AMI03 SIGNALS & SYSTEMS

UNIT-1 REPRESENTATION OF SIGNALS

1.1 Continuous and discrete time signals:
1.2 Classification of Signals
1.3 Periodic aperiodic even- odd- energy and power signals
1.4 Deterministic and random signals- complex exponential and sinusoidal signals- periodicity- properties of discrete time complex exponential unit impulse- unit step impulse functions
1.5 Transformation in independent variable of signals: time scaling, time shifting.
1.6 Determination of Fourier series representation of continuous time and discrete time periodic signals
1.7 Explanation of properties of continuous time and discrete time Fourier series.

UNIT-2 ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS

2.1 Continuous time Fourier Transform and Laplace Transform analysis with examples
2.2 Properties of the Continuous time Fourier Transform and Laplace Transform basic properties,
2.3 Parseval's relation, and convolution in time and frequency domains.
2.4 Basic properties of continuous time systems: Linearity, Causality, time invariance, stability, magnitude and Phase representations of frequency response of LTI systems
2.5 Analysis and characterization of LTI systems using Laplace transform:
2.6 Computation of impulse response and transfer function using Laplace transform.

UNIT-3 SAMPLING THEOREM AND z - TRANSFORMS

3.1 Representation of continuous time signals by its sample
3.2 Sampling theorem
3.3 Reconstruction of a Signal from its samples, aliasing- discrete time processing of continuous time signals, sampling of band pass signals
3.4 Basic principles of z-transform - z-transform definition - region of convergence
3.5 Properties of ROC - Properties of ztransform - Poles and Zeros - inverse z-transform using Contour integration
3.6 Residue Theorem, Power Series expansion and Partial fraction expansion,
3.7 Relationship between z-transform and Fourier transform.

UNIT-4 DISCRETE TIME SYSTEMS

4.1 Computation of Impulse & response & Transfer function using Z Transform.
4.2 DTFT Properties and examples
4.3 LTI-DT systems
4.4 Characterization using difference equation
4.5 Block diagram representation
4.6 Properties of convolution and the interconnection of LTI Systems
4.7 Causality and stability of LTI Systems.

UNIT-5 SYSTEMS WITH FINITE AND INFINITE DURATION IMPULSE RESPONSE

5.1 Systems with finite duration and infinite duration impulse response
5.2 Recursive and non-recursive discrete time system - realization structures - direct form - I, direct form - II,
5.3 Transpose, cascade and parallel forms.

References Books:

1. John G.Proakis and Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, 3rd edn., PHI, 2000.
2. M.J.Roberts, Signals and Systems Analysis using Transform method and MATLAB, TMH 2003.
3. Simon Haykin and Barry Van Veen, Signals and Systems, John Wiley, 1999