

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI-HYDERABAD CAMPUS**  
**INSTRUCTION DIVISION, SECOND SEMESTER 2012-2013**  
**COURSE HANDOUT (PART-II)**

Date: 08/01/2014

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

**Course No.** : BITS F442/ CE F433/ EA C442  
**Course Title** : Remote Sensing & Image Processing  
**Instructor – in – Charge** : RAJITHA K  
**Instructors** : Dr K.M.M.Rao and Ms. P. Spandana

**Course Description:** The course introduces remote sensing, remote sensing satellites and data products. Fundamentals of digital image processing techniques are discussed in the course focusing its applications in various fields like medical image processing, agriculture, water resources, forestry, disaster management etc.

**Scope & Objective:** The course introduces the students to the fundamentals of digital images and its processing, focusing various satellite based images and medical images. The main objective of the course is to make the student familiar with the fundamentals of remote sensing and digital image processing techniques through case studies of real life applications using the remote sensing data and related products.

**Text Book:**

**T.1.** Thomas M Lillesand, and Ralph W Kiefer; “Remote sensing and Image Interpretation”, John Wiley & Sons, 5<sup>th</sup> ed.

**Reference Books :**

R.1 Gonzalez, R. C. & R. E. Woods, Digital Image Processing, LPE, Pearson Prentice Hall, 3<sup>rd</sup> edition.

R.2 . James B. Campbell and Randolph H.Wyne. Introduction to Remote sensing, Guilford Press, 5<sup>th</sup> edition.

**Course Plan:**

Lecture No.	Learning Objectives	Topics to be covered	Reference
1-3	Fundamentals of Digital Image Processing- I	Introduction to digital images and its fundamentals	T.1. Chapter-7 R.1. Chapter-2
6-10	Overview of Satellite Remote Sensing	Landsat, IRS & SPOT Thermal, Microwave and Hyper-spectral Remote	T.1. Chapter 5,6 and R2 chap 6,7,8&9

		Sensing and LIDAR	Lecture notes
11	Overview of photography and mapping cameras	Introduction to photography and Cameras	Lecture notes
12-13	Imaging devices	Scanners, Photo writing etc.,	Lecture notes
14-16	Fundamentals of Image processing- II	sampling, quantization and interpolation, Basic Image operations, Image rectification and restoration	R.1. Chapter-2, T.1. Chapter-7
17-20	Image Enhancement:- Spatial domain	Spatial domain based image enhancement; Histogram processing: equalization matching, Spatial filtering	R.1. Chapter-3 T.1. Chapter-7
21	Frequency transforms	Fourier transform, discrete transform and properties	R.1. Chapter-4
22-25	Image Enhancement	Frequency domain based image enhancement; Fourier transform, Frequency domain filtering, FFT	R.1. Chapter-4
26-27	Color image processing	Color images, color image transforms	R.1. Chapter-6
28- 31	Image classifiers	Supervised and unsupervised classification ; ML classifier, ISODATA	T.1. Chapter-7
32-34	Applications of Image processing	Applications of Digital image Processing and Medical Image processing	Lecture notes
35-37	Advances in R.S.Satellite imaging	Satellite imaging and on board Controls. HR satellites	Lecture notes
38-40	Applications of Remote sensing	Case studies : Urban planning, Disaster management, water resources management, forestry etc	T.1. Chapter.4 Lecture notes

**Evaluation Scheme**

<b>EC No.</b>	<b>Evaluation Component</b>	<b>Duration(min)</b>	<b>Weightage (%)</b>	<b>Date &amp; Time</b>	<b>Remarks</b>
1	Test I	60	20	25/2; 11 AM -12 Noon	CB
2	Test II	60	20	27/3; 11 AM -12 Noon	OB
3	Surprise test	Cont.	10	-----	-
4	Project work	Cont.	10	-----	-
6	Comp. Exam.	180	40	15/05	CB

**Chamber Consultation Hour:** To be announced

**Notices:** All notices will be displayed at Civil Engineering Notice Board and EEE notice board.

**Make-up Policy:** Take prior permission

**Instructor-In-Charge**  
**BITS F442/CE F433/ EA C442**