

Digital Signal and Image Processing Lab

Course Code	23SA8754	Year	IV	Semester	I
Course Category	SEC	Branch	ECE	Course Type	Practical
Credits	2	L-T-P	0-1-2	Pre requisites	Digital Signal Processing, Digital Image Processing
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		BL
CO1	Examine the impulse response and frequency response of discrete-time LTI systems	L3
CO2	Design IIR and FIR digital filters for real time DSP applications	L5
CO3	Apply Multirate signal processing concepts to various applications	L3
CO4	Apply various image processing algorithms in real time applications	L3
CO5	Analyse and design image processing algorithms in real time applications	L6
CO6	Make an effective report of the experiments	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of Correlations (3:High, 2:Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3			2	2						2	2	
CO2	3	3	3	2	2						2	2	
CO3	3			2	2						2	2	
CO4	3			2	2						2	2	
CO5	3	3	3	2	2						2	2	
CO6	3			2	2								
Avg.	3	3	3	2	2						2	2	

Syllabus

Unit No.	Contents	Mapped CO
1	Implementation of discrete time systems in time domain and to find the frequency response. (First order and Second order Systems)	CO1, CO6
2	DFT & IDFT of the given sequences and their properties.	CO1, CO6
3	Fast Fourier Transform	CO1,CO6
4	Design of IIR filter using Butterworth and Chebyshev approximations (For the given specifications)	CO1,CO2, CO6
5	Design of FIR filters using window technique. (For the given specifications)	CO1,CO2, CO6
6	Implementation of Interpolation and Decimation. (Factor 2 or 3)	CO3, CO6
7	Perform Pixel based operations (Point based operations) for Image enhancement	CO4, CO6
8	Plot the histogram of an image and perform histogram equalization	CO4, CO6
9	Computation of 2D-DFT and Perform filtering in Frequency domain	CO4, CO5, CO6
10	Apply Spatial Filtering in real time applications	CO4, CO5, CO6
11	Comparison of coding Techniques for image compression (Bit plane, Arithmetic, Huffman coding)	CO4, CO5, CO6
12	Detections of edges in an image (Prewitt, Sobel and Laplacian of Gaussian Operators, Canny operators) and compare	CO4, CO5, CO6
13	Image Segmentation based on thresholding	CO4, CO5, CO6

Learning Resources**Text Books**

1. J. G. Proakis and D. G. Manolakis, Digital Signal Processing: Principles, Algorithms and Applications, 4th Ed., Pearson Education, 2007.
2. R. C. Gonzalez and R. E. Woods, "Digital Image Processing, 3rd Ed., Pearson, 2008.

Reference Books

1. A.V. Oppenheim, R. W. Schaffer, Discrete-Time Signal Processing, 3rd Ed., PHI, 2009.
2. Sanjit K Mitra, Digital Signal Processing, A – Computer Based Approach, Tata Mc-Graw Hill 2nd Ed., 2003
3. Lawrence R Rabiner & Bernard Gold, Theory and Application of Digital Signal Processing - Prentice Hall.
4. Anil K.Jain, "Fundamentals of Digital Image Processing", Prentice Hall of India, 9th Ed., Indian Reprint, 2002.
5. Jayaraman, S. Esakkirajan, and T. Veerakumar," Digital Image Processing", Tata McGraw-Hill Education, 2009.

e-Resources & other Digital Material

1. <http://www.nptel.iitm.ac.in/>
2. <http://www.ee.umanitoba.ca/~moussavi/dsp815/LectureNotes/index.html>
3. <http://www.ece.cmu.edu/~ee791>
4. <http://cobweb.ecn.purdue.edu/~ipollak/ee438/FALL04/notes/notes.html>
5. <http://nptel.iitm.ac.in/video.php?subjectId=117105079>