

Digital Signals and Systems

T.Y. B.Sc. (IT) : Sem. VI

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2½ Hrs.	75
Practical Exam	–	50
Theory Internal	–	25

SYLLABUS

Unit - I Classification of Signals & Systems

Introduction, Continuous Time and discrete time signals, classification of signals, simple manipulations of discrete time signals, amplitude and phase spectra, classification of systems, analog to digital conversion of signals.

Fourier Analysis of Periodic and Aperiodic Continuous Time Signals & Systems

Introduction, trigonometric Fourier series, Complex or exponential form of Fourier series, Parsevals identity for Fourier series, Power spectrum of a periodic function. Fourier transform and its properties, Fourier transforms of some important signals, Fourier transforms of power and energy signals.

Unit - II Applications of Laplace Transform to System Analysis

Introduction, definition, region of convergence (ROC) LT of some important functions, Initial and final value theorems, convolution integral, Table of Laplace transforms, partial fraction expansions, network transfer function. S-plane Poles and zeros. LT of periodic functions. Application of LT in analysing networks.

Unit - III Z Transform

Introduction, definition of z-transform, properties of z-transform, evaluation of inverse z-transform.

Unit - IV Linear Time Invariant Systems

Introduction, properties of DSP system, Discrete convolution, solution of linear constant coefficient difference equation. Frequency domain representation of discrete time signals and systems. Difference equation and its relationship with system function, impulse response and frequency response.

Unit - V Discrete and Fast Fourier Transforms

Introduction, discrete Fourier series, Discrete time Fourier transform (DTFT), Fast Fourier transform (FFT), Computing an inverse DFT by doing direct DFT, Composite radix FFT, Fast (Sectioned) convolution, Correlation.

Unit - VI Finite Impulse Response (FIR) Filters

Introduction, magnitude response and phase response of digital filters, frequency response of linear phase FIR filters, Design techniques of FIR filters, design of optimal linear phase FIR filters.

Infinite Impulse Response (IIR) Filters

Introduction, IIR filter design by approximation of derivatives, IIR filter design by impulse invariant method, IIR filter design by the bilinear transformation, Butterworth filters, Chebyshev filters, Elliptic filters, frequency transformation.

