PVP 22

DSP PROCESSORS

22ECMC2T5C   **Credits: 4**
Lecture: 4 periods/week   **Internal assessment: 40 marks**
                                                     Semester end examination: 60 marks
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Prerequisites: Signals & Systems, Digital Signal Processing

Course Outcomes:
At the end of the course Student will be able to

- Design DSP filters suitable for real-time applications
- Understand the architecture and pipeline operations of DSP Processors
- Illustrate the features of on-chip peripherals and interrupts ofTMS320C54XXDSP Processor
- Implement various DSP algorithms using DSP processors

UNIT I
Introduction: 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

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, Hardware looping, Interrupts, Stacks, Relative Branch Support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models

UNIT III
Programmable Digital Signal Processors: Commercial Digital Signal Processing Devices, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors

UNIT IV
Implementation of Basic DSP Algorithms: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing. FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit- Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum

Learning Resources

Text Books

1. Avtar Singh and S.Srinivasan, Digital Signal Processing –, Thomson Publications, 2004
2. B. Venkata Ramani and M. Bhaskar, Digital Signal Processors, Architecture, Programming and Applications -, TMH, 2004

References

1. Jonatham Stein, Digital Signal Processing, John Wiley, 2005

2. Lapsley et al, DSP Processor Fundamentals, Architectures & Features -. S. Chand & Co, 2000

E – Resources

1. https://nptel.ac.in/courses/117102060