4/4 B.Tech. EIGHTH SEMESTER

EM8T1 DIGITAL IMAGE PROCESSING Credits: 4

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

Learning Objectives:

The purpose of this course is to introduce the basic concept and methodologies for digital image processing.

Learning outcomes:

- The students undergoing this course will be able to know
- The fundamental of image processing.
- Various transforms used in image processing.
- About the various techniques of image enhancement, reconstruction, compression and segmentation

UNIT – I

Introduction: Origin of Digital Image Processing, Fields that uses Digital Image Processing,Fundamental steps in Digital Image Processing, Components of an Image Processing System**.**

UNIT – II

Digital image fundamentals: Elements of Visual perception, Image sampling and Quantization, Basic relationships between Pixels, Linear and Non-linear operations.

UNIT – III

Image enhancement in spatial domain: Some basic Grey level transformations, histogram processing, enhancement using Arithmetic/Logic operations, Smoothing Spatial Filters, Sharpening Spatial Filters.

UNIT – IV

Image enhancement in frequency domain: Introduction to Fourier Transform and the Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters.

UNIT –V

Image restoration: Noise models, Restoration in the presence of Noise, only SpatialFiltering, Periodic Noise reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Inverse Filtering, Wiener Filtering.

UNIT – VI

Image compression: Fundamentals – Image Compression models – Error Free Compression, Lossy Compression.

UNIT – VII

Image Segmentation: Detection of discontinuities, Thresholding, Edge based Segmentationand Region based Segmentation.

UNIT –VIII

Image Representation and Description: Representation schemes, Boundary Descriptors, Regional Descriptors.

TEXT BOOK:

1. R C Gonzalez and Richard E Woods, Digital Image Processing, Pearson Education, Second Edition, 2002.

REFERENCE BOOKS:

1. A K Jain, Fundamentals of Digital Image Processing, PHI, 1989
2. B Chanda and D Dutta Majumder, Digital Image Processing and Analysis, PHI,2001.
3. MilanSonka, Vaclav Hlavac and Roger Boyle, Image Processing Analysis and Machine Vision, Thomson learning, Second Edition, 2001.
4. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.