

Digital Image Processing

(Elective – I)

B.E. Sem. VII [ETRX]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

Objectives : Image processing has grown considerably due to fast computational systems. Many important real life applications in diverse fields are therefore possible. This first course in image processing shall teach basic concepts in the subject.

Pre-requisite : Continuous and Discrete time signals and systems.

SYLLABUS

1. Digital Image Fundamentals

Introduction, components of image processing systems, Image sensing & acquisition, Image sampling & Quantization, Pixel operation.

2. Image Enhancement

Gray Level Transformations, Histogram Processing, Spatial Filtering, Smoothing and Sharpening Filters. Homomorphic Filtering Colour Image Enhancement.

3. Image Segmentation

Detection of Discontinuities, Edge linking & Boundary Detection, Thresholding, Region based segmentation Laplacian of Gaussian, Derivative of Gaussian, Canny Edge Detection, Morphological operation : Dilation erosion, Opening & Closing, Basic Morphological Algorithm, Image representation schemes.

4. Image Transform

Discrete Fourier transform, Walsh transform(WT), Hadamard transform, Cosine transform, Haar transform, Wavelet transform.

5. Image Compression

Fundamentals, Lossless compression : RLE, Arithmetic Coding, Huffman Coding, Lossy compression : JPEG, MPEG, Subband Coding, Vector quantization, Image & Video compression standard.

6. Applications of Image Processing

Case Study on Digital Watermarking, Biometric Authentication (Face, Finger Print, Signature Recognition), Vehicle Number Plate Detection and Recognition, Object Detection using Correlation Principle, Person Tracking using DWT, Handwritten and Printed Character Recognition, Content Based Image Retrieval, Text Compression.

References :

1. Digital Image Processing (*Gonzalez & Woods*) Pearson Education, Second edition.
2. Digital Image Processing (*W. Pratt*) Wiley Publication, third edition, 2002.
3. Digital Image Processing (*S.Jayaraman*) TMH (Mc Graw Hill) publication
4. Digital Image Processing and Computer Vision Cengage Learning (*Milin Sonaka*) Thomson publication second edition.2007.
5. Fundamentals of Image processing (*A.K. Jain*) Prentice Hall of India Publication, 1995
6. Digital Image Processing using MATLAB (*Gonzalez & Woods*) Pearson Education.
7. Introduction to Digital Image processing with Matlab (*Mc Andrew*) Cengage Learning Publication.
8. Digital Image processing for medical application (*Doubherty*) Cambridge.

