(EC508) DSP PROCESSORS & ARCHITECTURES (ELECTIVE - I)

Objective of the Course :

Student will acquire the knowledge of building blocks of DSP processors, Architectural, programming issues of 54XX series DSP processor and its interfacing.

UNIT - I

Computational Accuracy in DSP Implementations: Introduction, A Digital signal-processing system, Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT - II

Architectures for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT - III

Execution Control and Pipelining: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT - IV

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT - V

Implementations of Basic DSP Algorithms & Interfacing: The Q-notation, FIR Filters, IIR Filters, Computation of the signal spectrumMemory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and

I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, “Digital Signal Processing”, Thomson Publications, 2004.
2. Lapsley et al. “DSP Processor Fundamentals, Architectures & Features”, S. Chand & Co, 2000.

REFERENCE BOOKS:

1. B. Venkata Ramani and M. Bhaskar, “Digital Signal Processors, Architecture, Programming and Applications”, TMH, 2004.
2. Jonatham Stein, “Digital Signal Processing”, John Wiley, 2005.