## SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
## (AUTONOMOUS)

## QUESTION BANK

**Year / Semester: III B.Tech VI Semester**          **Regulation: R20**

**Subject and Code:    REMOTE SENSING AND GIS (20CIV473C)**

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## SYLLABUS

### UNIT I: INTRODUCTION TO REMOTE SENSING
**concept and scope of remote sensing:** Definitions, Process and Characteristics of Remote Sensing System, Advantages, and limitations.
**Concept of electromagnetic radiation (EMR):** Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Spectral signatures.

### UNIT II: PLATFORMS AND SENSORS
Introduction. Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners.
**Types and characteristics of sensor:** Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites.
**Remote sense platforms and satellite orbits:** Ground, Airborne and Space borne Platforms, Orbital Characteristics - Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit.
**Energy interaction in the atmosphere and with earth surface features:** Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

### UNIT III: REMOTE SENSING APPLICATIONS
Scope of Remote Sensing Applications - Potentials and Limitations. Applications in land use and land cover analysis. Resource evaluation - Soils, forest and agriculture. Water Resource Applications - Mapping, monitoring of surface water bodies, tanks, lakes/reservoirs. Environmental applications.

### UNIT IV: GEOGRAPHIC INFORMATION SYSTEM

Basic Concepts: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS.

### UNIT V: GIS DATA

Spatial and Attribute Data, Information Organization and Data Structures - Raster and Vector data structures, Data File and database
Creating GIS Data: Creating GIS Software's, File organization and formats, Geo-database, Database model, Rectification, Digitization and Map Composition

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**Max Marks: 10**

| S.No. | CO | Questions | BT |
|---|---|---|---|
| | | **Unit I: (INTRODUCTION TO REMOTE SENSING)** | |
| 1 | 1 | **a. Define Remote Sensing and list its major characteristics.** <br> **b. Define Electromagnetic Radiation (EMR) and spectral signature.** | **L1** |
| 2 | 1 | **Explain the process of remote sensing with neat diagram.** | **L2** |
| 3 | 1 | **Explain the EMR spectrum and wavelength regions with applications.** | **L2** |
| 4 | 1 | **Apply wavelength–frequency–energy relationship to explain why UV has higher energy than microwave.** | **L3** |
| 5 | 1 | **Analyze the relationship between spectral signatures and land cover identification.** | **L4** |
| 6 | 1 | **Evaluate the advantages and limitations of remote sensing in national resource mapping.** | **L5** |
| 7 | 1 | **Develop a conceptual model explaining the interaction between EMR and Earth surface features.** | **L6** |
| 8 | 1 | **A.    Define spectral signature and explain its importance in remote sensing.** <br> **B.    Explain the EMR spectrum and classify different wavelength regions with their applications.** | **L2** |

**Note:-    L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating**

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| S.No. | CO | Questions | BT |
|-------|----|-----------|----|
| Unit II: ( PLATFORMS AND SENSORS ) |||
| 1 | 2 | **a. Define active and passive sensors with examples.** <br> **b. List different types of satellite orbits used in remote sensing.** | L1 |
| 2 | 2 | **Explain whiskbroom and push-broom scanning systems.** | L2 |
| 3 | 2 | **Describe different types of sensor resolutions with examples.** | L2 |
| 4 | 2 | **Select a suitable satellite sensor for crop monitoring and justify your choice.** | L3 |
| 5 | 2 | **Compare imaging and non-imaging sensors and analyze their applications.** | L4 |
| 6 | 2 | **Evaluate the suitability of geostationary and sun-synchronous orbits for environmental monitoring.** | L5 |
| 7 | 2 | **Design a remote sensing platform for disaster monitoring and justify the choice of orbit and sensor.** | L6 |
| 8 | 2 | **A. Explain the working principle of Whiskbroom and Push-broom scanners with suitable diagrams.** <br> **B. Compare active and passive sensors and analyze their suitability for flood monitoring during cloudy conditions.** | L5 |

**Note:-   L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating**

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| S.No. | CO | Questions | BT |
|-------|----|-----------|----|
| Unit III: (REMOTE SENSING APPLICATIONS) |||||
| 1 | 3 | **a. List major applications of remote sensing in water resources.**<br>**b. Define Land Use and Land Cover (LULC).** | L1 |
| 2 | 3 | **Explain the role of remote sensing in forest resource evaluation.** | L2 |
| 3 | 3 | **Explain the potential and limitations of remote sensing applications.** | L2 |
| 4 | 3 | **Apply NDVI concept for assessing crop health.** | L3 |
| 5 | 3 | **Analyze how remote sensing helps in flood mapping and monitoring.** | L4 |
| 6 | 3 | **Critically evaluate the role of remote sensing in environmental protection.** | L5 |
| 7 | 3 | **Develop a remote sensing-based framework for sustainable agriculture planning.** | L6 |
| 8 | 3 | **A. Discuss the applications of remote sensing in agriculture and forest resource evaluation.**<br>**B. Evaluate the role of remote sensing in water resource management and disaster mitigation.** | L5 |

**Note:-   L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating**

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| S.No. | CO | Questions | BT |
|-------|-----|-----------|-----|
| | | **Unit IV: (GEOGRAPHIC INFORMATION SYSTEM)** | |
| 1 | 4 | **a. Define GIS and list its components.** <br> **b. Define point, line, and polygon in GIS.** | L1 |
| 2 | 4 | **Explain the functionality of GIS with suitable examples.** | L3 |
| 3 | 4 | **Explain advantages and limitations of GIS.** | L4 |
| 4 | 4 | **Demonstrate how GIS can be used in urban planning.** | L3 |
| 5 | 4 | **Analyze the role of GIS in disaster management systems.** | L4 |
| 6 | 4 | **Evaluate the importance of GIS integration with remote sensing.** | L5 |
| 7 | 4 | **Design a GIS-based decision support system for city traffic management.** | L6 |
| 8 | 4 | **Differentiate between Raster and Vector data models and analyze their advantages in GIS analysis.** | L5 |
| | | **Note:-  L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating** | |

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| S.No. | CO | Questions | BT |
|:---:|:---:|:---|:---:|
| Unit V: ( GIS DATA ) | | | |
| 1 | 5 | **a.  Define spatial data and attribute data.** <br> **b. Define raster and vector data structures.** | **L1** |
| 2 | 5 | **Explain raster and vector data models with diagrams.** | **L2** |
| 3 | 5 | **Explain geo-database and database models used in GIS.** | **L2** |
| 4 | 5 | **Apply rectification and digitization steps to convert a paper map into GIS format.** | **L3** |
| 5 | 5 | **Analyze differences between raster and vector data for watershed mapping.** | **L4** |
| 6 | 5 | **Evaluate the importance of proper file organization and database management in GIS projects.** | **L5** |
| 7 | 5 | **Develop a complete GIS data workflow from data collection to map composition.** | **L6** |
| 8 | 5 | **Develop a workflow for creating a GIS database for urban land use mapping.** | **L6** |

**Note: L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating**

# Instruction to Faculty Members:

# The Six Levels of Bloom's Taxonomy:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory (e.g., list, define, name, locate).

2. **Understanding:** Constructing meaning, explaining ideas, or concepts (e.g., summarize, interpret, classify, compare).

3. **Applying:** Using information in new situations or implementing procedures to solve problems (e.g., solve, use, demonstrate, implement).

4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure (e.g., contrast, categorize, distinguish, diagram).

5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing (e.g., judge, critique, justify, defend, argue).

6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure (e.g., design, construct, develop, formulate).