CSE3131: Digital Signal Processing
75 Marks [70% Exam, 20% Quizzes/Class Tests, 10% Attendance]
3 Credits, 33 Contact hours, Exam. Time: 4 hours

Introduction: signals, systems and signal processing, classification of signals, the concept of frequency in continuous time and discrete time signals, analog to digital and digital to analog conversion, Sampling and quantization.

Discrete time signals and systems: Discrete time signals, discrete time systems, analysis of discrete time linear time invariant systems. Discrete time systems described by difference equations, implementation of discrete time systems, correlation and convolution of discrete time signals.

The z-transform: Introduction, definition of the z-transform, z-transform and ROC of infinite duration sequence, properties of z-transform inversion of the z-transform, the one-sided z-transform.

Frequency analysis of signals and systems: Frequency analysis of continuous time signals, Frequency analysis of discrete time signals, Properties of Fourier transform of discrete time signals, Frequency domain characteristics of linear time invariant system, linear time invariant systems as frequency selective filters, Inverse systems and deconvolution.

The Discrete Fourier Transform: The DFT, Properties of the DFT, Filtering method based on the DFT, Frequency analysis of signals using the DFT.

Fast Fourier Transform Algorithms: FFT algorithms, applications of FFT algorithm.

Digital Filters: Design of FIR and IIR filters.

Adaptive filters: Adaptive system, kalman filters, RLS adaptive filters, the steepest-descent method, the LMS filters.

Application of DSP: Speech processing, analysis and coding, Matlab application to DSP.

Books Recommended:

1. J. G. Prokis : **Digital Signal Processing**, *Prentice-hall Of India*
2. Defatta : **Digital Signal Processing,** *Wiley India Pvt Ltd*
3. R. G. Lyon : **Understanding Digital Signal Processing,** *Orling Kindersley India*
4. P. R. Babu. : **Digital Signal Processing**, *Scitech Publication.*.