Semester - IV

10. MAJOR COURSE-MJ7: Subject: FUNDAMENTALS OF REMOTE SENSING & GIS **Allotted: 72Lectures**

Course Objective:

The Learning objective of this course are as follows-

1. To explain the meaning, concept, and definition Remote sensing and GIS, as an important tool in the study and Explaining geographic phenomenon.

2. To aware students about use of GPS and GIS, its principle, working mechanism and applications.

Sl.	Unit	Topics	Teaching Methodology	Assessment	Outcome
1	**Unit 1:** **17 Lectures**	Remote Sensing: Meaning, Definition & Scope; Development of Remote Sensing; Components and Process of Remote Sensing; EMR Interaction with Atmosphere and Earth Surface;	• Lecture • Digital Classes • Group Discussion • Self-study • EX-situ Examples. • Practical	• Quiz on basic concepts • Practical Class Test • Assignments • Presentation	Will equip students with a comprehensive understanding of how to gather information about the Earth's surface from a distance using electromagnetic radiation, enabling them to analyze satellite imagery, interpret data related to land cover, environmental changes, and apply this knowledge to various fields like environmental monitoring, urban planning, agriculture, and disaster management.
2	**Unit2:** **15 Lectures**	Remote Sensing Platforms & Sensors, Satellite Imagery Interpretation: Visual & Digital Interpretation Techniques; Elements and Interpretation Keys for Visual Interpretation. (Shape, Size, Colour, Tone, Texture, Association), Image Enhancement Techniques; Application of Remote Sensing	• Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples. • Practical.	• Quiz on basic concepts and Theories • Practical Class Test • Assignments • Presentation	Will equip students with the ability to analyze and interpret satellite imagery, identifying features on the Earth's surface by visually examining and digitally processing satellite images, allowing them to extract valuable information for applications in various fields like environmental monitoring, urban planning, resource management, and disaster assessment, by understanding the different types of remote sensing platforms, sensors, and interpretation techniques.
3	**Unit3:** **10 Lectures**	Geography & Geographic Information System: Definition & Development of GIS; Elements and	• Lecture • Digital Classes • Group Discussion.	• Quiz on basic concepts and Theories • Practical Class Test	Students will developing a strong understanding of spatial data analysis, critical thinking skills, problem-solving abilities, visual literacy, and the ability to apply geographic information to real-

		Components of GIS, Spatial Data: Elements & Types of Spatial Data; Raster & Vector Data Structures;.	• Ex-situ Examples. • Practical. • Self-study	• Assignments • Presentation	world scenarios across various disciplines, making them well-equipped to analyze and interpret complex data related to location and patterns, ultimately preparing them for careers in fields like environmental science, urban planning, public health, and more; it can also foster engagement and motivation through interactive learning experiences using maps and data visualization tools.
4	**Unit4:** **15 Lectures**	Coordinate Systems, Geo-Referencing of Spatial Data, GIS Database: Creation of Spatial & Non- Spatial Data Base;;	• Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples.	• Quiz on basic concepts and Theories • Class Test • Assignments • Presentation	Projections and coordinate systems are a complicated topic in GIS, but they form the basis for how a GIS can store, analyze, and display spatial data. Understanding projections and coordinate systems important knowledge to have, especially if you deal with many different sets of data that come from different sources
5	**Unit5** **15 Lectures**	Digital Elevation Models (DEM), Basic Principles of Computer Assisted Cartography. Integration of GIS with Remote Sensing & Global Positioning System (GPS)	• Lecture • Digital Classes • Group Discussion • Self-study • Ex-situ Examples. •	• Quiz on basic concepts and Theories • Class Test • Assignments • Presentation	Will equip students with the knowledge to accurately represent the Earth's surface topography through digital data, enabling them to analyze terrain features, model environmental processes like water flow and landslides, and effectively apply this information across diverse fields like geography, civil engineering, environmental science, and urban planning, ultimately leading to better decision-making in projects related to land use, infrastructure development, and disaster management.

Suggested Readings:

1.Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad.

2.Chauniyal, D.D., (2010): Sudur Samvedan evam Bhogolik Suchana Pranali (Hindi), Sharda Pustak Bhawan, Allahabad.