RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
Credit Based Grading System
Information Technology, VI-Semester
Elective –II IT-6005(1): Digital Signal and Processing

Unit I

Discrete-Time Signals and Systems

Discrete-time signals, discrete-time systems, analysis of (DTLTI) discrete-time linear time-invariant systems, discrete time systems described by difference equation, solution of difference equation, implementation of discrete-time systems, stability and causality, frequency domain representation of discrete time signals and systems.

Unit II

The z-Transform

The direct z-transform, properties of the z-transform, rational z-transforms, inversion of the z transform, analysis of linear time-invariant systems in the z- domain, block diagrams and signal flow graph representation of digital network, matrix representation.

Unit III

Frequency Analysis of Discrete Time Signals

Response of LT1 systems to arbitrary inputs (Convolution sum), circular convolution, Discrete Fourier transform (DFT), properties of DFT, two dimensional DFT.

Unit IV

Efficient Computation of the DFT

FFT algorithms, Radix 2 FFT, Decimation in time algorithm, Decimation in frequency algorithm, Decomposition for 'N' composite number.

Unit V

Digital filters Design Techniques

Design of IIR and FIR digital filters, Impulse invariant and bilinear transformation, windowing techniques-rectangular and other windows, examples of FIR filters, design using windowing.

References:

1. Proakis, Digital Signal Processing, Pearson Education.
2. Oppenheim and Schafer, Digital Signal Processing, PHI Learning.
3. Johnny R. Johnson, Introduction to Digital Signal Processing, PHI Learning.
4. Rabiner and Gold, Theory and Application of Digital Signal Processing, PHI Learning.
5. S. Salivahanan, Digital Signal Processing, TMH.