

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: CIVIL (WATER RESOURCES ENGINEERING) (33)

SUBJECT NAME: REMOTE SENSING AND ITS APPLICATION

SUBJECT CODE: 3713304

1st Semester

Type of course: Program Elective II

Prerequisite: Primary knowledge of remote sensing and GIS, Active and passive remote sensing, electromagnetic 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)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Name of Topic	Teaching Hours	% 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 Tutorials:

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

Major Equipments:

1. Map digitizer
2. GIS softwares

List of Open Source Software

1. The Sentinel Toolbox
2. QGIS Semi-automatic Classification Plugin (SCP)
3. SAGA GIS: System for Automated Geoscientific Analyses
4. ORFEO Toolbox (OTB): Optical and Radar Federated Earth Observation
5. GRASS: Geographic Resources Analysis Support System
6. PolSARPro
7. Opticks
8. OSSIM: Open Source Software Image Map
9. InterImage
10. ILWIS: Integrated Land and Water Information System
11. gvSIG
12. Whitebox GAT
13. E-foto

Learning website:

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