No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
2	ECE-801(B)	Digital Image Processing	PEC	3	2	1	0	50	100	150

Course Outcomes:

	At the end of the course the student will be able to
CO1	Explain the fundamentals of digital image processing, including image representation in spatial and transform domain.
CO2	Perform image enhancement and filtering techniques in spatial and frequency domain.
CO3	Evaluate the image restoration and filtering techniques for image analysis.
CO4	Describe image segmentation and morphological image processing techniques for image analysis.
CO5	Apply image compression and recognition techniques for image processing.

Detailed Syllabus

Section-A

Unit 1: Digital Image fundamentals: Steps in Digital Image Processing, Components, Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms, DFT, DCT.

(7 Hrs)

Unit 2: Image Enhancement, Spatial Domain: Gray level transformations, Histogram processing, Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters, Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

(8 Hrs)

Unit 3: Image Restoration, degradation model, Properties, Noise models, Mean Filters, Order Statistics, Adaptive filters, Band reject Filters, Band pass Filters, Notch Filters, Optimum Notch Filtering, Inverse Filtering, Wiener filtering.

(6 Hrs)

Section-B

Unit 4: Image Segmentation: Edge detection, Edge linking via Hough transform, Thresholding, Region based segmentation, Region growing, Region splitting and merging, Morphological processing, erosion and dilation.

(6 Hrs)

Unit 5: Image Compression and Recognition: Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Regional Descriptors, Topological feature, Texture, Recognition based on matching.

(8 Hrs)

Text Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Digital Image Processing	Rafael C. Gonzalez, Richard E. Woods	Pearson	4th (2018)
2	Digital Image Processing	William K. Pratt	John Wiley, New York	4th (2010)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Digital Image Processing	Kenneth R. Castleman	Pearson	2nd (2008)
2	Digital Image Processing using MATLAB	Rafael C. Gonzalez, Richard E. Woods, Steven Eddins	Pearson Education, Inc.	5th (2009)