Course Code	Course Title						Core / Elective
PC503EC	**DIGITAL SIGNAL PROCESSING**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
SATT PC304EC	3	1	-		30	70	3

Course Objectives:
- ➢ Describe the necessity and efficiency of digital signal processing.
- ➢ Design and implementation of FIR and IIR digital filters.
- ➢ Describe the basics of Multirate digital signal processing and its application.
- ➢ Describe the DSP processor architecture for the efficient implementation of digital filters.

Course Outcomes:
- ➢ Necessity and use of digital signal processing and its application.
- ➢ Analyze FIR and IIR digital filters.
- ➢ Applications of Multirate digital signal processing.
- ➢ Acquaintance of DSP processor and its architecture.

UNIT - I
Discrete and Fast Fourier Transform: Discrete Fourier Transform (DFT), Computation of DFT- Linear and Circular Convolution, FFT algorithms: Radix-2 case, Decimation in Time and Decimation in Frequency algorithms- in place computation- bit reversal.

UNIT - II
Digital Filter (IIR) Design: Butterworth and Chebychev approximation- IIR digital filter design techniques- Impulse Invariant technique- Bilinear transformation technique- Digital Butterworth & Chebyshev filters.

UNIT - III
Digital Filters (FIR) Design: Amplitude and phase responses for FIR filters- Linear phase filters- Windowing techniques for design of Linear phase FIR filters- Rectangular, Bartlett, Hamming, Hanning, Kaiser windows- realization of filters- Finite word length effects, Comparison between FIR and IIR filters.

UNIT - IV
Multirate Digital Signal Processing: Introduction- Decimation by factor D and interpolation by a factor I- Sampling Rate conversion by a Rational factor I/D- Implementation of Sampling **Rate conversion-** Multistage implementation of Sampling Rate conversion- Sampling conversion by a Arbitrary factor, Application of Multirate Signal Processing.

UNIT - V
Introduction to DSP Processors: Difference between DSP and other microprocessors architecture- their comparison and need for ASP, RISC and CPU- General Purpose DSP processors: TMS 320C 54XX processors, architecture, addressing modes- instruction set.

Suggested Reading:

1. Alan V. Oppenheim and Ronald W. Schafer, "Digital Signal Processing", 2/e, PHI, 2010.
2. John G. Praokis and Dimtris G. Manolakis, "Digital Signal Processing: Principles, Algorithms and Application", 4/e, PHI, 2007.
3. Avathar Singh and S. Srinivasan, "Digital Signal Processing using DSP Micrprocessor", 2/e, Thomson Books, 2004.
4. John G Proakis and Vinay K Ingle, " Digital Signal Processing using MATLAB" 3/e, Cengage Learning, 1997.
5. Richard G Lyons, "Understanding Digital Signal Processing", 3/e, Prentice Hall.