University of Technology Computer Engineering Department Academic Year 2023-2024 3st Year- Second semester- All Branches	

CE336	*Image Processing*	2Hr/Week	2 Units

Contents of syllabus	Hours
1. Introduction to Image Processing • **Basic definitions** • **The electro-magnetic spectrum and related imaging systems** • **Components of digital images processing system** • **Image processing applications and tasks**	**4**
2. Digital Image Fundamentals • **A simple image formation model** • **Image sampling and quantization** • **Digital image representation** • **Types of digital images: binary images, gray-scale images, color images, multispectral images** • **Digital image file formats** • **Spatial and gray-level resolution** • **Image algebra** • **Zooming and resizing** • **Some basic relationships between pixels**	**6**
3. Image Enhancement in the Spatial Domain • **Histograms and statistical properties** • **Some basic gray-level transformations** • **Histogram manipulation techniques** • **Spatial filtering** • **Combining spatial enhancement methods**	**6**

4. Image Enhancement in the Frequency Domain • **Fourier transforms** • **Frequency domain vs. spatial domain** • **Fourier spectrum and phase spectrum** • **Filtering in the frequency domain**	**6**
6. Image Restoration • **Noise models** • **Restoration in the presence of noise only-Spatial filtering**	**4**
Image Segmentation • **Point detection** • **Line detection**	**2**
Image Compression • **Lossless compression** • **Lossy compression**	**2**

References:

1.Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Third Edition2008

2.Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Prentice – Hall 2004.

3.Scott E Umbaugh, "Computer Vision and Image Processing", Prentice – Hall 1998.

4.Nick Efford, "Digital Image Processing – a practical approach using Java", Pearson Education 2000.

5.John R Jensen, "Introductory Digital Image Processing", 3/E. Prentice Hall, 2005.