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
I	CO1: Distinguish the basic concepts of digital image processing. intensity transformations and spatial filtering (K4)	**UNIT-1:** BASICS OF DIGITAL IMAGE PROCESSING				Chalk & Talk. Smart Board. PPT and Tutorial
		1.1	Origins of digital image processing	T1, T2	1	
		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**	

II	CO2: Apply image restoration and reconstruction process in the images (K3))	**UNIT- 2:** INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING				
		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**	

III	CO3: Differentiate the Multi-Resolution Processing And Image Compression (K3)	**UNIT-3** IMAGE RESTORATION AND RECONSTRUCTION				
		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**	

IV	CO3: Differentiate the Multi-Resolution Processing And Image Compression (K3)	**UNIT - 4** MULTI-RESOLUTION PROCESSING &IMAGE COMPRESSION				
		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**	

V	CO4: Understand the concepts of Morphological Image Processing. segmentation and color Image Processing (K4)	**UNIT – 5:** MORPHOLOGICAL IMAGE PROCESSING, SEGMENTATION AND COLORIMAGE PROCESSING				
		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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