

## Digital Image Processing

### Unit-1:

1. a) Explain the components of Digital Image Processing system?  
b) Explain the fundamental steps in digital image processing?
2. a) Explain the basic concepts of sampling and quantization with neat sketch .  
b) Define the terms.
  - i) Neighbours of pixels
  - ii) connectivity
3. a) State and prove any two properties of –DDFT.  
b) Write an algorithm to generate Haar basis and find haar basis for second order function?
4. a) Discuss about Discrete Cosine Transform and derive the kernel for  $N=4$ ?  
b) Explain Walsh transform in detail and derive the kernel for  $N=4$ .

### Unit-2:

1. a) Explain basic gray level transformation techniques  
b) What is meant by image sharpening? How is it achieved using Laplacian operator?
2. a) Explain about
  - i) Median filters.
  - ii) Max and Min filters.  
b) Explain how Image sharpening is done using frequency domain filters.
3. Describe Histogram equalization, Histogram Normalization and Local Histogram in detail.
4. What are the basic steps involved in filtering in frequency domain.

### Unit-3:

1. Explain about adaptive filters?
2. Explain the following mean filters for restoration process
  - a) Arithmetic filter
  - b) Geometric filter
  - c) Harmonic filter
3. a) Explain the model of Image Degradation/Restoration process.  
b) What is Noise? Explain about Various noise models.
4. Explain how to apply inverse filtering in image restoration process.

## Unit-4:

1. (a) Draw and explain the schematic diagram of how pixel of an RGB color image is formed from the corresponding pixels of three component images.  
(b) Explain about the basic color models.
2. Explain about following color model conversions.
  - (a) RGB to HSI color model
  - (b) HSI to RGB color model
3. What is Pseudo color image processing? Discuss various Pseudo color techniques.
4. (a). What is meant by Smoothing? Discuss about color image smoothing.  
(b) What is meant by Sharpening? Discuss about color image sharpening.

## Unit-5:

1. Explain image compression model and Huffman coding in detail.
2. (a) What is meant by redundancy? What are the types of image compression techniques?  
(b) Explain about Digital image watermarking.
3. Explain about (a) Image Pyramids and (b) Sub band Coding.
4. (a) What is meant by Wavelet? Explain about Haar wavelet transform for multi resolution analysis.  
(b) Explain about the wavelet transforms in One Dimension.

## Unit-6:

1. Explain about point, line and edge detection schemes in image segmentation.
2. Explain about the following edge detector operators used in segmentation.
  - (a) Prewitt
  - (b) Roberts
  - (c) Sobel
3. (a) What is meant by Morphology? Explain about Reflection and Translation properties of set theory.  
(b) Explain about Dilation and Erosion in Morphological operations
4. Explain thresholding in detail