



Programme	M.Tech/Ph.D				Year of Regulation				2021				
Department	Electronics and Communication Engineering				Semester				I				
Course Code	Course Name				Credit Structure				Marks Distribution				
					L	T	P	C	INT	MID	END	Total	
EC 529	Digital Image Processing				3	0	0	3	50	50	100	200	
Course Objectives	To study the fundamentals of digital image processing				Course Outcomes	CO1	Ability to understand the fundamentals of digital image processing						
	To study the different enhancement and restoration techniques used for digital images processing.					CO2	Ability to analyse the different enhancement and restoration techniques used for digital images processing.						
	To study the various techniques employed for images segmentation.					CO3	Ability to analyse the various techniques employed for images segmentation.						
	To study the various techniques employed for images compression.					CO4	Ability to analyse the various techniques employed for images compression.						
	To study the various morphological operations used in image processing.					CO5	Ability to analyse the various morphological operations used in image processing.						

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	3	1	1	0	3	0	0	0	1	0	0	0	3	1	0	0
2	CO2	3	3	3	2	3	1	0	0	2	0	0	0	3	2	2	0
3	CO3	3	3	3	2	3	1	0	0	2	0	0	0	3	2	2	0
4	CO4	3	2	2	0	3	0	0	0	2	0	0	0	3	2	2	0
5	CO5	3	3	3	2	3	1	0	0	3	0	0	0	3	2	3	0

SYLLABUS

No.	Content	Hours	COs
I	Introduction Origin of digital image processing, human visual system and image perception, image acquisition, display, storage, colour image fundamentals - RGB, HSI models, image sampling, quantization: scalar and vector, Dither, two-dimensional signal and system preliminaries, 2D transforms - DFT, DCT, KLT, SVD, DWT.	8	CO1
II	Image Enhancement Histogram equalization, spatial-domain filtering, frequency-domain filtering, colour image enhancement.	8	CO2
III	Image Restoration Degradation model, unconstrained restoration - Lagrange multiplier and constrained restoration, inverse filtering removal of blur caused by uniform linear motion, Wiener filtering, geometric transformations-spatial transformations.	8	CO2
IV	Image Segmentation Edge detection, edge linking via Hough transform, thresholding, region-based segmentation – region growing, region splitting and merging, dam construction – watershed segmentation algorithm.	8	CO3
V	Image Compression Need for data compression, Huffman, run length encoding, shift codes, arithmetic coding, vector quantization, transform coding, JPEG standard, MPEG	8	CO4
VI	Morphological Image processing Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms segmentation by morphological watersheds.	8	CO5
Total Hours		48	

Essential Readings

1. Gonzalez R. C. and Woods R. E, "Digital Image Processing", Pearson Prentice Hall, 2nd edition, 2002

Supplementary Readings

1. Sonka M. Hlavac V., Boyle R., "Image Processing, Analysis and Machine Vision", Cengage Learning, 3rd edition, 2007.

2. Gonzalez R. C, Woods R. E and Eddins S. L "Digital Image Processing using MATLAB", McGraw Hill Education, 2nd edition, 2017.