Code	Subject	L	T	P	C
PHD19007	Digital Image Processing	3	1	-	4

Course Objective:

The course provides an exposure to the different principles of image processing using digital means, applications and insights into Computer Vision and Machine Learning.

Unit 1: Introduction to Digital Image Processing, Image Preprocessing & its Significance:: Spatial filtering, Smoothing & Sharpening Spatial Filters; Frequency Domain- 2-D Fourier transform, Smoothing and Sharpening Frequency Domain Filtering; Convolution and Correlation Theorems;

Unit2: Components of an Image Processing system, Applications. Human Eye and Image Formation; Sampling and Quantization, Basic Relationship among pixels neighbor, connectivity, regions, boundaries, distance measures;

Unit3: Image Enhancement Spatial Domain-Gray Level transformations, Histogram, Arithmetic/Logical Operations; Image Restoration Inverse filtering, Wiener filtering; Wavelets- Discrete and Continuous Wavelet Transform, Wavelet Transform in 2-D;

Unit 4: Image Segmentation Discontinuities, Edge Linking and boundary detection, Thresholding, Region Based Segmentation, Watersheds; Introduction to morphological operations; binary morphology- erosion, dilation, opening and closing operations, applications; basic gray-scale morphology operations; Feature extraction; Classification; Object recognition; Colour Image Processing Colour models, Different processing techniques; Colour image filtering;

Unit 5: Feature Recognition & Learning: Supervised and Unsupervised Learning, Reinforcement Learning, Supervised Learning: Perceptron Learning, Back propagation Learning, Competitive Learning, Hebbian Learning. Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences & Fuzzy Systems.

Text Books:

1. Digital Image Processing- R. C. Gonzalez and R. E. Woods, Pearson Education
2. Digital Image Processing using MATLAB- R. C. Gonzalez , R. E. Woods and S. L. Eddins, Pearson Education
3. Digital Image Processing- Castleman, Pearson Education Digital Image Processing- Pratt, John Wiley

References

1. Digital Image Processing and Analysis- Chanda and Mazumdar, PHI
2. Digital Image Processing- Annadurai and Shanmugalakshmi, Pearson Education