



C. U. SHAH UNIVERSITY

Wadhwan City

FACULTY OF:- Computer Science

DEPARTMENT OF:- Master of Computer Applications

SEMESTER:- V

CODE :- 5CS05MIP1

NAME – IMAGE PROCESSING (IP) - (MAJOR ELLECTIVE – II)

Teaching and Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS05MIP 1	IMAGE PROCESSING (IP)	4	0	0	4	4	30	1.5	70	3	--	---	--	100

Objectives:

- The objective of this course is to the objective of this course is to introduction to fundamentals concepts and algorithms for image processing and to can be utilized the knowledge for further research in study.
- To understand enhancing image characteristics, filtering, reducing, blurring, effects of noise, and image representations.

Pre-requisites:

- Fundamentals knowledge to implement mathematical functions for computer graphics.

Course outline:-

Sr. No.	Course Contents	Number of Hours
1.	Fundamentals of Image Processing Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance measures, connectivity , Image Geometry, Photographic film. Histogram: Definition, decision of contrast basing on histogram, operatio ns basing on histograms like image stretching, image sliding, Image classification. Definition and Algorithm of Histogram equalization.	06
2.	Image Transforms A detail discussion on Fourier Transform, DFT,FFT, properties. A brief discussion on WALSH Trans form , WFT, HADAMARD Transform, DCT.	08



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3.	<p>Image Enhancement</p> <p>Arithmetic and logical operations, pixel or point operations, size operations, Smoothing filters-Mean, Median, Mode filters – Comparative study. Edge enhancement filters – Directorial filters, Sobel, Laplacian, Robert, KIRSCH Homogeneity & DIFF Filters, prewitt filter, Contrast Based edge enhancement techniques. – Comparative study, Low Pass filters, High Pass filters, sharpening filters. – Comparative Study, Comparative study of all filters, Color image processing.</p> <p>Image enhancement : (By FREQUENCY Domain Methods) -esign of Low pass, High pass, EDGE Enhancement, smoothening filters in Frequency Domain. Butter worth filter, Homomorphic filters in Frequency Domain Advantages of filters in frequency domain, comparative study of filters in frequency domain and spatial domain.</p>	10
4.	<p>Image compression</p> <p>Definition: A brief discussion on – Run length encoding, contour coding, Huffman code, compression due to change in domain, compression due to quantization Compression at the time of image transmission. Brief discussion on:- Image Compression standards.</p>	10
5.	<p>Image Segmentation: Definition, characteristics of segmentation.</p> <p>Detection of Discontinuities, Thresholding Pixel based segmentation method. Region based segmentation methods – segmentation by pixel aggregation, segmentation by sub region aggregation, histogram based segmentation, spilt and merge technique. Use of motion in segmentation (spatial domain technique only)</p>	08
6.	<p>Morphology</p> <p>Dilation, Erosion, Opening, closing, Hit-and-Miss transform, Boundary extraction, Region filling, connected components, thinning, Thickening, skeletons , Pruning Extensions to Gray – Scale Images Application of Morphology in I.P</p>	06
	Total hours	48

Learning Outcomes:

At the end of the work student will be able to

- Use histogram processing techniques and its applications.
- Can able to deal with frequency domain and data compressing.

Books Recommended:

- “Digital Image Processing Using MATLAB”, **Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins**, 2nd Edition, Tata McGraw Hill Education
- “Digital Image Processing”, **Rafael C. Gonzalez and Richard E. Woods**, 3rd Edition, Pearson Education.