4/4 B.Tech. FIRST SEMESTER

IT7T4C   **IMAGE PROCESSING**   **Credits: 4**
(Common to CSE/IT)

Lecture: 4 periods/week   **Internal assessment: 30 marks**
Tutorial: 1 period /week   **Semester end examination: 70 marks**

Objectives:

Introduce the students to

- Basic principles of digital images
- Image data structures
- Image processing algorithms.

Outcomes:

Students will be able to

- Understand the fundamentals of digital image processing.
- Understand image digitization.
- Understand image display hardware and software.
- Understand and apply image enhancement and restoration techniques.
- Understand image encoding techniques.
- Understand image segmentation approaches.
- Apply image processing techniques in both the spatial and frequency domains.

Syllabus

UNIT I
Digital Image fundamentals: Introduction, An image model, sampling & quantization, basic relationships between Pixels.

UNIT II
Image Transforms: Properties of 2 – D Fourier transform, FFT algorithm and other separable image transforms, Walsh transforms.

UNIT III
Image Enhancement: Background, enhancement by point processing, histogram processing, spatial filtering and enhancement in frequency domain.

UNIT IV
Image filtering and restoration: Degradation model, diagnolisation of circulant and block circulate matrices, Algebraic approach to restoration, inverse filtering, least mean squares and interactive restoration.

UNIT V
Image compression: Fundamentals, image compression modes, error free compression, lossy compression, image compression standards.

UNIT VI
Image segmentation: Detection of discontinuities, edge linking and boundary detection thresholding, region – oriented segmentation, use of motion in segmentation.

UNIT VII
Representation and description: Various schemes for representation, boundary descriptors, and regional descriptors.

UNIT VIII
Image Reconstruction: Image reconstruction from Projections, Radon Transforms, Convolution/Filter back – Project Algorithms.

Textbook:

1. Digital Image Processing, 3/e, GONZALEX, WOODS, Addison Wesley

Reference Books:

1. Fundamentals of Digital Image Processing, A.K.JAIN, PHI.
2. Fundamentals of Digital Image Processing, Anna durai, shanmugalakshmi,   Pearson.
3. Introduction to Digital Image Processing, Alasdair, McAndrew, Cengage.
4. Digital Image Processing, Castleman, Pearson.
5. Digital Image Processing, S Jayaraman, SEsakkirajan, T Veerakumar,TMH.