EE 427 Computer Aided Circuit Design

Designation: Elective

Catalog Description:
Application of the computer in the analysis, simulation, and design of CMOS analog circuits (to be updated in the next catalog printing).

Credits: 3
Prerequisites: EE 326 and EE 326 L
Class/Lab Schedule: 3 lecture hours per week

Topics Covered:
This course covers the fundamental concepts of analog integrated circuit design. Throughout the course, the students use software tools to do homework and projects. To develop intuition with analog circuits, the students are encouraged to first analyze circuits with inspection followed by validation of their results with computer simulation. The topics covered are

- Introduction/Review (1 hrs)
- MOS device physics (3 hrs)
- Short channel effects/CMOS processing tech (2 hrs)
- Single stage amplifier (8 hrs)
- Differential amplifier (10 hrs)
- Passive and active current mirrors (5 hrs)
- Frequency response and feedback (5 hrs)
- Op amps (5 hrs)
- Introduction to switched capacitor circuits (2 hrs)

Text Book and Other Required Materials:

Course Objectives and Their Relationship to Program Objectives:
The students learn the fundamental principles, analysis, and design of MOS analog integrated circuits. Learn computer aided techniques in the design of analog integrated circuits. [Program Objectives this course addresses: 1, 2, 3, 4, 5]

Course Outcomes and Their Relationship to Program Outcomes:
The following are the course outcomes and the subset of Program Outcomes (numbered 1-11 in square braces "[ ]") they address:

- Demonstrate an ability to design a system or component that meets a specified need [2,3,5,9,10,11]
- Develop an ability to use the techniques, skills, and modern tools necessary for engineering practice [3,11]
- Enhance the student’s ability to design an experiment and to analyze the resulting data [2,3,5,11]
• Enhance the students’ ability to communicate effectively [7]

**Computer Usage:**
Computer usage for this class is necessary and essential. Software tools (such as SPICE/Cadence) are used to verify analyses/concepts and used to design circuits in homework problems and projects.

**Design Credits and Features:**
EE 427 has 1.5 design credits.

**Instructor(s):** V. Malhotra

**Person(s) Preparing Syllabus and Date:** V. Malhotra, May, 2009.