Course Code	18CEO407T	Course Name	APPLICATIONS OF REMOTE SENSING AND GIS	Course Category	O	Open Elective Course	L	T	P	C
							3	0	0	3

Pre-requisite Courses		Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Civil Engineering	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning
CLR-1 :	Identify the basic principles of remote sensing	Level of Thinking (Bloom)
CLR-2 :	Understand various remote sensing methods	
CLR-3 :	Know the methods of GIS and data capturing	
CLR-4 :	Study data analysis in GIS	
CLR-5 :	Explore the application of RS and GIS in various domains	

Course Outcomes (CO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Program Outcomes (PO)													
			1 Engineering Knowledge	2 Problem Analysis	3 Design & Development	4 Analysis, Design, Research	5 Modern Tool Usage	6 Society & Culture	7 Environment & Sustainability	8 Ethics	9 Individual & Team Work	10 Communication	11 Project Mgt. & Finance	12 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Understand the basic principles of remote sensing	5	3	-	-	-	2	-	-	-	-	-	-	3	3	-	-
CLO-2 :	Relate the various remote sensing methods	5	3	3	-	-	3	-	-	-	-	-	-	-	3	-	-
CLO-3 :	Analyze GIS components and data capturing techniques	5	3	-	-	-	2	-	-	-	-	-	-	3	3	-	-
CLO-4 :	Interpret the data and data analysis in GIS	5	3	3	-	-	3	-	-	-	-	-	-	-	3	-	-
CLO-5 :	Apply the methods in RS and GIS in various fields	5	3	3	-	-	3	-	-	-	-	-	-	-	3	-	-

Duration (hour)		9	9	9	9	9
S-1	SLO-1	Introduction of Remote Sensing	Visual image interpretation	Introduction to GIS	Spatial data analysis	Remote sensing applications
	SLO-2	EMR and its characters	Elements of image interpretation	Elements of GIS	Non spatial data analysis	GIS applications
S-2	SLO-1	Electromagnetic radiation interaction with Atmosphere	Digital image formats	cartography	Spatial interpolation	RS and GIS integration
	SLO-2	Electromagnetic Radiation interaction with Earth surface features	Raster data format	Maps and types	Data retrieval – Reclassification techniques	RS and GIS in environmental studies
S-3	SLO-1	Remote Sensing systems	Image distortion and rectification	Coordinate system	Buffer analysis	RS and GIS in geology
	SLO-2	Platforms and sensors	Atmospheric correction	Projection	Vector and topological overlay analysis	RS and GIS in urban planning
S-4	SLO-1	Scanning mechanisms	Radiometric correction	Datum	Raster overlay analysis	RS and GIS in smart city planning
	SLO-2	Optical and thermal scanners	Geometric correction	GIS - data types	Measurement -	RS and GIS in flood disaster studies
S-5	SLO-1	Microwave remote sensing	Image enhancement	Spatial and non-spatial data	Spatial and non-spatial query	RS and GIS in landslide studies
	SLO-2	Lidar remote sensing	Contrast enhancement	Data input - Methods	Expert system	RS and GIS in Geological studies
S-6	SLO-1	LANDSAT series SPOT series	Image classification	Digitization	Digital elevation model	RS and GIS in soil studies
	SLO-2	Indian Remote Sensing satellites	Supervised classification	Errors in digitization	Generation- parameters	RS and GIS in rural planning
S-7	SLO-1	Metrological satellites	Unsupervised classification	Data output - Methods	Modeling surface	RS and GIS in smart transport planning
	SLO-2	High resolution satellites	Pattern recognition	Software modules	DEM application	RS and GIS in health application
S-8	SLO-1	Resolution	Filtering techniques	Vector data structure	Digital terrain model and visualization	RS and GIS in agriculture studies
	SLO-2	Types of resolutions	Change detection	Topology	TIN-Generation	RS and GIS in forest mapping
S-9	SLO-1	Merits	Image merging	Raster data structure	Cost-Path analysis	RS and GIS in water resources studies

	SLO-2	*Multi and hyperspectral remote sensing*	*Advantages*	*Merits and demerits*	*DEM and DTM –Merits and demerits*	*RS and GIS in environmental studies*

Learning Resources	*1 Patrick McHaffie, Sungsoon Hwang, Cassie FollettGIS: An Introduction to Mapping Technologies, CRC Press , Taylor & Francis Group, Boca Raton FL 2019* *2. M. Anji Reddy, Textbook of Remote Sensing and Geographical Information systems, BS Publications* *3. A.M. Chandra and S.K. Ghosh. Remote Sensing and Geographical Information system .Narosa Publishing House, New Delhi. 2006* *4. Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman , RemoteSensing and Image Interpretation, John Wiley & Sons, 2008.*	*5. John R. Jensen,, Introductory Digital Image Processing: A remote sensing perspective, Prentice Hall* *6.. NPTEL Course — Introduction to GIS https://nptel.ac.in/courses/105102015/:* *7. Floyd F. Sabins, Jr: Remote Sensing Principles and Interpretation, Freeman and Co., San Franscisco, 2007* *8..NPTEL Course, Introduction to remote sensing , https://nptel.ac.in/courses/105108077/*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	*20 %*	-	*20 %*	-	*10 %*	-	*20 %*	-	*20 %*	-
Level 2	Understand	20 %	-	20 %	-	20 %	-	20 %	-	20 %	-
Level 3	Apply	20 %		30 %		20 %		20 %		30 %	
Level 4	Analyze	*20 %*	-	*20 %*	-	*20 %*	-	20 %	-	*20 %*	-
Level 5	Evaluate	*20 %*	-	*10 %*	-	*30 %*	-	20 %	-	*10 %*	-
Level 6	Create	-	-	-	-	-	-	-	-	-	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

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