GUJARAT TECHNOLOGICAL UNIVERSITY
BRANCH NAME: B. Arch
SUBJECT NAME: Remote Sensing and GIS
SUBJECT CODE: 2X85007
4th Year, Semester: VIII

Prerequisite:
There is no prerequisite for taking this course. It is assumed that students, taking this course, are interested in Remote Sensing.

Rationale:
To provide an exposure to remote sensing with GIS and its practical applications and apply principles of remote sensing and GIS and its practical applications.

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks	University Exam Type
Field work	Lectures	Studio	C	External exam		Internal exam			
				(ESE)Theory	(ESE) Viva	(PA)Theory	(PA)Viva		
1	2	1	4	NA	50	NA	50	100	VIVA

Content:

Sr. No.	Content	Total Hours*	% Weightage
1	**REMOTE SENSING AND EMR INTERACTION** • Definition of Remote Sensing and its components- -Active & Passive remote sensing - Electro Magnetic Radiation- - EMR Spectrum - Atmospheric Characteristics • Scattering of EMR – Raleigh, Mie, Non-selective & Raman Scattering - Atmospheric Windows and its significance - Energy interactions in the atmosphere - Energy interaction with earth surface features - Spectral reflectance of vegetation, soil and water - Ideal remote sensing systems - Characteristics of real remote sensing systems.	1 2	20 %

2	**PLATFORMS & SENSORS** • Platforms - Aerial & Space platforms - Passive and Active sensors - Orbit types, Sun synchronous and Geosynchronous - Across track and along track scanning systems - Types of sensor resolutions (Spatial, Spectral, Radiometric and Temporal resolution) - Mutispectral and thermal scanners - Characteristics of Remote sensing satellites and sensors (IRS, Landsat, SPOT, IKONOS, QUICKBIRD - Radar, LIDAR, SAR, SLAR MODIS, AMSRE).	12	20 %
3	**IMAGE INTERPRETATION, ANALYSIS AND DIGITAL IMAGE PROCESSING** • Types of Data Products – Types of image interpretation - Standard False Colour Composites - Basic elements of image interpretation • Visual interpretation strategies and interpretation keys. Digital Image Processing - Storage formats (BSQ, BIL, BIP) - Sources for Geometric and Radiometric distortions in images -Image enhancement - level slicing, contrast stretching, convolution filtering, Image classification - Supervised, Unsupervised and Hybrid classification.	12	20 %
4	**GEOGRAPHIC INFORMATION SYSTEMS** • Introduction - Maps - Definitions - Map projections • Types of map projections - Map Analysis GIS • Definition, Spatial and attribute data, Components of GIS, GIS Data Models - Spatial data structure (Raster and Vector) - Merits and demerits of raster and vector structures - Sources of GIS data - Data input techniques and data editing - updating and query • Spatial data analysis (Extraction, Overlay, Neighborhoods, Spatial interpolation, Proximity, Network) - Data quality and errors in GIS.	18	30 %

5	**APPLICATIONS OF REMOTE SENSING & GIS** • Remote Sensing applications in natural resource mapping - Land use/ Land cover Mapping - Geologic and Soil Mapping. • Application of Remote Sensing and GIS with specific reference to Hydrologic modelling and watershed management, Impact of mining activities on environment, Urban growth and transportation planning, Disaster management.	10	10 %

References:

1. Anji Reddy, "Remote Sensing and Geographical Information Systems", 3rd Edition, BS Publications, 2009.
2. Srinivas M.G., "Remote Sensing Applications", Narosa Publishing House, 2001.
3. Lillesand T.M. and Kiefer R.W., "Remote Sensing & Image Interpretation", 4th Edition, John Wiley & Sons, New York, 2004.
4. Burrough P.A., "Principles of GIS for Land Resource Assessment", Oxford University Press, 2000.
5. Basudeb Bhatta, "Remote sensing and GIS", Oxford University Press, 2008.

List of Projects/Assignments*:

Lectures/Tutorial work shall consist of presentations on various topics of the subject. AV projects may be introduced to students for documenting best practices and advances through case studies. A group discussion or forum may be organized for discussion on various aspects of the subject.

*- this is suggestive for common purpose. Faculty may decide on this, considering student group and institution philosophy.