EE 2011 Linear Systems and Circuits

Updated: Feb. 6 2013

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-2001; fall, spring, summer, every year)
Sinusoidal steady state analysis. AC power calculations. Laplace transforms. Laplace transforms in circuit analysis. Elementary filter circuits. Frequency response of elementary MOSFET amplifiers. BJT characteristics and biasing. BJT small signal models and elementary amplifiers. Frequency response of BJT amplifiers. Use of circuit simulators.

Contact Hours: 3 hours of lecture 1 hour of discussion per week.

Text:
Microelectronic Circuits, Sixth Edition, Adel S. Sedra and Kenneth C. Smith, Oxford University Press.
Electric Circuits, Ninth Edition, James W. Nilsson and Susan Riedel, Prentice Hall.

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

Course Outcomes:
1) The ability to analyze circuits in the sinusoidal steady state using phasors.
2) The ability to analyze and design small scale transistor amplifiers using both large signal and small signal concepts.
3) The ability to use Laplace Transform techniques to create system-level circuit descriptions in order to do time-domain and frequency domain analysis of circuits.

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

(a) an ability to apply knowledge of mathematics, science, and engineering
(e) an ability to identify, formulate, and solve engineering problems
(i) a recognition of the need for, and an ability to engage in life-long learning
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Outline

Week	Lecture Topics
1	Sinusoidal steady state analysis; phasors, power calculations.
2	Sinusoidal Steady State Analysis
3	AC Power Calculations
4	Introduction to the Laplace Transform
5	The Laplace Transform in Circuit Analysis
6	Laplace Transforms in Circuit Analysis
7	Laplace Transforms in Circuit Analysis
8	Laplace Transforms in Circuit Analysis; Frequency Selective Circuits
9	Frequency Selective Circuits; Review of MOSFET characteristics and amplifiers
10	Frequency respons of MOSFET amplifiers
11	Frequency respons of MOSFET amplifiers
12	BJT Characteristics, load lines, and biasing
13	BJT Single transistor amplifiers
14	Frequency response of BJT amplifiers

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