# CMPE 314: Principles of Electronic Circuits

## Summer 2014

**Lecture:**      Tu, Th 4:00 – 5:30 pm; Lab: Tu 6:00 – 8:00 pm

**Classrooms:**   ITE 102 (Lecture); ITE 242 (Lab)

**Instructor:**   Ali Jafari
ITE 313, a137@umbc.edu
Office Hours: Th 5:30 – 7:30 pm (ITE 242) or by appointment

**Textbook:**     <u>Electronics Circuit Analysis and Design</u>, 4th Ed., by Donald A. Neamen (McGraw-Hill)

   A brief overview of semi-conductor devices and technology. The basic physical operation of PN-Junction diodes, junction field effect transistor, MOSFETs and bipolar transistors. The corresponding small signal AC models. Basic transistor circuit configuration (CE, CC, CB, CS, CD, CG). DC bias. Small signal analysis. Simple multitransistor circuits: diffamp, operational amplifier and current mirror frequency response. In addition to the lectures, there is a laboratory associated with course. Prerequisite: CMPE 306.

**Grading:**      40% Final exam
25% Midterm exam
20% Labs
10% Homework assignment
5% Class participation/ Quiz/ Class exercise

## Course Goals

1. Students will understand the operation and use of PN-junction diodes
2. Students will understand the operation and use of Filed-Effect transistors (FETs)
3. Students will understand the operation and use of bipolar transistors.
4. Students will be able to apply the basic small signal AC models to the various types of transistors and will be able to conduct small signal analysis as appropriate.
5. Students will be able to analyze simple multi-transistor circuit.
6. Students will understand basic frequency response of transistor circuits.

## Class policies:

Completion of all laboratory projects is mandatory. Missing of any lab project will result in, at the least, a grade of I (incomplete). Late homework and lab reports will not be accepted. Follow the lab policies.

**Subjects and approximate schedule:**

Week 1:  Semiconductor materials, PN-junction diodes

Week 2:  Diode characteristics and models, rectifier circuit

Week 3:  Zener diode circuit, clippers and clampers circuits

Week 4: Bipolar junction transistor, BJT DC analysis and biasing

Week 5: midterm exam, Small signal hybrid-$\pi$ model

Week 6:  BJT Ac analysis and amplifier circuits

Week 7: Multi-transitor circuits

Week 8: Field-effect transistor circuits, DC analysis

Week 9: Small signal AC models, FET amplifiers circuit

Week 10: Active loads, multi-transistor circuits

Week 11: Frequency response

Week 12: Applications

**Student Academic Integrity**

"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are to be held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full student academic policy, consult the UMBC student handbook, the faculty handbook, or the UMBC policies section of the UMBC directory."

You may study together. You must do your own work and not copy from anyone else or from the solutions obtained elsewhere! Copying will result in zero points and cheating on the exam will be reported to the department and university.