

INTRODUCTION TO SIGNALS AND SYSTEMS

Course Code:13EE1107

L	T	P	C
4	0	0	3

Pre requisites: Mathematics – I, II & III.

Course Educational Objectives:

To get basic understanding of continuous time signals and systems and clearly understand how signals and systems can be viewed from various points of view (time, frequency). To Understand how transform methods can be used for analyzing continuous time systems and discrete time systems.

Course Outcomes:

To be able to classify systems, apply transform methods to analyze systems described by differential and difference equations. Also to be able to visualize what happens when signals pass through linear systems.

UNIT-I

(12 Lectures)

SIGNALS AND SYSTEMS:

Introduction, Signals, Transformations of the Independent Variable, Basic continuous-Time Signals, Basic Discrete – Time Signals, Systems, Properties of Systems.

The Representation of Signals in terms of Impulses, Discrete-Time LTI systems: The Convolution sum, Continuous-Time LTI systems: The Convolution Integral, Properties of Linear Time-Invariant Systems, Systems Described by Differential and Difference Equations, Block-Diagram Representations of LTI systems described by Differential Equations.

UNIT-II

(12 Lectures)

FOURIER SERIES & FOURIER TRANSFORM:

Fourier series representation of continuous time periodic signals. Properties of Fourier series. Examples of continuous time filters described by differential equations.

Representation of periodic signals: The CT Fourier transform. The Fourier transform for periodic signals. Properties of continuous time Fourier transform.

UNIT-III

(12 Lectures)

SAMPLING:

Introduction, Representation of continuous time signals by its samples: The sampling theorem. Reconstruction of a signal from its samples using interpolation. The effect of under sampling: aliasing.

UNIT-IV

(12 Lectures)

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

Linear system, impulse response, response of a linear system, linear time invariant(LTI) system, Transfer function of LTI system, filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, Ideal LPF,HPF and BPF characteristics, Causality and Poly-wiener criterion for physical realization.

UNIT-V

(12 Lectures)

THE Z-TRANSFORM & PROPERTIES:

Introduction, the Z-transform, The region of convergence for the Z-Transform, Some common Z-Transform pairs. Analysis and characterization of linear time invariant systems using Z-transforms. Block diagram representations

TEXT BOOKS:

1. Signals and systems – A.V.Oppenheim, A.S.Willsky and S.H.Nawab, PHI, 2nd Edition, 1997. (UNITS – I, II, III, V)
2. Communications Systems – B.P.Lathi, BS Publications. (UNIT – IV)

REFERENCES:

1. Simon Haykin and Van veen, Wiley, “*Signals & Systems*”, 2nd Edition, 2002.
2. P.Rama Krishna Rao, “*Signals & Systems*”, 1st Edition, TMH, 2008.

3. Robert, “*Signals & Systems Analysis Using Transformation Methods & MATLAB*”, TMH, 2003.
4. C.L.Philips, J.M.Parr and Eve A.Riskin, “*Signals, Systems and Transforms*”, Pearson Education. 3rd Edition, 2004.
5. Sanjay Sharma, “*Signals and Systems with MATLAB programs*”, S.K.Publication, 5th Edition, 2005.

