INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Digital Image Processing	Course No *(will be assigned)*					
Specialization	Computer Engineering	Structure (LTPC)	3	1	0	4	
Offered for	UG/PG/Ph.D	Status	Core ☐		Elective ■		
Faculty	Dr. V. Masilamani	Type	New ■		Modification ☐		
Pre-requisite	COT	To take effect from	Aug 2012				
Submission date	June 2012	Date of approval by AAC					

Objectives	As input data for many real world problems are available in the form of images (2D-signals), it would be apt to introduce the students to a course on digital image processing. This course is designed to give fundamentals of image processing and its application in various fields. The students will also be exposed to implementation of image processing algorithms to solve real world problems using SCILAB/MATLAB
Contents of the course *(With approximate break up of hours)*	Digital Image Fundamentals: elements of visual perception, image acquisition and display, image sampling and quantization, pixel relationship, arithmetic operations between images and super resolution (4) Image Transformation and Enhancement: geometric transformation, intensity transformation, spatial domain filtering, DFT, DCT, KLT and frequency domain filtering (8) Image and Video coding: run length coding, Huffman coding, compression using DCT, H.264/MPEG-4 advanced video coding (4) Image Restoration and Reconstruction: models for image degradation and restoration process, Wieners' filter, principles of Computed Tomography (CT), Image reconstruction from projections using inverse Radon transform and binary image reconstruction using network flow (6) Color Image Processing: color models, pseudo and full-color image processing, smoothing and sharpening in color images and segmentation based on color (4) Morphological Image Processing: erosion and dilation, opening and closing, boundary extraction, hole filling, connected component extraction , thinning and thickening, and gray-scale morphology (6) Image Segmentation: point, line and edge detection, Hough transform, thresholding using Otsu's method, region based segmentation, watershed segmentation algorithm and graph-cut based segmentation (7) Representation, Description and Recognition of Objects: chain codes, polygonal approximation approaches, signatures, boundary segments, boundary descriptors, regional descriptors, recognition based on decision–theoretic methods, matching shape numbers and string matching (7)
Textbook	1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, Pearson Education, 3rd Edition, 2009.
References	2. William K Pratt, Digital Image Processing , John Willey, 4th edition, 2006. 3. A.K. Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 1995. 4. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, Digital Image Processing using MATLAB, Pearson Education, 2nd Edition, 2009. 5. B. Chanda, D. Dutta Majumder, Digital Image Processing and Analysis, Prentice Hall of India, 2008.