Birla Institute of Technology & Science, Pilani
Instruction Division
Second Semester, 2015-2016
Course Handout(Part II)

Date :13.01.2016

In addition to Part I(General Handout for all courses appended to the Time Table), this portion gives further specific details regarding the course.

Course No. : BITS F311

Course Title: Image Processing

Instructor – in - Charge:SUBHASH KARBELKAR

Course Description: This is a first course on digital image processing. It begins with an introduction to the fundamentals of digital images and discusses the various discrete transforms, which are extensively used in the field of image processing. The course discusses different image processing techniques essential for image enhancement, image restoration and image compression.

Scope & Objective: The course introduces the students to the fundamentals of digital images and various processing techniques that are applied to them so as to improve their quality. These techniques are essential for image enhancement, image restoration and image compression. Matlab software will be extensively usedin the course.

Text Book: Gonzalez, R. C. & R. E. Woods, Digital Image Processing, 3/e, Pearson.

Reference Books: Gonzalez, Woods, Eddins, Digital Image Processing using MATLAB, 2/e, Pearson

Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Reference to Text book sections
1	Introduction	Digital image processing	Chapter 1
2-3	Image sampling	Sampling & Quantization	2.3, 2.4
4	Introduction to MATLAB		Class notes
5-6	Basic intensity transformations	Negatives, Log, power law & piece wise linear	3.2
7-8	Histogram processing	Equalization & matching	3.3
9-11	Spatial filtering	Spatial filtering, correlation & convolution	3.4
12	smoothing	Smoothing filters	3.5
13-14	Sharpening	Laplacian filter	3.6,3.7
15-16	Frequency domain	Special frequency	4.1, 4.2
17-18	Fourier transforms (FT)	FT, convolution	Class notes
19-20	Digital Fourier transforms (DFT)	DFT, sampling functions	4.3 - 4.5
21-22	2-D DFTs	Properties of 2-D DFTs	4.6
23-25	Frequency domain filtering	Basics & filtering	4.7, 4.8

26-27	Image sharpening	Sharpening in image domain	4.9-4.10
28	Image restoration	Noise models	5.1, 5.2
29-31	Restoration in presence of noise	Spatial and frequency domain methods for restoration	5.3-5.5
32-33	Image reconstruction	Degradation function & inverse filtering	5.6-5.10
34-35	Image reconstruction from projections	CT & reconstruction	5.11
36-37	Image compression	Fundamentals	8.1
38-40	Basic compression methods	Basic compression methods	8.2

Evaluation Scheme:

Evaluation Component	Duration	Weightage	Date, Time & Venue	Nature of Component
Mid Sem	90 Minutes	30%	14/3 2:00 -3:30 PM	Closed/open Book
Quiz/Assignment		30%	-----	Closed Book
Comprehensive Examination	3 Hours	40%	4/5 FN	Closed/open Book

Chamber Consultation Hour: To be announced in the class.

Notices: Notices concerning the course will be put up on the FD III notice board and Nalanda.

Make-up Policy: Make-up for the tests will be granted only on genuine grounds of sickness **(to be supported by medical certificate and not prescription**) or urgency for going out of town. There will not be any make-up for the assignment / quiz test.

Instructor-in-Charge

BITS F311