Old Dominion University
Batten College of Engineering and Technology
Department of Electrical and Computer Engineering

ECE 202 – Circuits, Signals and Linear Systems – Fall 2010
Course Syllabus

Course Description:

Introduction to frequency-domain analysis of linear electrical circuits. Topics include Laplace transforms and Laplace transform analysis of circuits. Introduction to linear systems. Topics include: classification of systems; methods of system representation including differential equation, impulse response functions and transfer functions; methods of LTI system analysis including solution of differential equations, convolution and Laplace transform analysis, and system frequency response. Introduction to signal representations. Topics include: classification of signals, Fourier series representation of periodic power signals, Fourier transform representation of energy signals and Parseval's theorems for energy and power signals. Application of analysis techniques to electrical filters, signal sampling and multiplexing.

Prerequisites: ECE 201; Co-requisite: ECE287

Textbook (required):

- B. P. Lathi, Linear Systems and Signals, second edition, Oxford University Press, 2004. ISBN 978-0-19-515833-5.

Instructor:

Dr. Dimitrie C. Popescu.
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Course Goals and Objectives:

1. Develop understanding of basic concepts of signals and systems. Understand system representation through differential equations and then learn to apply Laplace transform to solve the differential equations.
2. Become familiar with time domain and frequency-domain analysis of LTI systems.
3. Develop understanding of frequency domain representation of signals and the use of Fourier series. Learn concept of the Fourier transform, properties and applications.

Course Topics to be covered:

1. Course Introduction. Mathematical Preliminaries (Ch. B);
2. Introduction to Signals and Systems: Overview and motivation; Classification of Systems; classification of signals; System modeling (Ch. 1);
3. Time Domain Analysis of Continuous Time Systems: impulse response, system response, stability (Ch. 2);

4. Laplace Transform Analysis of Continuous Time Systems: review of Laplace transform; solution to differential equations; the Laplace transformed circuit (Ch. 4);
5. Representation and Analysis of LTI systems: transfer function, system realization, frequency response analysis (Bode plots) (Ch. 4);
6. Fourier Analysis of Continuous Time Systems: periodic signals analysis using Fourier series; Fourier transform (Ch 6,7);

Evaluation:

1. In class quizzes: 10%
2. Homework: 20%
3. In class exam #1: 20%
4. In class exam #2: 20%
5. Final exam: 30%

Course Policy:

Homework must be handed in-person to the instructor at the beginning of the lecture on the day it is due. Late homework will not be accepted without a serious reason (in which case some points will be taken off for delay). Cheating is absolutely prohibited. Students are encouraged to discuss problem assignments with each other; however, submitted assignments are expected to be original work. Identical homework solutions from different students are not acceptable and will be penalized by taking off points from the full credit.

Examinations will be closed-book, closed-notes. Students are not supposed to receive or give assistance on examinations and quizzes.

Quizzes will be assigned frequently during the semester. There will be surprise quizzes.

Course Web Site:

Old Dominion University Blackboard.

Class Schedule for Fall 2010:

Lectures: Monday & Wednesday, 3:00 – 4:15 pm in Spong 208.
Office hours: Monday & Wednesday, 1:30 – 2:45 pm, or by appointment, Kaufman 231-G.

Examination Schedule for Fall 2010:

Quizzes: will not be announced.
In class exam #1: September 29.
In class exam #2: November 8.
Final exam: December 17, 3:45– 6:45 pm.