

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CIVIL (WATER RESOURCES ENGINEERING) (33)

### REMOTE SENSING AND ITS APPLICATION

**SUBJECT CODE:** 2711206

**SEMESTER:** I

**Type of course:** Remote sensing and GIS

**Prerequisite:** Primary knowledge of remote sensing and GIS, Active and passive remote sensing, electro-magnetic radiation, integration of GIS and remote sensing

**Rationale:** Students will be able to understand Electro-magnetic spectrum, satellite images interpretation, GIS mapping and applications of Remote Sensing in Civil Engineering.

#### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
ESE	OEP	PA			RP					
3	2	2	5	70	30	20	10	20	0	150

#### Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Definition, Components of Remote Sensing	2	6
2	Active and Passive Remote Sensing, Platforms, Electro Magnetic Radiation	6	12
3	EMR spectrum, Scattering of EMR, EMR interaction with Earth Surface Materials, Spectral Signature, spectral characteristics	6	12
4	Satellites, Satellite Sensors, Resolution, Description of Multi Spectral Scanning, Interpretation of Satellite Images, Characteristics of Digital Satellite Image	12	30
5	Image enhancement, Filtering, Classification, Integration of GIS and Remote Sensing, Environmental Monitoring Techniques from remote sensing images, Applications of Remote Sensing in Civil Engineering, Water resources, Urban Analysis, Watershed Management, Environmental management, Construction Management, Resources Information Systems	16	40

#### Reference Books:

1. Gibson P.J. and Power C.H., Introductory Remote Sensing, Rotledge London, 2000
2. Jensen, J.R., Remote sensing of the environment, Prentice Hall, 2000
3. Lillesand T.M. and Kiefer R.W., "Remote Sensing and Image Interpretation
4. John Wiley and sons Newyork, 1987

#### Course Outcome:

After learning the course the students should be able to: Basic principles of remote sensing and GIS, EMR spectrum, Interpretation of Satellite Images, Applications of Remote Sensing and GIS in Civil Engineering.

**List of Experiments:** Interpretation of remote sensing images, water resources engineering, GIS software and its application in water resources engineering

**List of Tutorial:**

1. Various Component parts of Remote Sensing
2. Type of Remote Sensing
3. Study of EMR Spectrum
4. Ground truth Study
5. Type of Satellite Sensors
6. Images and its interpretation
7. Application of Remote Sensing in civil Engineering

**Open Ended Projects:**

1. Spectrum identification and analysis
2. Watershed modeling using GIS
3. Development of Digital Elevation Map (DEM)

**Major Equipments:**

1. Map digitizer
2. GIS softwares

**List of Open Source Software/learning website**

<http://gis.stackexchange.com/questions/17227/free-gis-workshops-tutorials-and-applied-learning-material>