

Branch Name:	Computer Engineering (Software Engineering)
Program Code:	ET203
Course Title:	Digital Image Processing Practical
Course Code:	2ET2030303P
Pre-requisite Course:	Computer Graphics

Course Objectives: Main objective of this course is to make the students aware about producing mathematical model of images. It also helps the students to understand the various operations that can be performed on images. The course shall help gaining experience in applying image processing algorithms to real life problems like image enhancement & restoration of noisy images.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
1	-	-	2	2	—	—	—	—	10	25	10	25	50

Course Contents:

Unit No	Topics	Total Hours
1	To study about MATLAB.	03
2	Implement the spatial image enhancement functions on a bitmap image –Mirroring (Inversion)	02
3	Write a program to zoom and shrink an image using bilinear interpolation.	04
4	Write a computer program capable of reducing the number of intensity levels in an image from 256 to 2, in integer powers of 2.	02
5	Use fast Fourier transform to enhance the noisy images. Conclude which kind of image enhancement will be effective on different types of noise. (Note: Use imnoise() to introduce noise in a given image)	03
6	Experiment and analyze how histogram equalization will help enhance the image provided during the lab session. Also use equalization on 5 different types of images and find out in which case it gives the weakest enhancement.	04
7	Using any programming language, you feel comfortable with, load an image and then perform a simple spatial 3x3 average of image pixels. In other words, replace the value of every pixel by the average of the values in its 3x3 neighborhood. If the pixel is located at (0,0), this means averaging the values of the pixels at the positions (-1,1), (0,1), (1,1), (-1,0), (0,0), (1,0), (-1,-1), (0,-1), and (1,-1)	03
8	Implement (a) Low Pass Filter (b) High Pass Filter	02
9	Implement Smoothing and Sharpening of an eight bit color image	02
10	Convert the given image to resemble a pencil sketch. Document which process have you used and how it works for you to achieve your final output	03
11	Segment an object of interest from the grey scale image and change its background.	01
12	Segment an image and find appropriate shape representation for recognizing basic geometric figures.	02
13	Implement (a) Edge Detection (b) Line Detection	02

Reference Books:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson Education.
2. Anil K. Jain, Fundamental of Digital Image Processing, Prentice Hall.
3. Kenneth R. Castleman, Digital Image Processing, Paperback.
4. Earl Gose, Johnsonbaug, Steve Jost, Pattern Recognition and Image Analysis, PHI.
5. Rafael C. Gonzalez, Image Processing using MATLAB, PHI.

List of Open-Source Software/learning website:

1. www.nptel.ac.in/courses/106105032/
2. www.cs.nmt.edu/~ip/lectures.html
3. www.virtual-labs.ac.in/computer-science-and-engineering-labs.html

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Understand basic of image processing, acquisition, formats, color models, representations.	Understanding (1)
COL2	Understand basics of image compression standards. Understand various applications of digital image processing.	Understanding (1)
COL3	Apply mathematical principles and signal processing concepts in digital image enhancement and restoration.	Applying (3)
COL4	Design and develop various image representation stages for digital image processing applications	Applying (3)

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	M		M											
CLO2	H	M			M							L				
CLO3	H	M	M		M											
CLO4	M	M	M		M							L				

H: High, M: Medium, L: Low