Lesson Plan

Faculty : Ms. Sushma Nagdeote

CLASS		BE Electronics, Semester VIII
Academic Term		January – May, 2021
Subject		**Digital Image Processing** **(ELXDLO8044)**

Periods (Hours) per week	Lecture		4
	Practical		--
	Tutorial		--

Evaluation System		Hours		Marks
	Theory examination	3		80
	Internal Assessment	--		20
	--	--		--
	Practical /Oral Examination	--		25
	Term work	--		25
	Total	--		150

Time Table	Day		Time
	Tuesday		10:10 am to 11:10 am
	Wednesday		11:20 am to 12:20 am
	Thursday		09:00 am to 10:00 am
	Friday		10:10 am to 11:10 am

Course Content and Lesson plan

(Also include dates of assignments, test paper and mention as remarks)

Module 1

Wee k	Lecture No.	Date Planned	Actual	Topic	COs	Remarks (If any)
1	1	27-01-2021	27-01-2021	Introduction to Course objectives and outcomes Introduction to Laboratory objectives and outcomes Module 1: Digital Image	CO1	

				processing Fundamentals Basics of Digital image processing		
	2	28-01-2021	28-01-2021	Module 1: Digital Image processing Fundamentals Classification of Images Image Sampling and Quantization Representing Digital Images Introduction to Relationship between pixels		
	3	29-01-2021	29-01-2021	Module1: Digital Image Processing Fundamentals Relationship between pixels 4-adjacency 8-adjacency m-adjacency		
	4	02 – 02 – 21	02 – 02 – 21	Module1: Digital Image Processing Fundamentals Relationship between pixels 4-adjacency 8-adjacency m-adjacency, Distance Measure		
2	5	03 – 02 – 21	03 – 02 – 21	Module 1: mathematical operations in digital image processing, Image Formation model, Image file format, Colour models (RGB,HSI,YUV)		

Module 2: Image Enhancement in Spatial Domain

	6	04 – 02 – 21	04 – 02 – 21	Module 2: Image Enhancement in Spatial Domain: Concept of Identity transformation,Digital Negative, Contrast Streaching		
	7	05 – 02 – 21	05 – 02 – 21	Module 2: Image Enhancement in Spatial Domain: Clipping, Thresholding, Solved Examples		
	8	09 – 02 – 21	09 – 02 – 21	Module 2: Image Enhancement in Spatial Domain: Bit Plane Slicing, Intensity level slicing with and without background , Solved Examples		
3	9	10 – 02 – 21	10 – 02 – 21	Module 2: Image Enhancement in Spatial Domain:Bit Plane Slicing, Dynamic range compression, power law transformation	CO2	
	10	11 – 02 – 21	11 – 02 – 21	Module 2: Image Enhancement in Spatial Domain: Neighborhood processing: Introduction, Median Filter		

	11	12 – 02 – 21	12 – 02 – 21	Module 2: Image Enhancement in Spatial Domain: Median, Min, Max Filters,Low Pass filters		
	12	16 – 02 – 21	16 – 02 – 21	Solved Examples		
4	13	17 – 02 – 21	17 – 02 – 21	High Pass filter, High Boost Filtering		
	14	18 – 02 – 21	18 – 02 – 21	Histogram Equalization Introduction		
		19 – 02– 21		HOLIDAY ON ACCOUNT OF SHIV JAYANTI		
	15	02 – 03 – 21	02 – 03 – 21	Module 2: Histogram Equalization Examples Solved		
	16	03 – 03 – 21	03 – 03 – 21	Module 2: Histogram Specification		
	17	04 – 03 – 21	04 – 03 – 21	Module 2: Histogram Specification		

