III Year II Semester	L	T	P	C
Code: 17EC602	3	1	0	3

DIGITAL SIGNAL PROCESSING

UNIT-I Introduction:
Introduction to Digital Signal Processing: Discrete time signals and sequences, Classification of Discrete time systems, stability of LTI systems, Inevitability, Response of LTI systems to arbitrary inputs, Solution of Linear constant coefficient difference equation, Frequency domain representation of discrete time signals and systems, Review of Z transform, Solution of difference equation using Z transforms, System function.

UNIT-II: Discrete Fourier series and Fourier Transforms:
Properties of Discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier Transform,: Properties of DFT, linear filtering methods based on DFT, Fast Fourier Transform (FFT): Radix -2 decimation in time and decimation in frequency, FFT algorithm, Inverse FFT.

UNIT-III: Design of IIR digital filters and realizations:
Analog filter approximations: Butterworth and Chebyshev, Design of IIR digital filters from analog filters, Design examples, Analog and digital frequency transformation, Basic structure of IIR systems, Transposed forms.

UNIT-IV: Design of IIR digital filters and realizations:
Characteristics of FIR digital filters, frequency response, Design of FIR digital filters using windowing techniques and frequency sampling techniques, Comparison of IIR and FIR filters, Basic structure of FIR systems: Lattice structure, Lattice-Ladder structure.

UNIT-V: Multi rate Digital Signal Processing:
Introduction, Decimation, Interpolation, Sampling rate conversion, Implementation of sampling rate converters, Applications: Sub band coding of speech signals, Implementation of digital filter banks, Trans-multiplexers.

UNIT-VI: Introduction to DSP processors:
Introduction to programmable DSPs: Multiplier and multiplier accumulator, Modified bus structures and memory access schemes in P-DSPs, Multiple access memory, Multi ported memory, VLIW architecture, Pipelining, Special addressing modes, On-chip peripherals, Architecture of TMS320C5X: Introduction, Bus structure, Central Arithmetic Logic Unit, Auxiliary register ALU, Index register, Block move Address register, Parallel Logic unit, Memory mapped registers, Program controller, flags in the status register, On-chip memory, On-chip peripherals.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Application: John G. Proakis, Dimitris G. Manolakis, Pearson Education, PHI, 2007.
2. Discrete Time Signal Processing: A. V. Oppenheim and R.W. Schaffer, PHI
3. Digital Signal Processing A Computer-Based Approach: Sanjit K Mitra, 3rd Edition, McGraw Hill.

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, Tata McGraw-Hill Education India.
2. Schaums Outlines of Digital Signal Processing: M. H. Hayes, Tata MCGraw-Hill Education.
3. Digital Signal Processing: Alan V. Oppenheim, Ronald W. Schafer, PHI, 2006
4. Digital Signal Processing: Ramesh Babu, Sci Tech Publications.