

Shahjalal University of Science and Technology, Sylhet -3114
Department of Computer Science and Engineering

Course Code: CSE 426 (*Session 2014-15*)

Course Title: Digital Signal Processing Lab

Credit: 1.5

Course Teacher: Md Mahadi Hasan Nahid

Basics:

Task#01: Basics of Octave/ MATLAB / Python

Task#02: Create a Sinusoidal Signal $y(n)$ and plot the signal.

Task#03: Create 3 Sinusoidal signal y_1 , y_2 , y_3 . then combine them and plot it.

Task#04: Plot the basic signals like unit impulse, unit samples, unit step, exponential, unit ramp (discussed in classes) etc.

Task#05: Sampling of a Signal... take a signal then sample using a sampling rate.

Task#06: Sampling Theorem Experiment.

Core DSP:

Task#07: Implement some basic systems like Adder, Multiplier, Delay, Advanced, Fold etc.

Task#08: Implement Moving average filter, Median Filter, Accumulator etc.

Task#09: Convolution

Task#10: program to find the DFT/IDFT

Tasks#11: DFT/IDFT -> Composite Sinusoidal Signal to see the frequencies

Task#12: Read a .wav, img file and plot them, play / open them. Then apply DFT.

Task#13: Linear Convolution

Task#14: circular convolution program

Task#15: Linear Convolution by FFT, IFFT [DFT, IDFT]

Task#16: Circular convolution by FFT, IFFT [DFT, IDFT]

Filter:

Task#17: FIR Filter Low Pass

Task#18: FIR Filter High Pass

Task#19: FIR Filter Band Pass and Band Reject Filter

Task#20: IIR Filter Low Pass

Task#21: IIR Filter High Pass

Some Practical Applications:

Task#22: Read a .wav file -> mfcc

Task#23: Read an img file -> resize, reshap, flat (*numpy*, *openCV*)

Task#24: image-> gray scale, resize ... other basic operations (*OpenCV*)

Task#25: Basic Image Processing Methods

Task#26: Speech Processing -> Filter, Convolution etc.

Task#27: Data Compression (text and image)

Task#28: DCT → Application

Task#29: DWT → Application

Current Trends:

Task#30: Signal Processing using **NN** (Neural Network) -> Basics

Task#31: Signal Processing using **CNN** (Convolutional Neural Network) Basics

Task#32: Signal Processing using **RNN** (Recurrent Neural Network) Basics

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