

## 3/4 B.Tech- SIXTH SEMESTER

EC 6T6FE3

Digital Image Processing

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

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### Course Objectives:

- To acquire the fundamentals of image processing and mathematical transforms necessary for image processing.
- To know the details of image enhancement in spatial and frequency domains
- To study the image compression, and restoration techniques
- To attain knowledge of image segmentation techniques

### Learning Outcomes:

Student will be able to

- Analyze different types of images and color models
- Improve the quality of images using Spatial and frequency domain filtering.
- Apply the restoration techniques to improve the fidelity of images.
- Design the techniques for image compression, image Segmentation for various applications.

### UNIT I

**Digital Image fundamentals:** Digital Image Representation, Fundamental steps in image processing, Concept of gray levels, Gray level to binary image conversion, Sampling and quantization, Resolution, types of images, Relationship between pixels.

### UNIT II

**Image Enhancement in Spatial Domain:** processing, Histogram processing, Image smoothing & Image sharpening.

**Image Enhancement in frequency Domain:** Steps involved in frequency domain filtering, Image smoothing & Image sharpening.

### UNIT III

**Image compression:** Redundancies and their removal methods, Fidelity criteria, Image compression models, lossy and lossless compression.

### UNIT IV

**Image segmentation:** Detection of discontinuities, edge linking and boundary detection, thresholding, region – oriented segmentation.

### UNIT V

**Colour image processing:** Colour fundamentals, Colour models, Pseudo colour image processing, full colour image processing

## Learning Resources

### Text Books:

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Edition, 2002.

### References:

1. Fundamentals of Digital Image processing – A.K.Jain, PHI. 1989
2. Digital Image processing- S Jayaraman, S Esakkirajan and T. Veerakumar.TMH 3rd Edition,2010.
3. Digital Image Processing – William K. Pratt, John Wiley, 3rd Edition, 2004.
4. The Essential Guide to Image Processing-Alan c. Bovik, Academic Press, 2009.

### Web Resources:

1. [http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/Digi\\_Img\\_Pro/ui/TOC.htm](http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/Digi_Img_Pro/ui/TOC.htm)
2. <http://nptel.iitm.ac.in/video.php?subjectId=117105079>
3. [http://en.wikipedia.org/wiki/Digital\\_image\\_processing](http://en.wikipedia.org/wiki/Digital_image_processing).
4. <http://www.filestube.com/d/digital+image+processing+gonzalez+solution>.