MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY & MANAGEMENT
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III Year B.Tech. ECE. II-Sem	**L**	**T/P/D**	**C**
	4	**1/-/-**	**4**

(56027) DIGITAL SIGNAL PROCESSING

UNIT I: Introduction:
Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems

UNIT II: Discrete Fourier Series:
DFS representation of Periodic Sequences. Properties of Discrete Fourier Series., Discrete Fourier Transforms: Properties of DFT. linear convolution of sequences using DFT. Computation of DFT: Over-lap Add method, Over-lap Save method, Relation between DTFT, DFS. DFT and Z-Transform.

UNIT III: Fast Fourier Transforms:
Fast Fourier transforms (FFT) - Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT and FFT with general Radix-N

UNIT IV: Realization of Digital Filters:
Applications of Z - transforms, solution of difference equations of digital filters, System function. Stability criterion. Frequency response of stable systems, Realization of digital filters - Direct, Canonic, Cascade and Parallel forms

UNIT V: IIR Digital Filters:
Analog filter approximations - Butterworth and Chebyshev, Design of IIR Digital filters from analog filters. Step and Impulse invariant techniques. Bilinear transformation method, Spectral transformations.

UNIT VI: FIR Digital Filters:
Characteristics of FIR Digital Filters. Frequency response. Design of FIR Filters: Fourier Method. Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters

UNIT VII: Multirate Digital Signal Processing
Introduction. Down sampling, Decimation. Up sampling, Interpolation, Sampling Rate Conversion, conversion of band pass signals. Concept of re-sampling. Applications of multi rate signal processing

UNIT VIII: Finite Word Length Effects:
Limit cycles. Overflow oscillations. Round-off noise in IIR digital filters. Computational output round off noise. Methods to prevent overflow. Trade off between round off and overflow noise. Measurement of coefficient quantization effects through pole-zero movement. Dead band effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis. Pearson Education / PHI. 2007.
2. Discrete Time Signal Processing-A. V. Oppenheim and R.W. Schaffer. PHI, 2009
3. Fundamentals of Digital Signal Processing - Loney Ludeman. John Wiley, 2009

REFERENCE BOOKS:

1. Digital Signal Processing - Fundamentals and Applications - Li Tan, Elsevier. 2008
2. Fundamentals of Digital Signal Processing using Matlab - Robert J. Schilling. Sandra L, Harris, Thomson. 2007
3. Digital Signal Processing - S.Salivahanan. A.Vallavaraj and CGnanapriya.TMH.2009
4. Discrete Systems and Digital Signal Processing with MATLAB -Taan S.EIAli.CRC press. 2009.
5. Digital Signal Processing – P. Ramesh Babu, Scitech Publications, 4th Edition.
6. Digital Signal Processing – Nagoor Kani