

<b>Subject Code</b>	<b>Subject Name</b>	<b>Credits</b>
<b>26CS615</b>	<b>ADVANCED DIGITAL IMAGE PROCESSING</b>	<b>4</b>

### **Course Objectives**

1. To get to know the fundamentals of Image Processing
2. To understand and learn Image Enhancement, Segmentation and other related concepts
3. To know how to perform analysis of Features, Multi resolution analysis and Features
4. To get to know the various applications of Image Processing

### **Learning Outcomes**

After the completion of the course, the graduate will be able to

1. To learn the Image Processing techniques
2. To learn about various Image Processing techniques

### **Unit 1 - Fundamentals of Image Processing (12 Hrs.)**

Introduction – Steps in image processing systems – Image acquisition – Sampling and Quantization – Pixel relationships – Color fundamentals and models – File Formats, Image operations: Arithmetic, Geometric and Morphological.

### **Unit 2 - Image Enhancement (12 Hrs.)**

Spatial Domain – Gray level transformations – Histogram processing – Spatial filtering – Smoothing and sharpening – Frequency domain: Filtering in frequency domain – DFT, FFT, DCT – Smoothing and sharpening filters – Homomorphic filtering

### **Unit 3 - Image Segmentation and Feature Analysis (12 Hrs.)**

Detection of discontinuities – Edge operators – Edge linking and boundary Detection – Thresholding – Region based segmentation – Morphological Watersheds – Motion segmentation, Feature analysis and extraction

### **Unit 4 - Multi Resolution Analysis and Compressions (12 Hrs.)**

Multi Resolution analysis, Image pyramids – Multi resolution expansion – Wavelet transforms – Image compression: Fundamentals – Models – Elements of information theory – Error free compression – Lossy compression – Compression standards

### **Unit 5 - Applications of Image Processing (12 Hrs.)**

Image classification – Image recognition – Image understanding – Video motion analysis – Image fusion – Steganography – Digital compositing – Mosaics – Color image processing

### **References:**

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Third Edition, Pearson Education.
2. S.Sridhar, “Digital Image Processing”, Oxford University Press, 2011.