

## **ESE 372 Electronics**

Spring 2011

The pertinent elements of solid-state physics and circuit theory are reviewed and applied to the study of electronic devices and circuits, including junction diodes, transistors, and gate and electronic switches; large- and small-signal analysis of amplifiers; amplifier frequency response; and rectifiers and wave-shaping circuits.

The course is designed to provide the necessary theoretical support for lab courses ESE 211, 314 and 324.

**Text Books:** A.S. Sedra, K.C. Smith, "Microelectronic circuits",  
6<sup>th</sup> edition, Oxford, ISBN 978-0-19-532303-0

**Prerequisites:** ESE 271

**Corequisites:** ESE 211 for ECE/ESE majors only

**Topics Covered:**

Basic circuit elements. Signals in time and frequency domains.
Amplifiers and their frequency response. Circuits with OpAmps.
Introduction to semiconductors. Electric current in semiconductors.
Pn-junction diodes. Schottky and Zener diodes.
Rectifiers and other diode circuits.
Operation of Bipolar Junction Transistor.
BJT input/output characteristics. Bias of BJT circuits.
BJT small signal parameters. Common emitter amplifier.
CC and CB amplifiers. Frequency response of CE amplifier.
Operation of Field Effect Transistor.
MOSFET input/output characteristics. MOSFET bias.
MOSFET small signal parameters. MOSFET amplifiers.
CS, CG and CC amplifiers.
Frequency response of CS MOSFET amplifier.

**Class/laboratory Schedule:** Lecture: 1hour 20min/2 days per week

Recitation: 55min/1 day per week

**Grading:** Exams - 60%, Homeworks - 35%, Portfolio 5%