Course Code	Course Name	Hours per Week			Total	Total
		L	T	P	Hrs.	Credits
EC5CC02	**Advanced Digital Signal Processing**	4	0	2	6	5

UNIT I: Digital Signal Processing
Digital signal processing, Sampling of analog signals, Selection of sample frequency, Signal-processing systems, Frequency response, Transfer functions, Signal flow graphs, Filter structures, Adaptive DSP algorithms,

UNIT II: Fourier Transform
DFT-The Discrete Fourier Transform, FFT-The Fast Fourier Transform Algorithm, Image coding, Discrete cosine transforms.

UNIT III: Digital Filters and Finite Word length Effects
FIR filters, FIR filter structures, FIR chips, IIR filters, Specifications of IIR filters, Mapping of analog transfer functions, Mapping of analog filter structures, Multirate systems, Interpolation with an integer factor L, Sampling rate change with a ratio L/M, Multirate filters. Finite word length effects -Parasitic oscillations, Scaling of signal levels, Round-off noise, Measuring round-off noise, Coefficient sensitivity, Sensitivity and noise.

UNIT IV: DSP Architectures and Synthesis of DSP Architectures
DSP system architectures, Standard DSP architecture, Ideal DSP architectures, Multiprocessors and multicomputers, Systolic and Wave front arrays, Shared memory architectures. Mapping of DSP algorithms onto hardware, Implementation based on complex PEs, Shared memory architecture with Bit – serial PEs.

UNIT V: Arithmetic Units and Integrated Circuit Design
Conventional number system, Redundant Number system, Residue Number System, Bit-parallel and Bit-Serial arithmetic, Basic shift accumulator, Reducing the memory size, Complex multipliers, Improved shift-accumulator. Layout of VLSI circuits, FFT processor, DCT processor and Interpolator as case studies. Cordic algorithm.

Text Books:
1. Lars Wanhammer, “DSP Integrated Circuits”, 1999 Academic press, New York.
2. A.V.Oppenheim et.al, “Discrete-time Signal Processing”, Pearson Education, 2000.

References:
1. Emmanuel C. Ifeachor, Barrie W. Jervis, “Digital signal processing – A practical approach”, Second Edition, Pearson Education, Asia.
2. Keshab K.Parhi, “VLSI Digital Signal Processing Systems design and Implementation”, John Wiley & Sons, 1999.