IMAGE ANALYSIS (3-0-0)

Objective:

1. To understand the principles of Image Analysis.
2. To be familiar with the Image Analysis algorithms and their Implementation.

MODULE – I

Light and Electromagnetic spectrum, Components of Image processing system, Image formation and digitization concepts, Neighbours of pixel adjacency connectivity, regions and boundaries, Distance measures, Applications.

MODULE – II

Image Enhancements:

In spatial domain: Basic gray level transformations, Histogram processing, Using arithmetic/Logic operations, smoothing spatial filters, Sharpening spatial filters. In Frequency domain: Introduction to the Fourier transform and frequency domain concepts, smoothing frequency-domain filters, Sharpening frequency domain filters.

MODULE – III

Image Restoration:

Various noise models, image restoration using spatial domain filtering, image restoration using frequency domain filtering, Estimating the degradation function, Inverse filtering.

MODULE – IV

Colour Image processing:

Colour fundamentals, Colour models, Colour transformation, Smoothing and Sharpening, Colour segmentation. Wavelet and Multi-resolution processing: Image pyramids, Multi-resolution expansion, wavelet transform. Image compression: Introduction, Image compression model, Error-free compression, Lossy compression. Image segmentation: Detection of discontinuities, Edge linking and boundary detection, thresholding.

Outcome:

1. Technical knowhow of the Image Analysis techniques for real time applications.

Books Recommended:

1. Digital Image Processing, Second Edition by Rafel C. Gonzalez and Richard E. Woods, PearsonEducation
2. Digital Image Processing by Bhabatosh Chanda and Dwijesh Majumder, PHI
3. Fundamentals of Digital Image Processing by Anil K Jain, PHI
4. Digital Image Processing Using Matlab, Rafel C. Gonzalez and Richard E. Woods, PearsonEducation

Course Outcome:

After learning the course the students should be able to:

1. Understand the basic image enhancement techniques in spatial & frequency domains
2. Understand the various kind of noise present in the image and how to restore the noisy image.
3. Understand the basic multi-resolution techniques and segmentation methods.
4. To apply this concepts for image handling in various fields.