Name of the Course: Foundation Course in Remote Sensing and GIS

Educational Qualification: B.A. Geography /B.Sc. / M.A. /M.Sc. Geography /M.Sc.

Duration: Two Months

Maximum Marks: 50

Assessment: Assignment, MCQ and Project

Teaching Method: Theory and Practical

Course Medium: Marathi/English

Total Credits: 02

Course Objectives:

1) To introduce students to the fundamental concepts of remote sensing (RS) and geographic information systems (GIS).
2) To understand the characteristics of electromagnetic radiation (EMR) and its relevance in remote sensing applications.
3) To explore the interaction of EMR with the atmosphere and Earth's surface, including key processes such as reflection, absorption, and scattering.
4) To familiarize students with digital photogrammetry and its role in remote sensing.
5) To provide a comprehensive overview of satellite remote sensing, including platforms, sensors, and orbits.
6) To introduce the basic principles and components of GIS, including software, hardware, and data requirements.
7) To develop practical skills in GIS software, focusing on digitization, data inputs, projections, and map elements.

Course Outcomes:

By the end of the course, students will be able to:

CO1: Understand the basic principles of remote sensing and GIS, including key terminologies and concepts.

CO2: Analyze the characteristics of electromagnetic radiation and its interaction with atmospheric and surface elements.

CO3: Explain the stages and types of satellite remote sensing, including the role of platforms, sensors, and orbits.

CO4: Gain proficiency in GIS software, including open-source options, for tasks such as digitization and attribution.

CO5: Apply knowledge of map projections, coordinate systems, and georeferencing to GIS mapping projects.

CO6: Differentiate between vector and raster data models, and understand their significance in spatial analysis.

CO7: Visualize and design maps using GIS, focusing on symbology, map layout, and spatial data visualization techniques.

CO7. Implement image classification techniques proficiently, understanding theirsignificance in remote sensing.

1) Syllabus:

Sr. No.	Topics	Periods
1	Introduction to remote sensing	1
2	Characteristics of electromagnetic radiation (EMR): EMR spectrum, blackbody, radiation laws	2
3	Interaction of EMR with atmosphere and Earth's surface: reflection, absorption, transmission, scattering and refraction. Atmospheric windows	2
4	Introduction to digital photogrammetry	1
5	Basics of satellite remote sensing: definition, principle, stages and types	2
6	Platforms and orbits	1
7	Sensors and scanning / Input systems	1
8	Introduction to GIS: definition, development, components, objectives, hardware and software requirements	2
9	Introduction to GIS software (open sources)	2
10	Digitization and attribution	2
11	The basis of GIS mapping: map projections, datum and coordinate systems	2
12	Data types and data inputs: spatial data and attributes, data input, scanning, digitization, error corrections and topology	3
13	Data models: vector and raster, spatial and non-spatial data	2

	models	
14	Data visualization: types of visualization, map layout design and symbology	3
15	Georeferencing of maps	3
16	Map elements: scale, projection, coordinate systems	3

3) **Mode of Exam:**

1) Multiple choice question : 50% Mark (25 Marks)

2) Practical : 50 % Marks (25 Marks)

4) **Expected Fees: 500 per student**

5) Total Credits : 2