

REMOTE SENSING AND GIS

V Semester: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACEC17	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			

Prerequisite: No prerequisites required

I. COURSE OVERVIEW:

GIS and remote sensing techniques have become indispensable and potential tools for solving problems in civil engineering. Data from remote sensing mostly correlate spatial data to their attributes making them useful in this field. Different themes such as geology, terrain, drainage, and hydrology can be extracted by the use of remote sensing. Places, where remote sensing in technology is mostly used, include sanitation, urban growth, new road alignment, and irrigation project design. GIS and remote sensing data are mostly used to develop models by integrating socio-economic, demographic and information on natural resources.

II. COURSE OBJECTIVES:

The students will try to learn:

- The Photogrammetric techniques, concepts and components of Photogrammetry.
- The basic concepts and principles of various components of remote sensing and its applications.
- The concept of Geographical Information System (GIS), coordinate system, GIS Data and its types.
- The data management systems in GIS and its practical applications in the field of Civil Engineering.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	Recall the importance of aerial photogrammetric, flight planning and Stereoscopy for preparing 3D geographical maps.	Remember
CO 2	Relate the fundamentals of stereoscopy concept for adding third coordinate to the image pair.	Remember
CO 3	Interpret the electromagnetic spectrum, remote sensing data acquisition on platforms and sensors for studying energy interactions with earth surface and atmosphere and to provide base maps.	Understand
CO 4	List the basic components and data input to GIS for collecting GIS data using appropriate data collection technique.	Remember
CO 5	Summarize the data base management systems for storing and managing GIS data using suitable data management system.	Understand
CO 6	Utilize the GIS and remote sensing data for assessing the water resources applications.	Apply

IV. COURSE SYLLABUS:

MODULE-I: INTRODUCTION TO PHOTOGRAMMETRY (09)

Principles& types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducially line.

MODULE-II: REMOTE SENSING (09)

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

MODULE-III: GEOGRAPHIC INFORMATION SYSTEM AND TYPES OF DATA REPRESENTATION (09)

Introduction, History of GIS, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS.

MODULE-IV: GIS DATA MANAGEMENT (09)

Introduction, Data base management systems, functions and components of data base management system, GIS data file management, Database Models - Hierarchical Database Models, Network Systems and Relational Database Models. Storage of GIS data.

MODULE-V: WATER RESOURCES APPLICATIONS (09)

Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

V.TEXT BOOKS:

1. B.Bhatta, “Remote Sensing and GIS”, Oxford University Press, New Delhi, 2008.
2. Gorge Joseph, “Fundamentals of Remote Sensing, Universities Press, Hyderabad.

VI. REFERENCE BOOKS:

1. RA Narayana, “Remote Sensing and its Applications”, University Press 1999.
2. Kumar, “Basics of Remote Sensing & GIS”, Laxmi Publications, 2004.
3. Anji Reddy, “Remote Sensing and GIS”, B.S. Publications, New Delhi
4. Sung Chang, “GIS”, TMH Publications & Co.

VII. WEB REFERENCES:

1. <https://nptel.ac.in/courses/105103193/>
2. <https://nptel.ac.in/courses/121107009/>
3. <https://nptel.ac.in/courses/105108077/>

VIII. E-TEXT BOOKS:

1. https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/105107160/lec20.pdf