Course title		Code	semester	T+U	credit	ECTS
Signal Processing			2	3+0	3	4

Prerequisite Courses	None
Language of the Course	English
Course Level	Undergraduate
Type of Course	Optional
Course Coordinator	
Instructors	
Course Assistants	
The aim of lesson	This course is designed to teach how to process digitized information in digital signal processing systems.
Course Content	Discrete-Time Signals and Systems; Discrete-time Fourier Transform; Discrete Fourier Transform, Discrete-time Processing of Continuous Time Signals; z-transform; Frequency Domain Analysis of Linear and Time-Invariant Systems; Digital Filter Design Techniques
Course Learning Outcomes	Students who successfully complete this course; 1. Gain a perspective on the basic principles and techniques of digital signal processing. 2. Gain the ability to understand and design new digital signal processing systems. 3. Will be able to design digital filters with a computer-based approach. 4. They will understand how to apply mathematical concepts to real world problems. 5. Develop algorithms for the application of digital signal processing concepts.

Weeks	Topics
one	Introduction / Signals, Systems and Signal Processing / Classification of Signals / Frequency Concept in Continuous and Discrete Time Signals
2	Sampling Process / Analog-to-Digital and Digital-to-Analog Conversion / Sampling and Reconversion of Continuous Time Bandpass Signals
3	Discrete-Time Signals / Discrete-Time Systems / Analysis of Discrete-Time Linear Time-Invariant Systems / Analysis of Discrete-Time Systems with Difference Equations
4	Implementation of Discrete-Time Systems / Convolution / Correlation in Discrete-Time Signals
5	Frequency Analysis for Discrete-Time Signals / Frequency-Domain and Time-Domain Signal Properties / Fourier Transform Features for Discrete-Time Signals
6	Frequency-Domain Properties of Linear Time-Invariant (LZD) Systems
7	Frequency Response of DZD Systems / Using DZD Systems as Frequency-Selective Filters
8	Frequency Domain Sampling: Discrete Fourier Transform (AFD) / Features of AFD / Frequency Analysis using AFD
9	Frequency response of time-invariant systems. Its response to true sinusoidal signals. Ideal filters and their applications. Time domain and frequency domain.
10	The z-Transform and its Application to the Analysis of LZD Systems / Properties of the z-Transform
11th	Inverse z-Transform / Analysis of LZD Systems in z-Field
12	Structures for Implementation of Discrete-Time Systems / Structure of FIR Systems / Structures for IIR Systems
13	Digital Filter Design / FIR Filter Design
14	IIR Filter Design from Analog Filters
15	Multirate Digital Signal Processing

General Competencies
To be able to learn how to process digitized information in digital signal processing systems.

resources
John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing: Principles, Algorithms, and Applications, 4th Edition. Prentice Hall. 2007. SK Mitra, Digital Signal Processing, , 4th Edition, McGraw-Hill Int. Edition, 2011.
Evaluation System
The dates, days and hours of the Midterm Exam, Quiz, Final Exam and Evaluations will be announced later, according to the decision of the Faculty Administrative Board.

	WITH PROGRAM LEARNING OUTCOMES COURSE LEARNING OUTCOMES RELATIONSHIP TABLE										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PC11**
INCREASE 1	5	5	5	5	4	4	4	5	3	4	3
INCREASE 2	5	4	4	5	4	3	3	3	3	4	3
INCREASE 3	5	5	5	5	5	3	3	3	3	3	3
LO4	5	5	5	5	5	4	3	3	3	3	3
LO5	5	5	5	5	5	3	3	3	3	3	3
LO: Learning Outcomes OP: Program Outcomes											
Contribution Level	1 Very Low		2 Low		3 Medium		4 High		5 Very High		

Relation of Program Outcomes and Related Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
Signal Processing	5	5	5	5	5	3	4	4	3	4	3