3rd Semester

PET3I103 SIGNALS & SYSTEMS

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: Cross correlation and Autocorrelation Sequences, Properties.

MODULE – II (10 Hours)

The Continuous-Time Fourier Series:
Basic Concepts and Development of the Fourier series; Calculation of the Fourier Series, Properties of the Fourier Series.

The Continuous-Time Fourier Transform:
Basic Concepts and Development of the Fourier Transform; Properties of the Continuous-Time Fourier Transform.

MODULE- III (10 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.

MODULE- IV (6 Hours)

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.

Additonal Module (Terminal Examination-Internal) (04 Hours)

Properties of Continuous-Time Systems:
Block Diagram and System Terminology; System Properties: Homogeneity, Time Invariance, Additivity, Linearity and Superposition, Stability, Causality.

Text Books

1. *Digital Signal Processing – Principles, Algorithms and Applications, John. G. Proakis and Dimitris. G. Manolakis, 4th Edition, Pearson.*
2. *Fundamentals of Signals and Systems - M. J. Roberts, TMH*
3. *Signal & Systems by Tarun Kumar Rawat, Oxford University Press.*

Reference Books

1. *Signals and Systems - P. Ramakrishna. Rao, TMH.*
2. *Signals and Systems – A NagoorKani, TMH*
3. *Signals and Systems, Chi-Tsong Chen, Oxford*
4. *Principles of Signal Processing and Linear Systems, B.P. Lathi, Oxford.*
5. *Principles of Linear Systems and Signals, B.P Lathi, Oxford*