UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ECE-431	Signals and Systems II	6
Prerequisites	**Department**	**Semester**
ECE-331, MATH-280	Engineering	Fall
Type of Course	**Field**	**Language of Instruction**
Required	Engineering	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Ioannis Kyriakides	4th
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-Face	N/A	None

Course Objectives:

The main objectives of the course are to:

- provide the students with the mathematical tools for processing discrete signals and analyzing the behavior of discrete systems
- explain the z and Fourier domain characteristics of discrete signals and systems

Learning Outcomes:

After completion of the course students are expected to:

- understand the mathematical relationship between a continuous time signal and a discrete time signal and the method of conversion between the two
- perform basic signal operations such as convolution and correlation in the discrete domain
- represent discrete signals in the z-domain and perform inverse z-transform
- perform Fourier analysis of discrete signals
- understand implementations of the fast Fourier transform

Course Content:

- Signals, systems and signal processing, classification of signals, the concept of frequency in continuous-time and discrete-time signals, analog-to-digital and digital-to-

analog conversion

- Discrete-time signals and systems: analysis of discrete-time linear time-invariant systems, discrete-time systems described by difference equations, implementation of discrete-time systems, correlation of discrete-time signals
- The z-transform and its applications: properties of the z-transform, inverse z-transform, analysis of linear time-invariant systems in the z-domain
- Frequency analysis of signals and systems: frequency analysis of continuous-time and discrete-time signals, properties of the Fourier transform, frequency-domain characteristics of linear time-invariant systems, linear time-invariant systems as frequency-selective filters.
- The discrete Fourier transform – its properties and applications: frequency domain sampling – the discrete Fourier transform (DFT), properties of the DFT, linear filtering methods based on the DFT, frequency analysis of signals based on the DFT
- Efficient computation of the DFT: fast Fourier transform algorithms, applications of FFT algorithms, a linear filtering approach to computation of the DFT, quantization effects in the computation of the DFT

Learning Activities and Teaching Methods:

Lectures, in-class assignments.

Assessment Methods:

Exams, final examination.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Digital Signal Processing: Principles, Algorithms and Applications	J. Proakis and D. Manolakis	Pearson Prentice Hall	2007	0131873741

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Digital Signal Processing: Fundamentals and Applications	Tan, Li	Ebsco Host	2008	9780080550572

Signals, Systems, and Transforms	Charles L. Phillips, John Parr, Eve Riskin	Prentice Hall	2007	0131989235
Discrete-Time Signal Processing	Oppenheim and Shafer	Prentice Hall	1999	0137549202