MANGALORE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
MSc Computer Science

CSS 507: DIGITAL IMAGE PROCESSING		
Hours/Week: 4 **Credits : 4**		**I.A. Marks: 30** **Exam. Marks: 70**

Course Outcomes:

CO1: Understand the need for image transforms different types of image transforms and their properties.

CO2: Develop any image processing application.

CO3: Understand the rapid advances in Machine vision.

CO4: Learn different techniques employed for the enhancement of images.

CO5: Learn different causes for image degradation and overview of image restoration techniques.

CO6: Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.

CO7: Learn different feature extraction techniques for image analysis and recognition

	UNIT-I	**12 Hrs.**

Digitized image and its properties: Basic concepts, Image digitization, Digital image properties. Image Pre-processing: Image pre-processing; Histogram processing, Enhancement using arithmetic / logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Brightness and geometric transformations, local pre-processing.

	UNIT-II	**12 Hrs.**

SEGMENTATION: Thresholding, Edge-based segmentation, Regionbased segmentation, Matching.

	UNIT-III	**12 Hrs.**

IMAGE ENHANCEMENT: Image enhancement in the frequency domain: Background, Introduction to the Fourier transform and the frequency domain, Smoothing Frequency-Domain filters, Sharpening Frequency Domain filters, Homomorphic filtering.

IMAGE COMPRESSION: Image compression: Fundamentals, Image compression models, Elements of information theory, Error-Free Compression, Lossy compression.

	UNIT-IV	**12 Hrs.**

SHAPE REPRESENTATION: Region identification, Contour-based shape representation and description, Region based shape representation and description, Shape classes.

MORPHOLOGY: Basic morphological concepts, Morphology principles, Binary dilation and erosion, Gray-scale dilation and erosion, Morphological segmentation and watersheds.

REFERENCE BOOKS:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, **Image Processing, Analysis and Machine Vision** 2nd Edition, Thomson Learning, 2001.

2. Rafel C Gonzalez and Richard E Woods**, Digital Image Processing,** 2nd Edition, Pearson Education, 2003.

3. Anil K Jain, **Fundamentals of Digital Image Processing** Pearson Education/Prentice-Hall of India Pvt. Ltd., 1997.

4. B. Chanda, D Dutta Majumder**, Digital Image Processing and Analysis** Prentice-Hall India, 2002.