sciences or Electrical Engineering.

C. Student Responsibilities

Each student is expected to complete assigned readings and homework, participate in classroom activities, successfully complete midterm and final exams.

AGENDA

Basic Semiconductor Physics

1. Introduction
2. Semiconductor band diagram. Statistics of electrons and holes.
3. Recombination processes.
4. Carrier transport in semiconductors.
5. Interaction of light with solid state.

p-n Junctions, Schottky Barrier Junctions, and Ohmic Contacts

6. P-N junction and P-N diodes
7. Schottky Barrier Junctions and Schottky diodes
8. Ohmic Contacts

Metal-Insulator-Semiconductor (MIS) contact

9. MIS capacitor
10. Metal –Oxide-Semiconductor (MOS) diode

Photodetectors

11. Photoresistors and photodiodes