ECE 200 Syllabus

Course: ECE 200

Credit Hours: 4

Course Title: Introduction to Signals, Systems & Circuits

Course Description:

Laboratory with experiments designed to provide fundamental concepts and an overview of Electrical and Computer Engineering specialization areas including Analog Electronic Circuits, Electric Power, Communication Systems, and Signal Processing. Introduction to standard laboratory equipment including power supply, multimeter, function generator, oscilloscope and spectrum analyzer.

Prerequisite(s): C- or better in MA 241 and PY 205; Co-Requisite: MA 242 & PY 208

Textbook(s) and/or other required material:

Textbook is written by ECE faculty (2000). The contributors are: M.C. Ozturk, H.J. Trussell and M. Baran. The notes are available in pdf format at the course web-site.

Course objectives. By the end of this course, the student should be able to (use demonstrative verbs):

1) Apply Ohm's Law and Kirchoff's Laws to simple circuits consisting of voltage sources, linear and non-linear resistive elements and capacitors.
2) Identify/measure/calculate time-varying waveform parameters including amplitude, peak-to-peak value, frequency, period, duty cycle, average (DC) value, root-mean-square, phase angle and time delay, from graphs, oscilloscope screenshots, and equations.
3) Determine and plot the instantaneous power dissipated on a resistive load given an arbitrary voltage waveform applied to the load in graphical or equation form, and use the instantaneous power to determine the real power.
4) Generate and analyze amplitude, phase and power spectra of periodic signals.
5) Find the amplitude or power spectrum of the signal at the filter output, given the periodic signal applied at the input and the frequency response or power gain.
6) Determine the input-output relationship of an operational-amplifier circuit including the voltage gain, the power gain, and the transfer characteristic.
7) Calculate the output signal waveform, given the transfer characteristic of an amplifier and an input signal.
8) Determine the amplitude or power spectrum of a signal at the filter/amplifier output, given the frequency response of a filter/amplifier and the amplitude or power spectrum of the periodic signal applied to the input.
9) Explain and use the concepts of signal multiplication, amplitude modulation (AM), and AM demodulation.

Topics covered:

Part I - Introduction to Circuits & Signals:Resistive Circuits(4);Capacitors and RC Circuits (2);

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Periodic Signals in Time Domain (2);Electric Power(2);Periodic Signals in Frequency Domain (1).
Part II - Introduction to Systems & Analog Signal Processing: Amplification of Signals (2);Operational Amplifiers (3);Filters (2);Transmission and Reception of RF Signals (2);Guest Lectures (on various specialty areas in ECE)(2)

Class/laboratory schedule (sessions per week and duration of each session):

Two 75-minute lectures per week and one 170 minute lab per week

Contribution of course to meeting the requirements of Criterion 5 - other:

Contribution of course to meeting the requirements of Criterion 5 - math and basic sciences:

Contribution of course to meeting the requirements of Criterion 5 - engineering topics:

4 hours

Contribution of course to meeting the requirements of Criterion 5 - general education:

Relationship of this course to program learning outcomes:

Learning Outcome	Level of Instruction	Related Course Content
Outcome A	Major	Students learn about fundamental circuit laws and analysis, I-V characteristics of a variety of passive and active circuit elements, analysis of signals in both time and frequency domains.
Outcome B	Major	Students conduct experiments on circuits and system using standard laboratory equipment and educational hardware created specifically for this laboratory.
Outcome C	Intermediate	Students design simple circuits using passive and active circuit elements including

Relationship of this course to program learning outcomes:

Learning Outcome	Level of Instruction	Related Course Content
		resistors, capacitors, diodes and operational amplifiers.
Outcome D	Major	
Outcome E	Basic	Many of the experiments refer to engineering problems in real life such as light dimmers, solar cells, amplifiers, radios and A/D converters.
Outcome F	Basic	IEEE code of ethics is introduced to the students.
Outcome G	Major	Students produce formal laboratory reports for all the experiments. Good writing skills are emphasized in grading of the lab reports.
Outcome H	Basic	Lectures on different specialization areas include discussions on impacts of engineering solutions.
Outcome I	Basic	Lectures emphasize the fact the Electrical and Computer Engineering is a rapidly growing discipline and that life-long learning is essential to keep up with the advances.
Outcome J	N/A	
Outcome K	Major	Students learn to use standard testing equipment (oscilloscopes, function generators, multimeters, spectrum

Relationship of this course to program learning outcomes:

Learning Outcome	Level of Instruction	Related Course Content
		analyzers).

Person who last prepared this description and date of preparation:

- Ozturk, Hatice Orun (hoo) - Apr 15th, 2010 (12:16pm)