

GUJARAT TECHNOLOGICAL UNIVERSITY

Biomedical Engineering

B. E. SEMESTER: VII

Subject Name: **Image Processing (Department Elective-I)**

Subject Code: **170307**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Basics of Image processing: Image acquisition, Processing, communication, display, Electromagnetic Spectrum, Visual perception, structure of the human eye, image formation in the eye, uniform and Non-Uniform Sampling, Quantization, Image formats	06
2.	Image Enhancement: Spatial Domain-Point processing techniques, histogram processing, Neighbourhood processing, Frequency Domain techniques- 2D-DFT, Properties of 2 D-DFT, Low pass, High pass, Noise removal, Homomorphic filters, Basics of Colour image processing	10
3.	Image Segmentation: Detection of discontinuities, point line, edge detection, Edge linking, Hough transform, Region Based segmentation	08
4.	Image transforms: DFT, FFT, DCT, DST, Hadamard, Walsh, Haar, Slant, K-L Transforms, Basis Functions and basis images	08
5.	Morphological Image Processing: Dilation and Erosion, Opening and Closing, The Hit-or-Miss , Boundary Extraction, Region, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning, Extensions to Gray-Scale Images	08

6.	Image Compression: Fundamentals of Image compression models, Lossless Compression- RLE, Huffman, LZW, Arithmetic coding techniques Lossy Compression- IGS coding, Transform coding, JPEG, Predictive Coding.	08
7.	Representation and Description: Morphology-dilation, Erosion, open, close, Hit and miss, Boundary extraction, region filling, skeletonization, Feature extraction, Moments	08

Text Books:

1. Digital Image Processing, Gonzalez and Woods- Pearson Education
2. Digital Image Processing, S. Sridhar – Oxford University Press.
3. Fundamentals of Digital Image Processing, A.K. Jain .P.H.I.
4. Digital Image Processing and Analysis, Chanda Majumder- Printice Hall India

Reference Books:

1. Digital Image Processing and Computer Vision, Sonka, Hlavac,Boyle- Cenage learning.
2. Digital Image Processing, William Pratt- John Wiley.