

Branch Name:	CIVIL ENGINEERING
Program Code:	ET106
Course Title:	Remote Sensing and GIS in Civil Engineering
Course Code:	2ET1060507T
Pre-requisite Course:	Basic Knowledge of Advance Surveying Engineering.

Course Objective:

CO-1: To understand the fundamental of RS and Image processing.

CO-2: To understand the fundamentals of GIS and Processes.

CO-3: To understand the basic utility of RS and GIS in Science & Engineering.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	3	1	-	4	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	REMOTE SENSING Definition –Components of Remote Sensing –Active and Passive Remote Sensing – Electro Magnetic Spectrum – Interaction of EMR With the Earth’s Surface – Interactions with the Atmosphere Energy Sources and Radiation. Active and Passive Remote Sensing. Energy Interaction with the Earth Surface Features. Data Acquisition and Recording. Remote Sensing Data Products.	08	20
2	IMAGE INTERPRETATION AND DIGITAL IMAGE PROCESSING Introduction to Digital Image and Imaging Sensors- Data Formats of Digital Image Display of Digital Image - Image Processing Systems – Strategies – Keys – Equipment – Fundamentals of Image Classification and Analysis.	05	10
3	GEOGRAPHIC INFORMATION SYSTEM Introduction to GIS- Definitions of GIS and related terminology - Components of GIS – GIS Data – Geo-referenced data – introduction to data input and output in GIS– Fundamentals of data quality and Management.	06	15

4	SPATIAL DATA ANALYSIS Characteristics of Map Coordinate systems Introduction to Map projections- Geo-referencing Frameworks and Reference Coordinate Systems. GIS analysis functions – Retrieval – Reclassification – Buffering and Neighborhood – Overlaying – Data Output – Fundamentals of GIS Analysis functions	10	25
5	GLOBAL NAVIGATION SATELLITE SYSTEM Introduction to GPS and GNSS, receivers, processing methods, errors and accuracy.	05	10
6	APPLICATION OF RS AND GIS Agriculture and Soil, Forestry and Ecology, Geoscience and Geo-hazards, Marine and Atmospheric Sciences, Urban and Regional Studies and Water Resources	08	20

List of Reference Books:

1. Lilliesand T.M. and Kiefer R.W., Remote Sensing and image Interpretation, John Wiley and Sons, New York, 2004.
2. Burrrough P.A and McDonnel R.A., Principles of Geographic Information Systems, Oxford university press, 1998.
3. A.M. Chandra and S.K. Ghosh, Remote Sensing and Geographical information System, Narosa Publishing House, New Delhi, 2006.
4. BhattaB., Remote Sensing and GIS, Oxford University Press, New Delhi, 2008.
5. Stan Aronoff, “Geographical Information Systems”, WDL Publications, Ottawa, Canada, 1989.
6. Agrawal N.K., Essentials of GPS, Spatial Network Pvt. Ltd., Hyderabad, 2004.
7. Bhatta B., Remote Sensing and GIS, Oxford University Press, New Delhi, 2008.
8. Manual of Remote Sensing (Edited), Series of volumes.
9. Lo C.P. and Yeung Albert K.W., Concepts and Techniques of Geographical Information Systems, Prentice-Hall of India Pvt. Ltd. New Delhi, 2006.

Course Outcome:

After successful completion of the course the students shall be able to:

1. Observe, Identify and define simple/ complex problems of day to day lives present in Industry/ Society where GIS and Remote Sensing applications can be useful.
2. Apply knowledge of basic image interpretation and data image processing.
3. Integrate the existing data through various observations from various angles and layer creation.
4. Apply problem-solving methodologies to generate, evaluate and justify innovative solutions.
5. Demonstrate the ability to give solutions with an ability which can help communicate effectively for giving better interpretation and solutions.

E-Resources (If any):

<http://nptel.ac.in/>

Course Learning Outcomes (CLO):

After successful completion of the course the students shall be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Observe, Identify and define simple/ complex problems of day to day lives present in Industry/ Society where GIS and Remote Sensing applications can be useful.	L1& L2
CLO2	Apply knowledge of basic image interpretation and data image processing.	L2
CLO3	Integrate the existing data through various observations from various angles and layer creation.	L3
CLO4	Apply problem-solving methodologies to generate, evaluate and justify innovative solutions.	L2 &L3
CLO5	Demonstrate the ability to give solutions with an ability which can help communicate effectively for giving better interpretation and solutions.	L4

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CLO1	M	M			M								M	M	
CLO2	H	M	M	M								M	M	M	
CLO3	H	M	M		M							M	L	M	
CLO4	H	M											M	M	
CLO5	M	M	M									M	M	M	

H: High, M: Medium, L: Low