

# Digital Signal & Image Processing [DSIP]

B.E. Sem. VII [CMPN]

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## EVALUATION SYSTEM

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

## SYLLABUS

### 1. Discrete Time Signal and System

Introduction: Signals, Systems and Signal processing, classification of signals, system, LTI system, Frequency domain representation of DTS & Signals. Convolution, Correlation.

### 2. Z-Transforms

Introduction, Z-transforms, Inverse Z-Transforms, properties, System Function, Application of Z-Transform, Unilateral Z-Transform.

### 3. Discrete Fourier Transform

Introduction, DFT and its properties, FFT algorithms – direct, divide and conquer approach, radix-2 algorithm (Decimation In Time), 2-D DFT & FFT.

### 4. Introduction to Digital Image Processing Systems

Introduction, Brightness adoption and discrimination, Image sampling and quantization, basic relationship between pixels.

### 5. Image Transforms

Introduction to Fourier Transform, properties of Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Slant Transform, Optimum Transform: Karhunen-Loeve (Hotelling) Transform, Radon, Comparison of Transform. Introduction to wavelet transform.

### 6. Image Enhancement

Image Enhancement in the Spatial domain: Spatial domain point operation and Neighbourhood Operation, Gray-Level Transformation, Median Filter, Bit plane slicing, Histogram Processing, Arithmetic and Logic Operation, Spatial filtering: Introduction, smoothing and sharpening filters., Image Enhancement in the frequency domain: Frequency-domain filters: smoothing and sharpening filters, homomorphic filtering.

### 7. Image Restoration and Denoising

Introduction, Image Degradation, Types of Image Blur, Classification of image restoration Techniques, Image Restoration Model, Linear and non-Linear image restoration Technique, Blind deconvolution, Image Denoising, Classification of Noise in Image, Trimmed Average Filter, Applications of Image restoration.

### 8. Image segmentation

Detections of discontinuities, edge-linking and boundary detection, thresholding, region-based segmentation, Hough's transform.

### 9. Image Data Compression

Fundamentals, redundancies: coding, inter-pixel, psychovisual, fidelity criteria, image compression models, error-free compression, lossy Compression.

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**Reference :**

- 1 Introduction to Digital signal processing (*John G. Proakis, D.G. Manolakis*) Maxwell Macmillan Int.
- 2 Digital Image Processing (*R.C. Gonsales, R.E. Woods*) Second edition, Pearson Education.
3. Digital Signal processing (*S.Salivahanan*) TMH.
4. Fundamentals of Image Processing (*Anil K. Jain*) PHI.
5. Digital Image Processing (*S. Jayaraman, S Esakkirajan, T Veerakumar*) Mc Graw Hill.
6. Digital Signal and Image Processing (*Tamal Bose*) John Wiley & Sons Inc.