Module 3: Image Segmentation and Representation

	18	05– 03 – 21	05– 03 – 21	Module 3: Image Segmentation Introduction, classification, Point, line and edge detection		
5		09– 03 – 21		Internal Assessment 1	CO3	
		10– 03 – 21	10– 03 – 21	Internal Assessment 1 (DIP)		
		11– 03 – 21		HOLIDAY ON ACCOUNT OF SHIVRATRI		
	19	12– 03 – 21	12– 03 – 21	Derivative Of Gaussian, Laplacian of Gaussian, Edge Linking and Boundary detection		
6	20	16– 03 – 21	16– 03 – 21	Edge Linking and Boundary detection		Assignment/ Quiz I
	21	17– 03 – 21	17– 03 – 21	Hough Transform		
	22	18– 03 – 21	18– 03 – 21	Graph Theorotic approach		
	23	19– 03 – 21	19– 03 – 21	Segmentation based on similarity: Region Growing, Splitting and Merging		
	24	30– 03– 21	30– 03– 21	Image Representation		
	25	31– 03– 21	31– 03– 21	Chain codes		
	26	01– 04 – 21	01– 04 – 21	Chain codes, Polygonal approximation, Signature		

	27	02– 04 – 21	02– 04 – 21			

Module 4:Binary Image Processing

7	28	06– 04 – 21	06– 04 – 21	Module 4: Binary image Processing		
	29	07– 04 – 21	07– 04 – 21	Dilation, Erosion Solved Examples, Opening and Closing		
	30	08– 04 – 21	08– 04 – 21	Hit and Miss transformation, Boundary Extraction, region Filling		
	31	09– 04 – 21	09– 04 – 21	Thinning, Thickening, Skeletonization, Morphology applied to Gray scale image	CO3	

Module 5: Image Transform and frequency domain processing

11		13– 04 – 21				
		14– 04 – 21				
	32	15– 04 – 21	15– 04 – 21	Module 5: Image Transform		
	33	16– 04 – 21	16– 04 – 21	Introduction to DFT, Properties of DFT, Examples Solved	CO4	
12		27– 04 – 21		Internal Assessment 2		
		28– 04 – 21				
		29– 04 – 21		Internal Assessment 2		
	34	30– 04 – 21	30– 04 – 21	Concept of Kornekar product, Hadamard Transform, Walsh Transform		
	35	04– 05 – 21	04– 05 – 21	Examples solved		

Module 6: Image compression

13	36	05– 05 – 21	05– 05 – 21	Module 6: Image Compression, Lossy and lossless compression, Huffman compression		
	37	06– 05 – 21	06– 05 – 21	Arithmetic coding, IGS coding		
	38	07– 05 – 21	07– 05 – 21	JPEG compresssion	CO5	
Total	**38 Lectures**					

	Module	Lecture Hours	Marks distribution in Test (For internal assessment/TW)		Approximate Marks distribution in Sem. End Examination
			Test 1	Test 2	
1	Digital Image Fundamental	04	5		marks
2	Image Enhancement in Spatial Domain	08	10		marks
3	Image Segmentation and Representation	08	5		marks
4	Binary Image Processing	06		10	marks
5	Image Transforms and frequency domain processing	12		5	marks
6	Image compression	10		5	20 marks

Examination Scheme

Text Books:

1. Rafel C. Gonzalez and Richard E. Woods, 'Digital Image Processing', Pearson Education Asia, Third Edition, 2009, 2. Anil K. Jain, "Fundamentals and Digital Image Processing", Prentice Hall of India Private Ltd, Third Edition

Reference Books:

1. S. Jayaraman, E.Esakkirajan and T.Veerkumar, "Digital Image Processing" TataMcGraw Hill Education Private Ltd, 2009,
2. Milan Sonka, Vaclav Hlavac, and Roger Boyle, "Image Processing, Analysis, and Machine Vision", Second Edition, Thomson Learning, 2001
3. William K. Pratt, "Digital Image Processing", Third Edition, John Wiley & Sons, Inc., 2001

Internal Assessment (IA) :-

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the tests will be considered as final IA marks.

End Semester Examination :-

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. The students need to solve total 4 questions.
3. Q.1 will be compulsory and based on entire syllabus.
4. Remaining questions (Q.2 to Q.6) will be set from all modules.

5. Weightage of each module in question paper will be proportional to the number of respective lecture hours mentioned in the syllabus.

Submitted By	Approved By	
Prof. Sushma Nagdeote	ii) Prof. K. Narayanan	Sign:
Sign: Sushma Nagdeote	ii) Prof. Sapna Prabhu	Sign:
	iii) Prof. Shilpa Patil	Sign:
	iv) Prof. Monica Khanore	Sign:
Date of Submission:27/1/21	Date of Approval: 01/02/21	
Remarks by PAC (if any)		