Course Name : Signals Theories

Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 311	C	Fall	2.00	0.00	2.00	3.00	6.00

Lecturer	Ervin Hajdari, Msc
Assistant	Fezi Shaholli, Msc
Course language	Albanian
Course level	Bachelor
Description	General knowledge. The main properties of signals. Fourie analysis of signals. Properties of Furie transform. Modulated signals. Knowledge of systems. Laplace transform and Z transform. Properties of systems. Analog and digital filters. Digital signals. Noises Random signals.
Objectives	The course aims to provide basic knowledge about signals and their classification; comparison of signals; trigonometric and exponential series with corresponding spectra; Laplace transform and its properties; Furie transformation and its properties; Signal energy and power; Classification of systems and their analysis in time and frequency; Modulations of signals in amplitude, phase and frequency with their respective spectra; Sampling and quantization of signals; Filters and their classification; Basic knowledge of random signals; Basic concepts related to discrete signal processing; Analysis of signals and systems through Z transformation, discrete Fourie transformation and fast Furie transformation algorithm; Implementation and construction of digital filters.
Core Concepts	1. Continuous signals and systems in time domain. 2. Discrete signals and systems in time domain. 3. Analog and digital communications. 4. Digital processing of signals.

Course Outline

Week	Topic
1	Signals and systems. Their classification. Exercises and problems
2	Continuous and linear time invariant systems. Exercises and problems
3	Discrete and linear time invariant systems. Exercises and problems
4	Application of Laplace transform to continuous systems. Exercises and problems
5	Fourie analysis in continuous time systems. Exercises and problems
6	Classification of filters and construction of analog filters. Exercises and problems
7	Application of Z transform in discrete systems. Exercises and problems
8	Midterm exam
9	Furie analysis in discrete time systems. Exercises and problems
10	Implementation and construction of digital filters. Exercises and problems
11	Amplitude modulation of signals. Exercises and problems
12	Frequency and phase modulation of signals. Exercises and problems
13	Digital transmissions of analog signals and noises in analog communications. Exercises and problems
14	Random signals. Power spectral density and random signals in linear time invariant (LTI) systems. Exercises and problems

15	State space analysis of systems. Exercises and problems
16	Final Exam

Prerequisites	The student must attend the course at a minimum rate of 75%.
Literature	• H.Muçostepa, Teoria e sinjaleve; 2009, shblu, STASH:2204-84 • Leksionet e dhëna nga lektori
References	• Alan.V. Oppenheim; Alan.S. Willsky; " Signal and Systems" 2-nd Edition; 1997, Prentice Hall, ISBN:7-302-03058-8. • Sanjit.K .Mitra, " Digital Signal Processing" Laboratory using Matlab, 2000, McGraw-Hill, ISBN: 0-07-116592-4

Course Outcome

1	Familiarity with the basic concepts of determined and undetermined signals and systems continuous and discrete in time domain.
2	Familiarity with the Laplace transform and its application to continuous linear time invariant systems.
3	Familiarity with Fourie transform into continuous and discrete systems. Familiarity with the implementation and construction of analog filters.
4	Familiarity with Z transform in discrete systems. Familiarity with the implementation and construction of digital filters.
5	Familiarity with signal modulations (in amplitude, frequency, phase). Familiarity with digital transmissions of analog signals.
6	Familiarity with random signals and power spectral density. Basic knowledge from analysis in state space of systems.

Course Evaluation

In-term Studies	Quantity	Percentage
Midterms	1	50
Quizzes	0	0
Projects	0	0
Term Projects	0	0
Laboratory	0	0
Class Participation	0	0
Total in-term evaluation percent		**50**
Final exam percent		**50**
Total		**100**

ECTS Workload (Based on Student Workload)

Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	4	56
Duties	0	0	0
Midterms	1	4	4
Final Exam	1	4	4
Other	14	1	14
Total Work Load			**142**
Total Work Load / 25 (hours)			**5.68**
ECTS			**6.00**