

## **EX-703 Digital Signal Processing**

### **Unit- I**

Introduction to Digital Signal Processing, Discrete time signals & systems, linear shift invariant systems, stability and causality, Linear-constant coefficient difference equations, Frequency domain representation of discrete time signals and systems, properties of the Discrete Time Fourier transform (DTFT), Sampling and discrete time processing of continuous-time signals.

### **Unit- II**

Applications of z-transforms, solution of difference equations of digital filters, System function, stability criterion, frequency response of stable systems, one sided Z-transform and its applications.

### **Unit- III**

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences. Discrete Fourier Transforms: Properties of DFT: Fast Fourier Transforms (FFT)  
- Radix-2 decimation in time and decimation in frequency FFT Algorithms. Inverse FFT.

### **Unit- IV**

IIR DIGITAL FILTERS: Analog filter approximations - Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Bilinear transformation method, step & impulse invariance techniques, Spectral Transformations, Realization of IIR digital filters - direct, canonic, cascade & parallel forms.

### **Unit- V**

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters frequency response, Design of FIR Digital Filters using Window Techniques. Comparison of IIR and FIR filters, Realization of FIR digital filters - direct, linear phase, cascade & parallel forms.

### **References:**

1. Oppenheim & Schaffer, Digital Signal Processing, PHI.
2. J Cavacchi Digital Signal Processing Wiley India
3. John G. Proakis Digital Signal Processing: Principles, Algorithms, And Applications, 4/E
4. Ludeman Fundamental of Digital Signal Processing, wiley india
5. A. Antoniou, Digital Filters Analysis & Design, TMH
6. A. Anand Kumar Digital Signal Processing ,PHI
7. S.K. Mitra, Digital Signal Processing, TMH