Specific Objectives	Contents

• Describe geographic information system and itsscope.
• Explain spatial data and howto think spatially.
• Install and configure QGISapp.
 	
• Learn to use QGIS interface.
	Unit 1: Introduction to GIS **[8]**
	1.1 GIS Introduction
	1.2 Scope of GIS
	1.3 Think Spatially
	
	<u>Practical Works</u>
	
	• *Installing QGIS*
	  • *Running QGIS for the first time*
	  • *Introducing the QGIS user interface*
	  • *Finding help and reporting issues*

• Categorizing the space on am ap. • Understand the levels ofmeas urement and relationshipbetween data me asurement and symbology. • Recognize, analyze, quantify patterns and make decisions. • Make use of QGIS to load ra ster data, vector data from files and style the layers • Create new vector layers and edit vector geometries	**Unit 2: Reading, Analyzing and Interpreting Maps [12]** 2.1 Space Categorization on a map 2.2 Levels of measurement 2.3 Relationship between symbology and datameasurement 2.4 Pattern Recognition - Random, Clustered, Uniform distributiona l patterns 2.5 Pattern Analysis and Quantification 2.6 Result Interpretation and Decision Making **<u>Practical Works</u>** Use QGIS Application to perform following task: *Loading vector data from files* *Loading raster files* *Styling raster layers* *Styling vector layers* *Creating new vector layers* *Editing vector geometries* *Editing attributes*

• Describe GIS data models • Elaborate Raster model and v ector model. • Represent surface in raster and vector models. • Use QGIS tool to analyze raste rdata, combine raster and vectordata. • Design printing maps andpres ent map online.	**Unit 3: GIS Data Model [14]** 3.1 Raster Model and Structure 3.2 Vector Representation 3.3 Surface Representation in Raster Model 3.4 Surface Representation in Vector Model **<u>Practical Works</u>** Use QGIS Application to perform following task: *Analyzing raster data* *Combining raster and vector data* *Leveraging the power of spatial databases* *Advanced vector styling* *Labeling* *Designing print maps* *Presenting your maps online*

• Define Geographic objects. • Demonstrate searching different geographic objects inGIS. • Extract, transform and load vector data and visualize GISdata. • Make use of Postgres withPostGIS and pgRouting . • Elaborate database importingand topological relati onships. • Establish travel time isochronpolygons.	**Unit 4: Searching for Geographic Objects** **[12]** 4.1 Finding Information in Raster Systems 4.2 Finding Features in Vector Systems 4.3 Searching Polygons in a GIS 4.4 Locating 2-D Map Objects 4.5 Defining the Groups for Searching **<u>Practical Works</u>** Use QGIS Application to perform following task: *Acquiring data for geospatial applications* *Visualizing GIS data* *Vector data – Extract, Transform, and Load* *Raster analysis* *Publishing the results as a web application* *Postgres with PostGIS and pgRouting* *OpenStreetMap data for topology* *Database importing and topological relationships* *Creating the travel time isochron polygons*

• Clarify the concept of distance measurement. • Analyze different geographic pat terns • Explain statistical surface,topolo gical surface and networks. • Measure connectivity and direct traffic in roads • Make use of Road graph plugin. • Calculate the shortest pathsusing the Road graph plugin • Visualize pgRouting result in QGIS tool	**Unit 5: Geographic Pattern Analysis** **[18]** 5.1 Distance Measurement -absolute, relative, functional distance 5.2 Statistical Surfaces Characteristics, working with surface data,predicting values with interpolation 5.3 Topological Surfaces 5.4 Networks - Connectivity measurement, impedance values, oneway paths, circuits, turns and intersections, directing traffic and ex ploiting networks **<u>Practical Works</u>** Use QGIS Application to perform following task: *Creating a simple routing network*