



BIT 408

DIGITAL IMAGE PROCESSING

UNIT-I

Image processing: Introduction, Fundamental steps, Components. Elements of visual perception, image sampling and quantization, some basic relationships between pixels.

Intensity Transformations Some Basic Intensity Transformation Functions, Histogram Processing

UNIT- II

Spatial Filtering: Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters

Filtering in the Frequency Domain: Preliminary Concepts, Image Smoothing using Frequency Domain Filters, Image Sharpening Using Frequency Domain Filters.

UNIT- III

Image Restoration and Reconstruction : A Model of the Image degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only—Spatial Filtering, Minimum Mean Square Error (Wiener) Filtering

Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing

UNIT- IV

Image Segmentation: Fundamentals, Point, Line, and Edge Detection, Segmentation by Thresholding, Region-Based Segmentation, Segmentation Using Watershed Algorithm.

Representation and Description: Representation, Some Simple Descriptors, Shape Numbers, Fourier Descriptors.

Object Recognition: Patterns and Pattern Classes, Matching: Minimum distance classifier, correlation.

UNIT-V

Color Image Processing: Color Fundamentals, Color Models, Pseudo color Image Processing.

Image Compression: Fundamentals, Compression Techniques, Lossless Compression, Lossy Compression, Measuring Information, Lossless Compression, Huffman Encoding, Arithmetic Coding, LZW, Run Length, Predictive Coding

Suggested Reading:

- 1) Rafael C Gonzalez and Richard E Woods, "Digital Image Processing", Pearson Education, 3rd Edition.
- 2) Vipula Singh, "Digital Image Processing with MatLab and lab View" Elsevier
- 3) Milan Sonka, Vaclav Halvac and Roger Boyle, "Image Processing, Analysis, and Machine Vision", Second Edition, Thomson Learning Publishers.
- 4) Kenneth R.Castleman, "Digital Image Processing", Pearson Education.
- 5) Rapel C Gonzalez , Richard E Woods and Steven L Eddins, "Digital Image Processing using MATLAB", Pearson Education.