

## **GEC-301: Advance Digital Signal Processing**

### **Unit1**

**8**

Discrete time signals and systems, Characterization & Classification of signals, Time domain characterization of LTI Discrete –Time systems, Discrete –Time Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform, Z-Transform .

### **Unit2**

**8**

Design of IIR filters from Analog filters: Approximation of derivatives, Design of IIR filter using impulse invariance technique, Design of IIR filter using bilinear transformation, matched z-transform.

Realization of Digital Filters: Direct form I and II realization, signal flow graph, Cascade form and Parallel form structure.

### **Unit3**

**8**

Design of FIR Filters using windows: Rectangular window, Triangular window, Hanning window, Hamming window, Blackman window and Kaiser window .

Realization of FIR Filters: Transversal structure, Linear phase realization and Polyphase realization of FIR filter.

### **Unit4**

**8**

Multirate Signal Processing: Introduction Down Sampling, Spectrum of the Down Sampled Signal, Upsampling, Spectrum of the Up-sampled, Transversal Structure for Decimator and Interpolator, Multistage Implementation of Sampling Rate Conversion.

### **Unit5**

**8**

Statistical Digital Signal Processing: Introduction, Statistical Properties of Random Signal, mean, mean square, variance, autocorrelation of random process, autocovariance of random process, Crosscorrelation of random processes and Crosscovariance of random processes, Power Density Spectrum.

### **Reference:**

1. Sanjit K. Mitra, "Application DSP a Computer based approach", TMH
2. Allan Y. Oppenheim & Ronald W. Schater, "Digital Signal Processing", PHI
3. S. Salivahanan, A. Vallavaraj & C. Gnanapriya, "Digital Signal Processing, TMH

