4/4 B.Tech - FIRST SEMESTER

IT7T6D	**IMAGE PROCESSING**	**Credits:3**
Lecture: 3 Periods/week		**Internal assessment: 30 marks**
Practice/Interaction: 1Period/week		**Semester end examination: 70 marks**

Objectives:

- To introduce basic principles of digital image processing.
- To provide knowledge on Image data structures
- To demonstrate different image encoding techniques.
- To explain segmentation and restoration techniques.

Outcomes:

Students will be able to

- Understand the fundamentals of digital image processing.
- Understand and apply image enhancement and restoration techniques.
- Understand different types of color image processing techniques and its operations.
- Analyze and implement various image encoding techniques.
- Understand different types of segmentation techniques.

Prerequisite:

C Programming

Syllabus:

UNIT-I

Introduction: Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels

UNIT-II

Image enhancement in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods

UNIT-III

Color Image Processing: Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation

UNIT-IV

Image Compression: Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards.

UNIT-V

Image Segmentation: Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation

Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms

Text Book:

1. Digital Image Processing, Rafeal C. Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

Reference Books:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Digital Image Processing and Analysis, B. Chanda, D. DattaMajumder, Prentice Hall of India, 2003
4. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
5. Digital Image Processing using Matlab, Rafeal C. Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.

e-Learning Resources:

1. http://nptel.ac.in/courses/117105079/29