

Digital Signal and Image Processing

B.E. Sem. VII [INFT]

EVALUATION SYSTEM

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

SYLLABUS

1. Introduction to Discrete Time Signals & System

Discrete-Time Signals representation and Manipulation, Discrete-Time IIR and FIR Systems, Impulse Response, Transfer Function, Difference Equation, Frequency Domain and Time Domain Analysis of IIR filter and FIR filter, Correlation, Linear and Circular and Covolution Algorithm.

2. Discrete Fourier Transform

DTFT, Frequency Domain Sampling, Properties of DFT, DIT-FFT algorithm, Spectral Analysis using FFT, Linear FIR filtering using FFT based Overlap Save and Overlap Add Method.

3. Image Transforms

Introduction to Unitary Transform, DFT, Properties of 2-D DFT, FFT, IFFT, Walsh transform, Hadamard Transform, Discrete Cosine Transform, Discrete Wavelet Transform.

Image Enhancement

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

4. Image Segmentation and Representation

Detection of Discontinuities, Laplacian of Gaussian, Derivative of Gaussian, Canny Edge Detection, Thresholding in Hierarchical Data Structures, Border Tracing, Edge linking and Boundary Detection, Thresholding, Region Based Segmentation. Representation Schemes.

5. Image Data Compression

Fundamentals, Redundancies: Coding, Interpixel, Psycho-visual, Error Free Compression, Lossy Image Compression : Lossy Predictive Coding, JPEG, MPEG, Subband Coding using Wavelet Transform, Vector Quantization.

6. Morphological Image Processing

Introduction, Dilation, Erosion, Opening, Closing, Hit-or-Miss transformation, Basic Morphological Algorithms on binary images.

7. 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.

Reference :

1. Introduction to Digital Signal Processing (*J.G. Proakis*) PHI
2. Digital Image Processing (*R.C.Gonsales R.E.Woods*) 2nd Edition, Pearson Education
3. Fundamentals of Image Processing (*Anil K.Jain*) PHI
4. Digital Signal Processing (*S Sallivahanan*) TMH
5. Image Processing Analysis and Machine Vision (*Milan Sonka, Vaclav Hlavac, Roger Boyle*) 2nd Edition, Thomson Learning Inc.
6. Digital Image Processing (*William Pratt*) John Wiley

