Lecture Plan

Course Name (Code) : Image and Video Processing (CSD509)
Class : II Sem, MTech (CSE)
Contact Hours : 3–0–0
Session : 2023−2024 (Winter Semester)

Sl No.	Topic	No. of Hours
1	**Introduction:** Digital Image; Basic Phases; History; Human Visual System; Image Sampling and Quantization; Image Representation; Image Formats; Relationship between Pixels; Pixel Adjacency; Path, Pixels Connectivity; Connected Set; Boundary; Hole; Distance Measurement; Mathematical Operators used in Image Processing.	6
2	**Image Enhancement-I:** Contrast Enhancement; Histogram Processing; Point Processing; Spatial Domain Filtering.	4
3	**Image Enhancement-II:** Edge Sharpening; Frequency Domain Filtering.	4
	Quiz-I (*Syllabus: Sl No. 1-3*)	
4	**Image Restoration**: Noise Smoothing; Linear and Non-linear Filtering; Sharpening; Image Restoration; Motion Blur Removal, Geometric Corrections.	2
5	**Image Morphology:** Fundamental Operations; Morphological Algorithms; Mathematical Examples.	3
	Mid Semester Examination (*Syllabus: Sl No. 1-5*)	
6	**Image Segmentation:** Pixel-based Approach; Multi-level Thresholding; Adaptive Thresholding; Optimal Thresholding; Region-based Approach; Point and Line Detection; First and Second Order Edge Operators; Canny Edge Detector; Hough Transform; Edge Linking.	6
7	**Image Compression:** Error Criterion; Lossless Compression: Run-length Coding; Shannon-Fano Coding; Huffman Coding; Arithmetic Coding; Lossy Compression: Block Truncation Compression; Vector Quantization Compression; JPEG Standard.	5
	Quiz-II (*Syllabus: Sl No. 6-7*)	
8	**Image Representation and Description:** Freeman Chain Coding; Binary Tree and Quad Tree Coding; Polygonal Approximation; Boundary Segments; Boundary Extraction; Medial Axis Generation & Thinning; Boundary Descriptors; Regional Descriptors; Topological Descriptors; Relational Descriptors.	2
9	**Multiresolution Analysis and Wavelet:** Pyramidal Coding; Subband Coding; Application of Wavelets.	2
10	**Video Processing:** Introduction; Video Formats; Motion Detection and Estimation; Video Enhancement and Restoration; Video Segmentation.	4
	End Semester Examination (*Syllabus: Sl No. 1-10*)	
	Total	**38**

Text and Reference Books:

1. Digital Image Processing, R. C. Gonzalez and R. E. woods, Pearson Education.
2. Digital Image Processing and Analysis, B. Chanda and D. Dutta Mazumdar, PHI.
3. Digital Image Processing, W. K. Pratt, Wiley-Interscience.
4. Fundamentals of Digital Image Processing, A. K. Jain, Pearson India Education.
5. Handbook of Image and Video Processing, AL Bovik, Academic Press.

Soumen Bag
Associate Professor/CSE