GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Signal Processing and Communication

Semester: I

Subject Name: **Digital Image Processing and Applications (Major Elective-I)**
Subject Code: **714104**

Sr. No.	Course Content
1	Image sensing and acquisition, image sampling and quantization, image types, neighbors of pixel, adjacency connectivity, regions and boundaries, distance measures
2	Image enhancement in spatial domain: intensity transformation functions, histogram processing and function plotting, spatial filtering. Image enhancement in frequency domain: 2 D discrete fourier transform, filtering in the frequency domain, smoothing and sharpening frequency domain filters
3	Image Restoration: noise models, restoration in the presence of noise only- spatial filters, periodic noise reduction, modeling the degradation function, direct inverse filtering, wiener filtering, constrained list squares filtering, geometric transformation and image registration
4	Morphological image processing: dilation, erosion, combining dilation and erosion, labeling connected components, morphological reconstruction, gray scale morphology
5	Image segmentation: point, line and edge detection, line detection using hough transform, thresholding, region based segmentation, segmentation using watershed transform
6	Image processing applications: target detection, object recognition, feature extraction and matching, writer identification system, digital watermarking, medical and Industrial applications, Image Morphing and Image Fusion.

Reference Books:

1. R.C.Gonzalez, R.E.Woods, "Digital Image Processing", 3/e Pearson Education.
2. S. Jayaraman , S.Esakkirajan, "Digital Image Processing", McGraw Hill.
3. Horst Bunke, Abraham Kandel, "Applied Pattern Recognition", Springer International Edition, Springer.
4. Frank Y.Shih, "Image Processing and Mathematical Morphology", CRC Press