Dec., 2016

Name of the Course: Image and Video Processing

Undergraduate: Code-IIVP632C

Postgraduate: Code-IIVP240E

Digital Image Fundamentals - Simple image model, digital image formation, sampling, quantization, resolutions and representation, relationship among pixels, types of digital images. Color Image Processing: Color Representation, Chromaticity Diagram and Color Spaces, types of digital imaging and application areas. Enhancement- Point Processing: Contrast Stretching, Power-law and Gamma Transformation. Histogram Processing: Histogram Equalization and Matching.

Filtering and Restoration- Degradation function and Noise Models, Spatial Domain Filtering: Correlation and Convolution, Smoothing Linear and Nonlinear Filters: Mean and Median Filters, Adaptive Filtering, Sharpening Linear and Nonlinear Filters: Derivative, Laplacian, Unsharp Masking, High-boost Filtering. Frequency Domain Filtering: Filtering: Low-pass (Smoothing) & High-Pass (Sharpening) Ideal, Butterworth and Gaussian Filtering, Unsharp Masking and High-Boost Filtering, Homomorphic Filtering, Periodic Noise Reduction and Inverse Filtering & Wiener Filtering.

Edges, Lines and Boundary Detection- First and Second Order Edge Operators, Multi-scale Edge Detection, Canny Edge Detection Algorithm, Hough Transform: Line and Edge Detection, Morphological Operations and Application: Boundary, Skelton, Convex-Hull, Thinning, Pruning etc.

Segmentation & Feature Extraction: Model-based and probabilistic methods and Image Classification Optimal and Multilevel Thresholding, Gray Image Segmentation, Watershed Algorithm.

Compression: Lossy and Lossless compression techniques, JPEG JPEG2000 and Variants,

Introduction to videoprocessing, Compression standards and formats, Video Streaming.

Text Books:

1. Digital Image Processing (3rd Edition) by Gonzalez, R. C. and Woods, R. E., *PHI*

2. Digital Image Processing (3rd Edition) by William K. Pratt, John Willey & Sons