The University of Texas at Tyler
Department of Electrical Engineering

EENG 5340: Advanced Topics in EE: Analog CMOS Design

Syllabus

Catalog Description:
CMOS device characteristics, fabrication, and modeling; CMOS analog subsystems (switches, current sources, and voltage references), amplifiers, and voltage comparators.

Prerequisites: EENG 4309, EENG 4109

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Behzad Razavi, *Design of Analog CMOS Integrated Circuits*  

Additional Material: Journal articles, Access to PSpice

Course Coordinator: David Beams, Associate Professor, Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)
1. CMOS device electrical characteristics;
2. CMOS fabrication processes;
3. Modeling of MOS devices;
4. CMOS switches;
5. MOS voltage references;
6. MOS current sources and current mirrors;
7. CMOS amplifiers and operational amplifiers.

Evaluation Methods: (only items in dark print apply):
1. Examinations / Quizzes  
2. Homework  
3. Report  
4. Computer Programming  
5. Project  
6. Presentation  
7. Course Participation  
8. Peer Review

Course Objectives1: By the end of this course students will be able to:
1. Describe the I-V characteristics of MOS transistors operating in triode and saturation regions [2,3,6];  
2. Describe the processing steps in the fabrication of CMOS devices [2,3,6];  
3. Model MOS devices operating in both triode and saturation regions[2,3,6];  
4. Design CMOS analog switches [2,3,6];  
5. Analyze and design CMOS voltage references [2,3,6];  
6. Analyze and design CMOS current sources and current mirrors [2,3,6];  
7. Analyze and design CMOS operational amplifiers [2,3,6];
Relationship to Program Outcomes (only items in dark print apply): This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. Possess a breadth and depth of knowledge in electrical and computer engineering. Students will possess and be able to apply knowledge and principles at a graduate level in two or more of the following areas utilizing modern engineering tools: electronics, power systems, controls, advanced engineering mathematics, signal processing, communications, real-time systems, computer systems, electromagnetic and power electronics. [1, 2, 3, 4, 5, 6, 7]

2. Possess and demonstrate oral and written communication skills: Students will be adequately prepared for entrance into advanced careers or into a doctoral program through reports, papers, publications, or presentations. [1, 2, 3, 4, 5, 6, 7]

3. Demonstrate the capability to perform independent learning and investigation: Students will successfully address electrical or computer engineering problems through independent research activity in coursework or a thesis. [1, 2, 3, 4, 5, 6, 7]

Contribution to Meeting Professional Component: (in semester hours)

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<thead>
<tr>
<th>Area</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Mathematics and Basic Sciences:</td>
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<tr>
<td>Engineering Sciences and Design:</td>
<td>3</td>
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<td>General Education Component:</td>
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Prepared By: David Beams  Date: 30 Aug 2010