GUJARAT TECHNOLOGICAL UNIVERSITY
B.PLAN 8th SEMESTER
ADVANCED REMOTE SENSING
SUBJECT CODE: 1085501

Prerequisite: 7th Semester GIS for Planning

Aim: **To study the application Advanced Remote Sensing**
Objective:
The general design philosophy of the course is to equip students with a broad range of advancement in remote sensing technology, enabling them to contribute to their profession by the use of modern tools.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA(I)	
1	0	2	2	40	30	-	30	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity/Field work; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment.

Content: Sr. No.	**Content**	**Total Hrs**	**% Weightag**
Unit -1	Optical remote sensing: Hyperspectral remote sensing, signatures, derivatives, sentinel-1 multispectral instrument overview, data characteristics, Swath, resolution- spatial, temporal and radiometric. land monitoring characteristics and applications	7	15%
Unit - 2	Thermal sensors: radiation laws, thermal region, sensors, thermal properties of earth's features, applications	7	15%
Unit - 3	Lidar: Operating principles, measurements, characteristics of Lidar data, applications.	10	20%
Unit - 4	Microwave bands, active and passive sensors, SLAR, SAR, Scatterometer, Altimeter , SAR data interpretation, Applications	10	20%
Unit – 5	Digital image processing: image properties, histogram, digital image enhancement, Image classification using supervised and unsupervised methods. High resolution data analysis, Remote sensing applications accuracy assessment methods	14	30%
	TOTAL	48	100%

Freeware like sentinel tool box, PolSARpro would be used.
Free data from USGS would be downloaded.

Reference Books:

Sr. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	W G Rees	Physical principles of Remote sensing	29-Nov-2012	Cambridge University Press
2	Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman	Remote Sensing and Image Interpretation	2017 7th edition	Wiley
3	Siamak Khorram, Cynthia F van der Wiele, Frank H. Koch, Stacy A. C. Nelson, Matthew D. Potts	Principles of Applied Remote Sensing	2017	Springer
4	John R Jensen	Remote Sensing of the Environment: An Earth Resource Perspective	May 2006 Hardcover – 11	Prentice Hall Series in Geographic Information Science
5	Xiaojun Yang(Editor)	Urban Remote Sensing: Monitoring, Synthesis and Modeling in the Urban Environment	ISBN: 978-0-470-74958-6	Wiley
6	Editors:Claudia Kuenzer,Stefan Dech	Thermal Infrared Remote Sensing: Sensors, Methods, Applications	2017	Springer
7	Dale A. Quattrochi , Jeffrey C. Luvall	Thermal Remote Sensing in Land Surface Processing	2016	
8	Huajun Tang (Author), Zhao-Liang Li (Author)	Quantitative Remote Sensing in Thermal Infrared (Springer Remote Sensing/Photogrammetry)	15 Jan 2014	springer
9	Ian H. Woodhouse Taylor and Francis	Introduction to Microwave Remote Sensing		

List of Exercises / Practicals:

Exercises related to download data from site import to the software, image display, histogram display, histogram equalization, multi band color display, natural color composite, false color composite, signature studies, image preprocessing, image enhancement , data fusion image, image classification, Thematic applications.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.