PCBM4302 **SIGNALS & SYSTEMS** (3-0-0)

Module – I **(10 hours)**
Discrete-Time Signals and Systems:
Discrete-Time Signals: Some Elementary Discrete-Time signals, Classification of Discrete-Time Signals, Simple Manipulation; Discrete-Time Systems : Input-Output Description, Block Diagram Representation, Classification, Interconnection; Analysis of Discrete-Time LTI Systems: Techniques, Response of LTI Systems, Properties of Convolution, Causal LTI Systems, Stability of LTI Systems; Discrete-Time Systems Described by Difference Equations; Implementation of Discrete-Time Systems; Correlation of Discrete-Time Signals: Crosscorrelation and Autocorrelation Sequences, Properties.
Selected portions from Chapter 2 (2.1, 2.2, 2.3.1, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4, 2.5, 2.6.1, 2.6.2) of Textbook – I
Properties of Continuous-Time Systems:
Block Diagram and System Terminology, System Properties: Homogeneity, Time Invariance, Additivity, Linearity and Superposition, Stability, Causality.
Selected portions from Chapter 4 (4.2, 4.4) of Textbook – II

Module – II **(12 hours)**
The Continuous-Time Fourier Series:
Basic Concepts and Development of the Fourier Series, Calculation of the Fourier Series, Properties of the Fourier Series.
Selected portions from Chapter 8 (8.3, 8.4, 8.7) of Textbook – II
The Continuous-Time Fourier Transform:
Basic Concepts and Development of the Fourier Transform, Properties of the Continuous-Time Fourier Transform.
Selected portions from Chapter 10 (10.3, 10.6) of Textbook – II

Module- III **(13 hours)**
The Z-Transform and Its Application to the Analysis of LTI Systems:
The Z-Transform: The Direct Z-Transform, The Inverse Z-Transform; Properties of the Z-Transform; Rational Z-Transforms: Poles and Zeros, Pole Location and Time-Domain Behavior for Causal Signals, The System Function of a Linear Time-Invariant System; Inversion of the Z-Transforms: The Inversion of the Z-Transform by Power Series Expansion, The Inversion of the Z-Transform by Partial-Fraction Expansion; The One-sided Z-Transform: Definition and Properties, Solution of Difference Equations.
Selected portions from Chapter 3 (3.1, 3.2, 3.3, 3.4.2, 3.4.3, 3.6.1, 3.6.2) of Textbook– I
The Discrete Fourier Transform: Its Properties and Applications:
Frequency Domain Sampling: The Discrete Fourier Transform; Properties of the DFT: Periodicity, Linearity, and Symmetry Properties, Multiplication of Two DFTs and Circular Convolution, Additional DFT Properties.
Selected portion from Chapter – 7 (7.1.2, 7.2.1, 7.2.2, 7.2.3) of Textbook – 1.

Text Books:
1. *Digital Signal Processing – Principles, Algorithms and Applications by J. G. Proakis and D. G. Manolakis, 4th Edition, Pearson.*
2. *Fundamentals of Signals and Systems - M. J. Roberts, TMH*

Reference Book:
1. Signals and Systems - P. R. Rao, TMH.
2. Signals and Systems – A Nagoor Kani, TMH
3. Signals and Systems by Chi-Tsong Chen, Oxford
4. Principles of Signal Processing and Linear Systems, by B.P. Lathi, Oxford.
5. Principles of Linear Systems and Signals, by B.p. Lathi, Oxford