SEMESTER	4
Paper Number	MCMS 4412
Paper Title	Digital Image Processing
No. of credits	6
Theory / Composite	Composite
No. of periods assigned	Th: 4 Pr: 4
Name of faculty member(s)	
Course description / objectives	On completion of this course, the students will be able to: 1. understand the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images 2. gain awareness of various spatial and frequency domain transformation techniques 3. know how colour images can be represented and manipulated 4. appreciate the importance of image compression and learn about lossy and lossless compression techniques. 5. gain knowledge regarding how to apply the methods to solve real-world problems in several areas including medical, remote sensing and surveillance and develop the insight necessary to use the tools of digital image processing (DIP) to solve any new problem. 6. know how image patterns can be represented and identified.
Syllabus	**Theory – 60 marks** Introduction: Introduction of Image Processing with its applications, Components of Image processing system, Image, Formation model. Image digitization process. Spatial Domain Image Transformation: Introduction of Image enhancement, Image enhancement techniques: Contrast intensification by Linear stretching, Non-Linear stretching, Exponential stretching, Noise cleaning or Smoothing by Image averaging, Image sharpening. Frequency Domain Image Transformation: Basic transformations in the frequency domain, Low Pass and High Pass Filters (Guassian, Butterworth, Laplacian) Colour Image Processing: Pseudo and False colouring, Image fusion. Colour Models: RGB, CMY, HSI Image Compression: Introduction, Lossy Compression techniques and Loss less image compression techniques, Huffman coding, Run Length Encoding, JPEG, Block Truncation compression. Image Pattern Representation and Recognition: Representation, Boundary Descriptors, Regional Descriptors, Patterns and Pattern Classes, Recognition based on decision theoretic methods, structural methods **Lab – 40 marks**
Reading/Reference Lists	1. Gonzalez E. Woods, Digital Image Processing, Pearson Education 2. Digital Image Processing and Pattern Recognition, Malay K. Pakhira, PHI 3. Arthur Weeks, Fundamentals of Electronic Image Processing, PHI
Evaluation	Total – 100 (Theory – 60, Practical – 40) Theory – CIA – 10 Semester Examination – 50