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.

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, Huffman Coding, LZW Coding.

Suggested Reading:

1) Rafael C Gonzalez and Richard E Woods, "Digital Image Processing", Pearson Education, 3nd Edition.

References:

1) Milan Sonka, Vaclav Halvac and Roger Boyle, "Image Processing, Analysis, and Machine Vision", Second Edition, Thomson Learning Publishers.
2) Kenneth R.Castleman, "Digital Image Processing", Pearson Education.
3) Rapel C Gonzalez , Richard E Woods and Steven L Eddins, "Digital Image Processing using MATLAB", Pearson Education.
4) Madhuri A Joshi, "Digital Image Processing: An Algorithmic Approach", PHI Learning Pvt Ltd, 2008.
5) S. Annadurai, R. Shanmuga Lakshmi, "Fundamental of Digital Image Processing", Pearson Education.