DIGITAL IMAGE PROCESSING
EE-705D
Credit: 3
Contact: 3L

Module 1
Digital Image Processing Systems:
Introduction to structure of human eye, Image formation in the human eye, Brightness adaptation and discrimination, Image sensing and acquisition, storage, Processing,
Communication, Display Image Sampling and quantization, Basic relationships between pixels.   [05]

Module 2
Image Transforms (implementation):
Introduction to Fourier transform, DFT and 2-D DFT, Properties of 2-D FT, FFT, IFFT, Walsh transform, Hadamard transform, Discrete cosine transform, Slant transform, Optimum transform: Karhunen – Loeve Hotelling) transform.   [07]

Module 3
Image Enhancement in the Spatial and Frequency Domain:
Gray level transformations, Histogram processing, Arithmetic and logic operations, Spatial filtering: Introduction, Smoothing and sharpening filters. Frequency domain filters: Homomorphic filtering.   [07]

Module 4
Image Data Compression:
Fundamentals, Redundancies: Coding, Inter pixel Psycho-visual, fidelity criteria, Image compression models, Error free compression, Lossy compression, Image compression standards: Binary image and Continuous tone Still Image compression standards, Video compression standards.   [07]

Module 5
Morphological Image Processing:
Introductions, Dilation, Erosion, Opening, closing, Hit -or-miss transformation,
Morphological algorithm operations on binary Images, Morphological algorithm operations on gray-scale Images.   [07]

Module 7
Image Segmentation, Representation and Description:
Detection of discontinuities, Edge linking and Boundary detection, Thresholding region based segmentation, Image Representation schemes, Boundary descriptors, and Regional descriptors.   [07]

Numerical problems to be solved in the class.

Text Books:
1. Digital Image Processing, R.C Gonzalez and R. Woods, Pearson publication.
2. Digital Image Processing, Anil K. Jain, Prentice-Hall, India.

Reference Books:
1. Digital Image Processing, W.K. Pratt 2nd Edition, John Wiley & Sons.
2. Digital Image Processing and Analysis, B. Chanda & D. Dutta Majumder Prentice-Hall, India.
3. Image Processing- Theory, Algorithms & Architecture, M. A. Sid-Ahmed, McGraw-Hill.