

EC449-DIGITAL SIGNAL PROCESSING LAB

Course Description & Objectives:

The course will introduce the students to solve and simulate problems in the areas of communications and signal processing using MATLAB environment and programming aspects and programming of DSP hardware for real-time signal processing applications.

Course Outcomes:

On completion of this lab course the students will be able to:

- a. Ability to program digital signal processing algorithms in C and MATLAB, including the design implementation, and real-time operation of digital filters, and applications of the fast Fourier transform.*
- b. Ability to program a DSP chip with a variety of real-time signal processing algorithms, such as filtering for noise reduction or digital audio effects.*
- c. Use the Fast Fourier Transform in a variety of applications including: signal analysis, fast convolution, spectral and temporal interpolation, and filtering.*
- d. Quickly choose and design digital filters.*
- e. Select and utilize appropriate methods for basic signal processing applications.*

List of Experiments

Part - A: Using MATLAB

1. Generation and operations on discrete time signals.
2. To verify linear convolution and correlation.
3. To find and sketch impulse and step response.
4. To find the FFT of given 1-D signal and plot.
5. To verify circular convolution.
6. FIR filter design using different window techniques.
7. IIR filter design using analog approximations.
8. Filter design using filter design analysis tool (fdatool).
9. Experiment based on spectrum estimation.
10. Experiments based on simulink and signal processing block set.

Part - B: DSP Processors

1. To study the architecture of DSP chips TMS 320 C 5X / 6X and instruction set.
2. Implementation of Linear and circular convolution on DSP Chips (TMS-320C6713).
3. Filter design and implementation using DSP chips (TMS-320C6713).
4. Filter design using FPGA Boards.

TEXT BOOKS :

1. Ramesh Babu, "Digital Signal Processing", Scitech, 2003.