

## (MDC-10) DIGITAL SIGNAL PROCESSING AND ITS APPLICATIONS

Theory paper: 100 Marks

Sessional: 50 Marks

Discrete Time signals - sequences, representation  
Discrete Time Systems - linear, Time invariant, LTI System, properties, constant - coefficient difference equation.  
Frequency Domain Representation of discrete time signals & systems  
Discrete - Time Random Signals  
Z Transform - properties, R.O.C, stability, Causality criterion  
Inverse Z- Transform. Recursive and Non recursive systems, Realization of discrete time system  
D.F. T - properties, linear and circular convolution  
Discrete Cosine transform, relationship between OFT & OCT.  
I.DF T , computation of D.F. T : F.F. T - Decimation in time & Decimation in frequency.  
F.I.R and IIR Systems: Basic structure of FIR & IIR, Bilinear transformation, Design of discrete time I.I.R filters - Butterworth, Chebychev, Inv. Chebychev, elliptic etc.  
Design of F.I.R filters by windowing - rectangular, Bartlett, Hann Hamming, Kaiser window filter, Design method, Relationship of Kaiser to other windows.  
Application or MATLAB for design of digital filters  
Effect of finite register length in filter design.  
Advanced signal processing techniques and transforms: Multirate Signal processing - Down sampling/upsampling, Int. to discrete Hilbert transform, wavelet transform, Haar transform etc  
Application or DSP to Speech Signal Processing.

### **Suggested Text Books and References:**

1. A. V Oppenheim and R.W Schaffer, "Discrete-Time signal processing"(2nd edition) Prentice Hall
2. S. Miura "Digital Signal Processing using MATLAB", 2nd Edition.
3. Proakis, "Int. to Digital Signal Processing", Maxwell Mcmillan.