SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement
20EC6E03	DIGITAL IMAGE PROCESSING AND ITS APPLICATION	VI	ECE A&B	5	2024-25	18/11/24

COURSE OUTCOMES: After completion of the Course students are able to	
1	Distinguish the basic concepts of digital image processing. intensity transformations and spatial filtering (K4)
2	Apply image restoration and reconstruction process in the images (K3)
3	Differentiate the Multi-Resolution Processing And Image Compression (K3)
4	Understand the concepts of Morphological Image Processing. segmentation and color Image Processing (K4)

UNIT	Out Comes / Bloom's Level	Topic No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
		UNIT-1: BASICS OF DIGITAL IMAGE PROCESSING				
I	CO1: Distinguish the basic concepts of digital image processing. intensity transformations and spatial filtering (K4)	1.1	Origins of digital image processing	T1, T2	1	Chalk & Talk. Smart Board. PPT and Tutorial
		1.2	Uses and Applications of D.I.P	T1, T2	1	
		1.3	Fundamental steps in digital image processing	T1, T2	2	
		1.4	Components of an image processing system.	T1, T2	1	
		1.5	Digital image fundamentals	T1, T2	2	
		1.6	Elements of visual perception	T1, T2	1	
		1.7	Explanation on light and electromagnetic spectrum	T1, T2	1	
		1.8	Imaging sensing and acquisition	T1, T2	2	
		1.9	Image sampling and quantization.	T1, T2	1	
		1.10	Some basic relationships between pixels.	T1, T2	1	
		1.11	Assignment/Class-test		1	
			Total		**14**	

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			UNIT- 2: INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING			
II	CO2: Apply image restoration and reconstruction process in the images (K3))	2.1	Background. Some basic intensity transformation functions.	T1,T2	2	Chalk & Talk. Smart Board. PPT and Tutorial
		2.2	Histogram processing.	T1,T2	1	
		2.3	Fundamentals of spatial filtering. smoothing spatial filters.	T1,T2	1	
		2.4	Sharpening spatial filters.	T1,T2	1	
		2.5	Filtering in the frequency domain: Preliminary concepts. the discrete Fourier transform (DFT) of one variable.	T1,T2	2	
		2.6	Extension to functions of two variables.	T1,T2	2	
		2.7	Some properties of the 2-D Discrete Fourier transform.	T1,T2	1	
		2.8	The basic of filtering in the frequency domain. image smoothing	T1	1	
		2.9	Sharpening using frequency domain filters.	T1,T2	1	
		2.10	Assignment/Class-test		1	
			Total		**13**	

			UNIT-3 IMAGE RESTORATION AND RECONSTRUCTION			
III	CO3: Differentiate the Multi-Resolution Processing And Image Compression (K3)	3.1	A model of the image degradation Restoration process.	T1,T2	1	Chalk & Talk. Smart Board. PPT and Tutorial
		3.2	Noise models.	T1,T2	2	
		3.3	Restoration in the presence of noise Only- Spatial Filtering.	T1, T2	1	
		3.4	Mean filters. order statistic filters and adaptive filters.	T1, T2	1	
		3.5	Periodic Noise Reduction by frequency domain filtering.	T1, T2	1	
		3.6	Linear. Position –Invariant Degradations.	T1, T2	2	
		3.7	Estimating the degradation function.	T1, T2	1	
		3.8	Inverse filtering. Minimum mean square error (Wiener) filtering.	T1,T2	1	
		3.9	Constrained least squares filtering. geometric mean filter.	T1, T2	1	
		3.10	Image reconstruction from projections.	T1, T2	1	
		3.11	Assignment/Class-test		1	
			Total		**13**	

			UNIT - 4 MULTI-RESOLUTION PROCESSING &IMAGE COMPRESSION			
IV	CO3: Differentiate the Multi-Resolution Processing And Image Compression (K3)	4.1	Image pyramids.	T1, T2	1	Chalk & Talk. Smart Board. PPT and Tutorial
		4.2	Sub-band coding & Haar transform.	T1, T2	1	
		4.3	Multi-resolution expressions.	T1, T2	1	
		4.4	Wavelet transforms in onedimension.	T1, T2	1	
		4.5	The fast wavelets transform.	T1, T2	1	
		4.6	Wavelet transforms in two dimensions.	T1, T2	1	
		4.7	Wavelet packets.	T1, T2	1	
		4.8	Image compression fundamentals.	T1, T2	1	
		4.9	Various compression methods-coding techniques.	T1, T2	1	
		4.10	Digital image water marking.	T1, T2	1	
		4.11	Assignment/Class-test		1	
Total					**11**	

			UNIT – 5: MORPHOLOGICAL IMAGE PROCESSING, SEGMENTATION AND COLORIMAGE PROCESSING			
V	CO4: Understand the concepts of Morphological Image Processing. segmentation and color Image Processing (K4)	5.1	Preliminaries Erosion and dilation, opening and closing	T1,T2	1	Chalk & Talk. Smart Board and PPT
		5.2	Hit-or-miss transformation	T1,T2	1	
		5.3	Basic Morphological algorithms,	T1,T2	1	
		5.4	Image segmentation- Fundamentals, point, line, edge detection thresholding,	T1,T2	2	
		5.5	Region-based segmentation,	T1,T2	1	
		5.6	Region -based segmentation,	T1,T2	1	
		5.7	Color models, pseudo color image processing, basic of full color image processing,	T1,T2	1	
		5.8	Industrial applications, Medical applications,	T1,T2	2	
		5.9	Military applications etc of image processing, patterns classification,	T2	1	
		5.10	Assignment/Class-test		1	
Total					**12**	

Content beyond Syllabus (if needed)			Applications of Colour Image		1	
			Design of watermark inside image		1	
CUMULATIVE PROPOSED PERIODS					**65**	

Text Books:

S.No.	AUTHORS. BOOK TITLE. EDITION. PUBLISHER. YEAR OF PUBLICATION
1.	R. C. Gonzalez and R. E. Woods, "Digital Image Processing, 3rd edition", Prentice Hall, 2018. (UNITI-V)
2.	Jayaraman, S. Esakkirajan, and T. Veera kumar, "Digital Image Processing", Tatc Graw-HillEducation, 2017.

Reference Books:

S.No.	AUTHORS. BOOK TITLE. EDITION. PUBLISHER. YEAR OF PUBLICATION
1.	R. C. Gonzalez, R. E. Woods and Steven L. Eddins, "Digital Image Processing Using MATLAB" 3rd edition, Gates mark, 2020.
2.	R. C. Gonzalez and R. E. Woods, "Digital Image Processing, 2nd d edition", Prentice Hall, 2012

Web Details:

1.	https://nptel.ac.in/courses/117/101/117101066/
2.	https://www.tutorialspoint.com/Digital Image Processing _overview.html
3.	https://ocw.mit.edu/resources/res-6-007-ImageProcessing-spring-2014.html

		Name	Signature with Date
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Principal