SCHEME OF COURSE WORK

Course Details:

Course Title	**: Remote sensing and GIS in Civil Engineering**		
Course Code	**: 13CE2103**	**L P C**	**: 4 0 3**
Program:	**: M. Tech.**		
Specialization:	**: Infrastructure Engineering and Management**		
Semester	**: I**		
Prerequisites	**: Transportation engineering, geotechnical engineering, environmental engineering and water resource engineering**		
Courses to which it is a prerequisite	**No**		

Course Outcomes (COs):

CO1 :	Analyse the principles and components of Photogrammetry and remote sensing.
CO2 :	Describe the process of data acquisition of satellite images and their characteristics
CO3 :	Compute an image visually and digitally with digital image processing techniques.
CO4 :	Explain the concepts and fundamentals of GIS.
CO5 :	Compute knowledge of remote sensing and GIS in different civil engineering applications.

Programme Outcomes (POs)	
PO 1:	Apply the knowledge of basic infrastructure requirements for the development of towns, cities and satellite towns.
PO 2:	Critically analyse the usage of natural resources in construction materials.
PO 3:	Evaluate a wide range of potential solutions for the alternative methods and techniques which can be adopted effectively keeping economic considerations of the project.
PO 4:	Apply scientific knowledge to analyse various problems of infrastructural engineering and to provide possible solutions by pursuing research.
PO 5:	Select appropriate modern engineering and IT tools for design and construction of civil engineering infrastructure projects.
PO 6:	Attain the capability to work in multi disciplinary teams to achieve common goals.
PO 7:	Demonstrate knowledge and understanding of engineering and management principles in multi disciplinery environments after consideration of economic and financial factors.
PO 8:	Communicate effectively on complex engineering activities to prepare reports and make presentations.
PO 9:	Ability to engage in life-long learning independently to improve knowledge.
PO 10:	Understand the responsibility of carryingout professional practices ethically for sustainable development of society.
PO 11:	Examine critically and independently one‟s actions and take corrective measures by learning from mistakes

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	M	M								M
CO-2	S	S	M	M								M
CO-3	S	S	M	M								M
CO-4	S	S		M								M
CO-5	S	S	S	M	S							M

S - Strongly correlated, *M - Moderately* correlated, *Blank - No correlation*

Assessment Methods:	Assignment / Seminar / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week No.	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction to aerial photography, types of aerial photographs Scale of vertical aerial photograph	CO-1	Define aerial photograph? Discuss briefly about types of aerial photographs with neat sketch Determine the scale of a vertical aerial photograph	▫ Lecture/ power point presentation/ Discussion/problem solving	
2	Introduction to photgrammetry, concepts of stereoscopy and parallax measurement for vertical aerial photograph	CO-1	Distinguish between aerial photography and Photogrammetry? Derive an expression to calculate coordinates and height of a vertical aerial photgraph	▫ Lecture ▫ Problem solving	
3	Introduction to remote sensing Concepts and principles involved in remote sensing	CO-1	Explain briefly about physics of remote sensing Discuss about ideal components of remote sensing	▫ Lecture / Discussion/ Power point presentation	
4	EMR and energy interactions with earths atmosphere and earth objects	CO-1	Define scattering? Describe about types of scattering Define spectral reflectance curve and explain about spectral reflectance curve for water bodies	▫ Lecture / Discussion/ Power point presentation	Assignment

5	Introduction about satellites and sensors sensor characteristics	CO-2	Distinguish between sateelite and sensor? What are the different types of sensors	▫ Lecture / Discussion/ Power point presentation	
6	Sensor characterstics of various satellites LANDSAT, IRS, SPOT	CO-2	What are the sensor characteristics of Indian Remote sensing satellite series?	▫ Lecture / Discussion/ Power point presentation	
7	Sensor charaters of communication and weather satellites like INSAT and NOAA, different types of data products	CO2	Explain about data products? Write briefly about BIP, BIL and BSQ?	▫ Lecture / Discussion/ Power point presentation	Assignment
8	Analysis and identifaction of features on satellite image with the help of interpretation keys	CO-3	What are the visusal interpretation keys/ elements and explain them?	▫ Lecture / Discussion/ Power point presentation	
9	**MID TEST - I**				
10	Introduction about digital image processing, principles and precalssification processing	CO-3	Explain about image rectification and image enhancement	▫ Lecture / Discussion/ Power point presentation	
11	**Classification techniques to identify features on satellite image**	CO-3	Differeintaite between supervised and unsupervised classification?	▫ Lecture / Discussion/ Power point presentation	Assignment
12	Introuctio n to GIS, components of GIS, Geographical Data	CO-4	What are the various software and hardware modules of GIS. Distinguish between raster and vector data?	▫ Lecture / Discussion/ Power point presentation	
13	**Concepts of mannual scanning and digitization**	CO-4	What are the precautions to be taken during digitization	▫ Lecture / Discussion/ Power point presentation	
14	**Concepts of data analysis and manipulation. Integration of Remote sensing, GPS and GIS**	CO-4	What are the principles of data analysis and manipulation How to integrate Remte sensing, GPS and GIS	▫ Lecture / Discussion/ Power point presentation / Field work	

15	Application of Remote sensing and GIS in Environmental Enginnering	CO-5	How remote sensing and GIS can be used for waste land management? With help of flow chart explain the methodology involved in site selection studies?	▫ Lecture / Discussion/ Power point presentation	Seminar
16	Application of Remote sensing and GIS in Water resource engineering, natural disasters	CO-5	How remote sensing and GIS can be used for water quality mapping? With help of flow chart explain the methodology involved in flood control	▫ Lecture / Discussion/ Power point presentation	Assignment
17	Application of Remote sensing and GIS in natural resources	CO-5	Explain the advantages of Remote sensing and gis for land use land cover mapping	▫ Lecture / Discussion/ Power point presentation	Seminar
18	**MID TEST - II**				
	END EXAM				