COURSE SYLLABUS STEM Ed Abroad Program

Course Title: Introduction to Signals, Systems & Circuits

Course Semester: Fall

University and Country: Adam Mickiewicz University; Poznan, Poland

Number of ECTS: 6 (lecture) and 2 (laboratory)

Course Designations for Transfer Credit: ECE200 (NCSU)

Content: 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.

Pre-requisites: Calculus III, Physics I and a basic course in Electrical Engineering.

Aims and Learning outcomes:
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-topeak 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.

COURSE SYLLABUS STEM Ed Abroad Program

Recommended Books: 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.

Instructors: TBA with consultation by Dr. Cecilia Townsend (NC State University).

Grading System and Percentage Contribution

A. Lecture assessment

Homework	12%
Problem Sessions	10%
Exam (3 @16% each)	48%
Final Exam, Cumulative	30%
Total	100%

B. Laboratory assessment

Preparation for laboratories	35%
Laboratory reports	65%
Total	100%

AMU Grading system and scale

The grading system used at Adam Mickiewicz University, whose name is abbreviated as AMU or UAM, is as follows:

Tests, exams, homework assignments grading scale

5 100%-91%
4+ 90%-86%
4 85%-76%
3+ 75%-71%
3 70%-60%
2 59% and less

This translates into the following ECTS (European internationally recognized system) grading scale:

ECTS Grade	AMU grade	Definition
A	5.0	EXCELLENT – outstanding performance with only minor errors
B+	4+ / 4.5	VERY GOOD – above the average standard but with some errors
B	4.0	GOOD – generally sound work with a number of notable errors
C+	3+ / 3.5	SATISFACTORY – fair but with significant shortcomings
C	3.0	SUFFICIENT – performance meets the minimum criteria
F	2.0	FAIL – considerable further work is required

Hours: 3 Lecture hours hour per week. The laboratory component consists of XXX topics listed below. Each laboratory has a duration of 2.5 hours.

COURSE SYLLABUS STEM Ed Abroad Program

Course Lecture and Laboratory Topics:

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):

Three 50-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:

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 resistors, capacitors, diodes and operational amplifiers.
Outcome D	Major	Many of the experiments refer to engineering problems in real life such as light dimmers, solar cells, amplifiers, radios and A/D converters
Outcome E	Basic	IEEE code of ethics is introduced to the students

Outcome F	Major	Students produce formal laboratory reports for all the experiments. Good writing skills are emphasized in grading of the lab reports.
Outcome G	Basic	Lectures on different specialization areas include discussions on impacts of engineering solutions.
Outcome H	Basic	Lectures emphasize the fact the Electrical and Computer Engineering is a rapidly growing discipline and that lifelong learning is essential to keep up with the advances
Outcome I	Major	Students learn to use standard testing equipment (oscilloscopes, function generators, multimeters, spectrum analyzer