

Image Processing [IP]

(Elective – I)

B.E. Sem. VII [INST]

EVALUATION SYSTEM

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

SYLLABUS

1. Introduction

Definition of image, generation of image, steps in image processing, elements of digital image processing systems, image enhancements, restoration and analysis.

2. Digital Image Fundamentals

Elements of visible perception, image model, sampling and quantization, relationships between pixels, imaging geometry.

3. Image Transforms

Introduction to D.F.T., 2-D.F.T., F.F.T., other separable image transforms (walsh, hadamard, discrete cosine, haar, slant, KL)

4. Image Enhancements

Point operations, histogram modeling, spatial filtering-smoothing, sharpening, low pass, high pass, homomorphic filtering.

5. 2-D systems and mathematical preliminaries

Introduction and definitions, matrix theory, random signals, spectral density function, results from estimation and information theory.

6. Image Restoration

Image observation models, inverse and wiener filtering, F.I.R. wiener filters, filtering using image transforms, least squares filters, generalized inverse, S.V.D. and interactive methods, recursive filtering, causal models, digital processing of speckle images, maximum entropy restoration.

7. Image Segmentation

Detection of discontinuities, edge linking and boundary detection, thresholding region oriented segmentation, use of motion in segmentation.

8. Image Data Compression

Introduction, pixel coding, predictive techniques (PCM, DPCM, etc), transform coding theory of images, hybrid coding and vector DPCM.

Reference :

1. Image Processing (*R. C. Gonzalez*) Pearson Education 2nd edition, 1999.
2. Fundamental of Digital Image Processing (*A. K. Jain*) PHI 2nd edition, 1995.
3. Digital Image Processing (*W. K. Pratt*) John Wiley and Sons, 1994.
4. Image Processing in C (*C. Phillips*) BPB Publication, 1995.
5. Digital Image processing (*B. Chanda, D. Dutta Majumdar*) PHI, 2000.
6. Digital Signal Processing (*Emmanuel C. Ifeakor and Barry W. Jervis*) Pearson Education, 2nd edition, 2000.
7. Image Processing (*Don Pearson*) (The ESSEX series in Telecommunication and information systems, McGraw Hill International ELTL engg. series), 1991.
8. Introduction to DSP (*Johnny Johnson*) PHI – 1996.
9. DSP (*Proakis*) PHI 1997.
10. Theory and Application of DSP (*Rabnier Gold*) PHI, 1996.
11. Image Processing analysis and machine vision (*Milan Sonka, Vaclav Hlavac*) Thomson Learning, 2nd edition, 1999.

