II B.C.A. – III SEMESTER - DIGITAL IMAGE PROCESSING

UNIT I

DIP: Introduction - Fundamental Steps in DIP – Elementary of Visual Perceptions - Image Sensing and Image Acquisition - Image Sampling and Quantization – Image Geometry. **Spatial Domain:** Relationship between Pixels - Basic Gray Level Transformations – Histogram Processing – Smoothing Spatial Filters- Sharpening Spatial Filters.

UNIT II

Frequency Domain: Smoothing Frequency Domain Filters - Sharpening Frequency Domain Filters – Homomorphic Filtering. **Image Restoration:** Image Restoration Model - Degradation Model - Noise Models - Restoration in the Presence of Noise - Estimating the Degradation Function - Inverse Filtering - Wiener Filter.

UNIT III

Image Segmentation: Point and Line Detection - Basic Edge Detection Techniques - Hough Transform – Thresholding - Global Thresholding - Optimal Thresholding using Otsu's Method- Multispectral Thresholding - Region Based Segmentation - Region Growing - Region Splitting and Merging.

UNIT IV

Color Image Processing: Color Models: RGB Color Model – HSL Color Model – CMYK Color Model –CIE Color Model. Color Transformation. **Image Compression**: Lossy Image Compression – Lossless Image Compression. **Morphological Image Processing:** Introduction – Operations: Erosion and Dilation - Opening and Closing – Thinning - Skeletonization.

UNIT V

Image Representation: Shape Features (Region-based representation and descriptors) – Area - Euler's Number – Eccentricity – Elongatedness – Rectangularity – Direction – Compactness – Moments - Covex Hull - Texture Features - Color Features. **Object and Pattern Recognition:** Pattern and Pattern Classes - Matching, Minimum Distance or Nearest Neighbor Classifier - Matching by Correlation - Optimum Statistical Classifier - Neural Network Classifier.

REFERENCE BOOKS:

1. Digital Image Processing - S. SRIDHAR - OXFORD University Press.
2. Image Processing, Analysis, and Machine Vision - MILAN SONKA, VACLAV HLAVAC AND ROGER BOYLE.