Birla Institute of Technology & Science, Hyderabad Campus

First Semester, 2019-20

Course Handout (Part II)

01-08-2019

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. : EEE F435 / ECE F435

Course Title: Digital Image Processing

Instructor – in - Charge: Sumit K Chatterjee

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 image processing. It then goes on to discuss the different image processing techniques such as image enhancement, automatic image classification and recognition.

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 image enhancement, automatic image classification and recognition.

Text Book: Gonzalez, R. C. & R. E. Woods, Digital Image Processing, Pearson Education, 3rd ed., 2009

Reference Books:

1. Digital Image Processing using MATLAB, Gonzalez, Woods & Eddins, Pearson, 2007

Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-2	To introduce fundamental concepts and terms associated with digital images.	Introduction and digital image fundamentals.	Chap 2
3-8	To study image enhancement by gray level transformations	Some basic gray level transformations	Sec. 3.1, 3.2
9-12	To study Histogram processing of an image	Histogram processing	Sec 3.3
13-18	To learn image enhancement by filtering in the spatial domain	Spatial filtering	Sec. 3.4-3.7
19-20	Review of Fourier domain techniques	Fourier Transforms, DFT, Convolution	4.1-4.6
21-24	Filtering in the Fourier domain	Image smoothing and sharpening using Frequency domain filters	4.7-4.10

25-26	Image Restoration and Reconstruction	Noise Models, Inverse filtering	5.1-5.7
27-30	Image Compression	Basic Compression Methods (DCT)	8.1-8.2
31-35	Morphological Image Processing	Erosion, dilation, Opening closing, Hit-or-miss transformation, some basic morphological algorithms	9.1-9.4, 9.5.1-9.5.7
36-40	Image Segmentation	Point, line and edge detection, thresholding	10.1-10.3
41-43	Representation and description	Boundary following, chain codes, signatures, boundary descriptors, regional descriptors	11.1.1-11.1.2, 11.1.5, 11.2, 11.3.3,11.3.4, 11.4

Evaluation Scheme:

Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
Mid-Sem Test	90 Minutes	30%	30/9, 9.00 -- 10.30 AM	Closed Book
Assignment		15%	Spread across the semester. Details will be announced.	Open Book
Quiz	30 Minutes	15%	Spread across the semester. Details will be announced.	Open Book
Comprehensive Examination	3 Hours	40%	04/12 FN	Closed Book

Chamber Consultation Hour: Will be announced in the class.
Notices: Notices concerning the course will be put up on the CMS website.

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**). There will not be any make-up for the quizzes.
Academic Honesty and Integrity Policy:
Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-Charge