EE223 Analog Integrated Circuits
Fall 2005

Course Objective: Introduction to analog integrated circuits. Bipolar and MOS transistor models. Analysis and design of monolithic operational amplifiers. Frequency response. Feedback amplifier theory and design. Applications to specific case studies, such as phase-locked oscillators and wide-band amplifiers. Switched-capacitor filters.

Course Description:

Intended Audience: Graduate students in EE with previous exposure to semiconductor devices.

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Office Hours: TTh 20:15-21:15 & MW 18:45-19:15 (make appointments)

Lectures: MW 17:30-18:45 Location: IS113

Textbook:

- Analysis and Design of Analog Integrated Circuits, 4th Edition by Gray, Hurst, Lewis, & Meyer, John Wiley

Other useful sources:

- The Design of CMOS Radio-Frequency Integrated Circuits, by Lee, Cambridge university press.
- Microelectronic Circuits, by Sedra & Smith, Oxford Press.
- Journal of Solid State Circuits, IEEE.

Topics:

- Semiconductor devices and models
- Amplifiers
- Current mirrors, active loads and references
- Output stages
- Operational Amplifiers
- Frequency response of integrated circuits
- Feedback
- Frequency response and stability of feedback amplifiers
- Non-linear analog circuits
- Fully differential operational amplifiers

Prerequisites: EE221

Homework: Homework assignments will be recommended at the end of each section represent a minimum number of suggested practice problems for the students to solve to test their understanding of the material covered in lecture. Even though homework will not be picked up or graded, they should be treated as an invaluable learning tool to get a good grasp of the material covered in this course.

Exams: There will be 1 examination in addition to the final comprehensive examination. The approximate dates of these examinations are shown on the course calendar. All exams will be open-book. There will be no make up exams. Any student who fails to take an examination will receive a letter grade "F" for that particular examination.

Project: This course involves a detail project; the topic of the project can be selected from suggested topics or desired topics (in case of desired topic, the new topic need to be approved by instructor). The project requires designing, analyzing, and simulating a proposed circuit to meet the design targets. You will present the results of your work to rest of class during a 20 minutes presentation and 5 minutes Q/A session. You need to submit the selected topic and design goals to instructor by Oct 3. The final report, including the results of your simulations, needs to be submitted by final exam. The project grade will be based on these criteria: material and design achievements, presentation, depth of material, handling of questions, report.

Quiz: There will be four to five quizzes to examine the level of understanding of the material covered during lectures. Quiz will be announced on previous lecture. No make up exam!

Course Grading:
Project 30%
Quiz 10%
Midterm 20%
Final 40%

Honor Code: All students in the Department of Electrical Engineering are expected to subscribe to the following Honor Code:
I have read the honor code below and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code.
I will not:

- Take an exam in place of someone else, or have someone else take an exam in my place.
- Give information or receive information from another person during an exam.
- Use more reference material during an exam than is allowed by the instructor.
- Obtain a copy of an exam prior to the time it is given.
- Alter an exam after it has been graded and returned it to the instructor for re-grading.

Measures Dealing with Occurrences of Cheating:
A. The student or students involved in cheating should get an F in the evaluation instrument (paper, exam, project, homework etc.) and should get reported to the Department and the University.
Second offense will result in suspension.

Course Calendar
EE223-01 Fall 2005

Week	Topic	Event	Comments
Aug. 29th – Sep. 2nd	Introduction/semiconductor devices		
Sep. 5th – Sep. 9th	Semiconductor devices/ process/ modeling		
Sep. 12th – Sep. 16th	Single/multiple transistor amplifiers		
Sep. 19th – Sep. 23th	Active loads, current sources		
Sep. 26th – Sep. 30th	Current sources		Submission of project topics
Oct. 3rd – Oct. 7th	Output stages		
Oct. 10th – Oct. 14th	Single ended operational amplifiers		
Oct. 17th – Oct. 21st	Single ended operational amplifiers		
Oct. 24th – Oct. 28th	Review	Midterm	
Oct. 31st – Nov. 4th	Frequency response of integrated circuits		
Nov. 7th – Nov. 11th	Feedback		
Nov. 14th – Nov. 18th	Frequency response and stability of feedback amplifiers		
Nov. 21st – Nov. 25th	Project presentations	No class on Wed. 11/23/05	Thanksgiving
Nov 28th – Dec 2nd	Project presentations		
Dec 5th – Dec 9th	Project presentations		
Dec 12th – Dec 16th			