Course Name: Digital Image Processing
Course ID: IT523
Course Type: M.Tech. (ICT) Elective open to B.Tech.(ICT) students
Course Structure: 3 – 0 – 0 – 3

Course Outline

Introduction:
Digital Image Processing takes the tremendous advances in technology and combines them with the powerful human ability to visualize and interpret data, offering creative solutions to complex problems. Image processing expands the unique human ability to visualize and interpret data; scientists worldwide have recognized that DIP is an essential tool for education, research and technology. Software growth thrives on real-time user enhancement, on-line training, permanent feedback from its broad spectrum of users, and, consequently, rapid advances in telecommunications, networking and computer architecture.

The field of Digital Image Processing (DIP) has seen a significant increase in the level of interest from other disciplines. DIP is continuously enhanced by other areas such as neural nets, wavelet theory, mathematical morphology, data compression and recognition, and artificial intelligence. With the dramatic drop in the cost of digital systems and the equally dramatic increase in the level of performance, the application of DIP in other disciplines is unavoidable. Digital Image Processing plays a crucial role in the areas of remote sensing, medical imaging, scientific visualization, telecommunications, robotics, biology, and environmental engineering among others.

Objectives:
The proposed course has the following objectives:
- Transfer the theory and practice required to process and visualize digital information.
- Expose students to state-of-the-art technology through a hands-on approach to Digital Image Processing.

Contents:
This course on digital image processing covers the following topics:
1. Image acquisition and mathematical representation of images
   a. Image sampling
   b. Image quantization
2. Image Transforms - two dimensional transforms
   a. Fourier
   b. Walsh-Hadamard, etc.
3. Image enhancement, edge detection, histograms and histogram processing
4. Image restoration:
   a. Inverse filtering,
   b. Weiner filtering, etc.
5. Mathematical morphology and their use in image description
6. Image Analysis and Recognition
7. Computer Tomography.

Books/Reading Material