**III Year II Semester**

**Code: 20EC6112**

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## DIGITAL SIGNAL PROCESSING LAB

**Course Objectives:**
1. To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB
2. To implement DIT and DIF radix-2 FFT algorithms
3. To implement FIR and IIR filters in MATLAB
4. To demonstrate the Multi-rate signal processing concepts using DSP Processor

**List of Experiments:**
1. To find Linear and Circular convolution for the given two sequences
2. To find Auto correlation and Cross Correlation for the given two sequences
3. Implementation of Linear convolution using DFT (Overlap-add and Overlap-Save methods)
4. Computation of N point DFT of a given sequence and to plot magnitude and phase spectrum
5. Implementation of Decimation-in-time radix-2 FFT algorithm
6. Implementation of Decimation-in-frequency radix-2 FFT algorithm
7. Design of IIR filters (LPF/HPF) and demonstrates the filtering operation
8. Design of FIR filters (LPF/HPF) and demonstrates the filtering operation
9. Implementation of Decimation and Interpolation Process
10. Implementation of I/D sampling rate converters
11. To Perform MAC operation using various addressing modes in DSP Processor
12. Implementation of Up-sampling and Down-sampling operations in DSP Processor

**Equipment required:**
1. MATLAB / SCI Lab / Equivalent Industrial Standard Licensed simulation software tool.
2. Computer Systems with required specifications
3. DSP Processor.

**Course Outcomes:**
A student who successfully fulfils this course requirement will be able to:

| S. No | Course Outcome | BTL |
|---|---|---|
| 1. | Compute Convolution and correlation of given sequences | L3 |
| 2. | Understand and Analyze DFT and FFT algorithms | L4 |
| 3. | Design IIR and FIR filters for the given specifications | L5 |
| 4. | Implement Decimation, Interpolation and Sampling rate converters | L3 |
| 5. | Implement up sampling down sampling using DSP processors | L3 |

**Correlation of COs with POs & PSOs:**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO 1 | 2 | - | - | - | 2 | - | - | - | 3 | - | - | - | 2 | 2 |
| CO 2 | 2 | - | - | - | 2 | - | - | - | 3 | - | - | - | 2 | 2 |
| CO 3 | 2 | 2 | - | - | 2 | - | - | - | 3 | - | - | - | 2 | 2 |
| CO 4 | 2 | 2 | - | - | 2 | - | - | - | 3 | - | - | - | 2 | 2 |
| CO 5 | 2 | 2 | - | - | 2 | - | - | - | 3 | - | - | - | 2 | 2 |