

**PRINCIPLES OF GEOGRAPHIC INFORMATION**  
**T.Y.B.Sc. (I.T.) (Semester –VI)**

UNIT	Details	(12 Lectures)
I	<p><b>A Gentle Introduction to GIS</b></p> <p><b>The nature of GIS :</b> Some fundamental observations, Defining GIS, GISystem, GIScience and GIApplications, Spatial data and Geoinformation.</p> <p><b>The real world and representations of it :</b> Models and modeling, Maps, Database, Spatial databases and spatial analysis.</p> <p><b>Geographic Information and Spatial Database</b></p> <p><b>Models and Representations of the real world</b></p> <p><b>Geographic Phenomena :</b> Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries.</p> <p><b>Computer Representations of Geographic Information :</b> Regular tessellations, irregular tessellations, Vector representations, Topology, and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects.</p> <p><b>Organizing and Managing Spatial Data</b></p> <p><b>The Temporal Dimension</b></p>	12
II	<p><b>Data Management and Processing Systems</b></p> <p><b>Hardware and Software Trends</b></p> <p><b>Geographic Information Systems :</b> GIS Software, GIS Architecture and functionality, Spatial Data Infrastructure (SDI)</p> <p><b>Stages of Spatial Data handling :</b> Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation.</p> <p><b>Database Management System :</b> Reasons for using a DBMS, Alternatives for data management, the relational data model, Querying the relational database.</p> <p><b>GIS and Spatial Databases :</b> Linking GIS and DBMS, Spatial database functionally.</p>	12
III	<p><b>Spatial Referencing and Positioning :</b></p> <p><b>Spatial Referencing :</b> Reference surface for mapping, Coordinate Systems, Map</p>	12



	<p>Projections, Coordinate Transformations.</p> <p><b>Satellite-based Positioning :</b>          Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology.</p> <p><b>Data Entry and Preparation</b></p> <p><b>Spatial Data Input :</b>          Direct spatial data capture, Indirect spatial data capture, Obtaining spatial data elsewhere.</p> <p><b>Data Quality :</b>          Accuracy and Positioning, Positional accuracy, Attribute accuracy, temporal accuracy, Lineage, Completeness, Logical consistency</p> <p><b>Data Preparation :</b>          Data checks and repairs, Combining data from multiple sources.</p> <p><b>Point Data Transformation :</b>          Interpolating discrete data, Interpolating continuous data</p>	
IV	<p><b>Spatial Data Analysis</b>          Classification of analytical GIS Capabilities</p> <p><b>Retrieval, Classification and Measurement :</b>          Measurement, Spatial selection queries, Classification</p> <p><b>Overlay functions :</b>          Vector overlay operators, Raster overlay operators.</p> <p><b>Neighbourhood Functions :</b>          Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis.</p> <p>Analysis : Network analysis, interpolation, terrain modeling</p> <p><b>GIS and Application models :</b> GPS, Open GIS Standards, GIS Applications and Advances.</p> <p><b>Error Propagation in spatial data processing :</b>          How Errors propagate, Quantifying error propagation.</p>	12
V	<p><b>Data Visualization</b>          GIS and Maps, The Visualization Process</p> <p><b>Visualization Strategies : Present or explore?</b></p> <p><b>The Cartographic toolbox :</b>          What kind of data do I have? How can I map my data?</p> <p><b>How to map?</b> How to map qualitative data, How to map quantitative data, How to map the terrain elevation, how to map time series.</p> <p><b>Map Cosmetics, Map Dissemination</b></p>	12