EE3115 Analog Electronics

Updated: December 17, 2012

This course outline is to serve as a reference for instructors and students. It gives a general overview of course content and ABET Outcomes. Please consult the semester specific syllabus produced by the course instructor for more detailed information.

Course Prerequisites, Basic Content, and Outcomes

Catalog Description:
(3.0 cr; Prereq-[3015 or &3015, CSE] or %; fall, spring, summer, every year) Basic differential amplifiers using FETs and BJTs. Current sources for differential amplifiers. Op- amp-based differential amplifiers. IC op amps as multi-stage amplifiers. Ideal (dc) feedback. Stability and compensation of negative feedback amplifiers. Sinusoidal oscillators. Waveshaping circuits. Power amplifiers. Use of circuit simulators.

Contact Hours:
3 lectures and 1 discussion section per week.

Text:
Microelectronic Circuits, Sixth Edition, Adel S. Sedra and Kenneth C. Smith, Oxford University Press

Prerequisites by Topic:
DC circuit analysis. Time domain analysis of RC and RL circuits. Diode, transistor dc and small signal analysis. Laplace and phasor analysis.

Course Outcomes:
1) The ability to analyze and design basic microelectronic circuits and a functional block level - including different blocks such as differential amplifiers, power amplifiers, and basic digital circuits.
2) The ability to analyze feedback circuits in terms of their classic feedback topologies.

Relationship to Student Outcomes:
In accordance with the Accreditation Board for Engineering and Technology (ABET) accreditation criteria, all engineering programs must demonstrate that their students achieve certain outcomes. This list of student outcomes may be found on the ABET.org website. Of the student outcomes listed in the ABET criteria enumerated as (a) through (k), this course teaches skills which help the student achieve the following:

(a) an ability to apply knowledge of mathematics, science, and engineering
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Outline

Week	Lecture Topics
1	Review of MOSFET and BJT amplifiers; basic FET diff amps
2	Basic FET diff amps
3	Basic BJT diff amps; current sources for diff amps
4	Current sources for diff amps; op-amp based diff amps
5	Op-amp based diff amps; IC op-amps
6	IC op-amps as multi-stage amplifier
7	Ideal (dc) negative feedback
8	Ideal (dc) negative feedback
9	Stability and compensation of feedback ampifiers
10	Stability and compensation of feedback amplifiers
11	Sinusoidal oscillators
12	Waveshaping circuits
13	Analog to digital and digital to analog circuits
14	Power amplifiers
15	Review

Departmental and University Policies

Student Academic Integrity and Scholastic Dishonesty: Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

*Scholastic Dishonesty***:** Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging , or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

Incompletes: A grade of I for Incomplete is given at the discretion of the course instructor when, due to extraordinary circumstances, the student who has successfully completed a substantial portion of the course's work with a passing grade was prevented from completing the work of the course on time. Students must fill out an Incomplete Grade Agreement form found in Keller 3-166. The maximum time to remove and replace an incomplete grade is one year.

Makeup Work for Legimate Absensces: Consult university policy here:
http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html

Personal Electronic Devices: Consult university policy here:
http://policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html

Mental Health: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website at http://www.mentalhealth.umn.edu