SIGNALS AND SYSTEMS

Paper Code **ECS-402**

Course Credits 4

Lectures/ Week 3

Tutorials/ Week 1

Course description

UNIT- I REPRESENTATION OF DISCRETE AND CONTINOUS TIME SIGNALS AND SYSTEMS.

Continuous time and discrete time signals, Representation and classification, Convolution, Representation of linear time invariant discrete and continuous time systems, Laplace transformation and its application in system analysis.

UNIT- II ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS

Fourier series representation of periodic signals, Response to periodic signal, Fourier transform and its properties, Inverse Fourier transforms, Frequency response function, Computation of response from the Fourier transform, Bandwidth concept, Impulse response of the ideal filters.

UNIT-III ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS

Z-transform and its properties, Inverse Z-transform, Frequency response of discrete time signals, Discrete Time Fourier Transform (DTFT) and its properties.

UNIT-IV SAMPLING

Sampling of signal, Sampling theorem, Frequency spectrum effect of under sampling, Reconstruction of signals, Sampling in frequency domain, Sampling of continuous time signal.

UNIT-V RANDOM SIGNAL AND NOISE

Random variables, Probability distribution and density function, Uniform Gaussian, Exponential and Poisson distributions, Statistical averages, Stochastic processes, Systems with stochastic inputs, Auto and Cross correlation functions, power spectral density, Noise and its types and mathematical representation.

Pre-requisite

Course/Paper: Basic Mathematics

Text Book: A.V. Oppenheim, Wilsky&Nawab, “Signals & Systems”, PHI, 1998.

Reference Books:

1. S. Haykin, “Communication Systems”, Wiley Eastern, 1992.

2. A.V. Oppenhiem& R.W. Shafer, “Digital Signal Processing”, Prentice Hall, 1992.

3. G.R. Copper & C.D. McGillen, “Methods of Signals & System Analysis, Holt Renehart&Winstons.

Course Outcome:

CO1. Ability to represent and perform various operations on continuous time(CT) and Discrete time(DT) signals, analyze CT and DT signals in time domain using convolution, Characterize and analyze properties of CT and DT signals and systems, analyze CT systems using Laplace Transform and define system stability.

CO2. Ability to represent periodic signal using Fourier Series, representation of periodic and non-periodic signal using Fourier Transform, ability to determine impulse response & frequency response functions and understanding of properties of Fourier Series and Fourier Transform.

CO3. Ability to analyze and define stability of Discrete time systems using Z-Transform, Understanding of properties of z-transform and should be able to determine Discrete Time Fourier Transform (DTFT).

CO4. Athoroughunderstanding of the process of sampling and reconstruction of signal, effects of under-sampling and over-sampling for Continuous time signals.

CO5. A thorough understanding of random variables and various parameters like CDF, PDF, Poisson, Gaussian distribution and power spectral density of signals, understanding of different types of noise in system and their effects.