UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ECE-331	Signals and Systems I	6
Prerequisites	**Department**	**Semester**
ECE-102	Engineering	Fall, Spring
Type of Course	**Field**	**Language of Instruction**
Required	Engineering	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Antonis Hadjiantonis	3rd
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- develop an understanding of the need to model signals and systems
- investigate continuous time signals and their transformations
- investigate continuous time systems with emphasis on LTI systems
- introduce signal convolution
- introduce the Fourier series, the Fourier transform the Laplace transform and z-transform along with their properties
- expose the student to various signal- or system- related MATLAB projects

Learning Outcomes:

After completion of the course students are expected to be able to:

1. identify signals and systems using mathematical functions and equations
2. apply time and amplitude signal transformations in a step-by-step approach
3. categorize systems based on their properties and investigate LTI systems
4. solve convolution problems in both a graphical way and using MATLAB
5. explain Fourier series and Fourier and Laplace transforms and their properties
6. determine the concept of discrete signals

Course Content:

1. Signal representation. Classification of signals, basic time and amplitude transformations.
2. Signal properties (symmetry, periodicity) and characteristics: Average Value, Energy, Power and Root Mean Square (rms)
3. Elementary signals, singularity functions (unit step/impulse) and properties
4. Classification and properties of continuous-time systems. Linear and time-invariant (LTI) systems, the convolution integral, graphical convolution, systems described by differential equations, state-variable representation
5. Signal and vector duality. Orthogonal set of functions. Definition of Fourier series. Properties and LTI system analysis using Fourier series.
6. Definition of Fourier transform. The Fourier Transform integral and properties. Derivation of Fourier pairs with known pairs and properties. Power and Energy Spectral Density. Fourier Transform applications (LTI frequency response, DSC-AM)
7. Laplace transform. Two-sided/one-sided Laplace transform, properties, inverse Laplace transform, applications
8. Discrete-time systems. Impulse response, difference equation representation

Learning Activities and Teaching Methods:

Lectures, in-class assignments

Assessment Methods:

Homework, in-class assignments, projects, exams, final exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Signals, Systems, and Transforms	C. L. Phillips, J. M. Parr, and E. A. Riskin	Prentice Hall	2008	0131989235

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Continuous and Discrete Signals and Systems	S. S. Soliman and M. D. Srinath	Prentice Hall	1998	0131712578

Signals and Systems: Continuous and Discrete	R. Ziemer, W. Tranter, and D. Fannin	Prentice Hall	1998	013496456X