

(EC510) DIGITAL IMAGE & VIDEO PROCESSING (ELECTIVE - II)

Objective of the Course :

Introduce the student to technologies and architectures of wireless communications and networks. Makes the student familiar with important types of wireless networks, their applications, design approaches and assess their relative merits

UNIT-I

Fundamentals steps of Image processing: Components of an Image processing system, Image sampling and quantization, relationship between the pixels. Gray level transformation, Histogram processing, Smoothing and sharpening spatial filters, Smoothing and sharpening frequency domain filters, Homomorphic filtering Restoration filters – spatial and frequency domain, Inverse filter, Wiener filter.

UNIT- II

Image Compression: Compression models, Error free coding, lossy coding, compression standards. **Image segmentation:** Edge linking and boundary detection, Thresholding, Region based segmentation.

UNIT - III

Video formation, perception and representation: Color perception and specification, Video capture and display, Analog video raster, Analog color TV systems, Digital Video **Video Sampling:** Basics of lattice theory, sampling over lattice, Sampling of video signals, filtering operations, Conversion of signals sampled on different lattices, Sampling rate conversion of video signals.

UNIT - IV

Video Modeling : Camera model, illumination model, object model. Scene model, Two dimensional motion models **2-D motion estimation:** Optical flow, General methodologies, Pixel based motion estimation, Block matching algorithm, Mesh-based motion estimation, Global motion estimation, Region based motion estimation, Multiresolution motion estimation. Application of motion estimation in video coding

UNIT - V

Video Coding: Information theory, Binary encoding, Scalar quantization, Vector quantization, Waveform based video coding: Block based transform coding, Predictive coding, Object based scalability, Wavelet Transform based coding

REFERENCE BOOKS:

1. Digital Image processing – Gonzalez and Woods
2. Video processing and communication – Yao Wang, Joern Ostermann and Ya-Qin Zhang, Prentice Hall
3. Digital video processing – M. Tekalp