

GIS Course For Gujarat Vidyapith

Course Title: GIS Operation for Carrying Out Application Project

Lectures: 10 Hours

Practical: 40 Hours

Project time: 30 Hours

Course Duration: 10 weeks

Topic Number	Name of the Topic
1	Introduction to GIS <ul style="list-style-type: none"> • Concept of data, information and knowledge • Concept of Information Systems • Relevance, Definition, Evolution and Components of GIS • Usefulness and Applications of a GIS
2	Nature of geographic data and representation <ul style="list-style-type: none"> • Spatial data, spatial data types and characteristics • Contents of spatial data: spatial and attribute • Concept of discrete and continuous geographic phenomena • Raster and Vector data models and formats • Concept of map scale
3	Geographic data collection and metadata <ul style="list-style-type: none"> • Data from National Mapping Agencies • Data from other projects • Data from analog datasets • Data from Public Domain Websites • Creating new datasets: from RS satellites, GPS Receivers, ASCII files • Concept of Metadata and their usefulness
4	Coordinate Systems, Map Projections, Geo-referencing and Projecting data from one map projection to the other <ul style="list-style-type: none"> • Model of the earth and Geographic Co-ordinate System • Modeling the earth as different spheroids, ellipsoids and datums • Map projections: Definition & Types • Commonly used Map projections and their characteristics • Geo-referencing raster and vector data • Projecting data from one map projection to the other
5	GIS Database Creation, Editing and transforming from one co-ordinate system to the other <ul style="list-style-type: none"> • GIS database creation from paper maps, satellite data, ASCII files and public domain Websites • Data editing for removing location errors, topological errors and attribute errors • Other editing operations: Edge-matching and Map-mosaicing , Line simplification and Smoothing

	<ul style="list-style-type: none"> Transforming data from one co-ordinate system to the other using Ground Control Points(GCPs)
6	Attribute Data in GIS
	<ul style="list-style-type: none"> Representation of attribute data in a GIS Field types supported by a GIS Creating Tables Relating and Joining Tables Attribute Data Types: Nominal, Ordinal, Interval and Ratio
7	GIS Data display, exploration, query and presentation
	<ul style="list-style-type: none"> Vector and raster data display and symbolization Data exploration Types of Queries: Spatial, Attribute and Complex Map based data manipulation: Classification, Aggregation Presentation in form of maps Presentation in form of Tables and Charts
8	GIS data Analysis
	<ul style="list-style-type: none"> What is spatial data analysis? Vector data analysis: Overlay, Proximity, Statistical, Measurements and Map Manipulation Functions Raster data analysis: Functions on rasters, Raster Calculator, Raster Reclassification, Euclidean Distance Rasters, Weighted overlay, Raster Manipulation Functions
9	3-dimensional Data Analysis
	<ul style="list-style-type: none"> Concept of 3-D surface Representation of a 3-D Surface: DEM, TIN, Contours Deriving terrain characteristics from 3-D data <ul style="list-style-type: none"> Slope Aspect Contours Visibility Analysis 3-D Views Hill shading View-shed Water-shed
10	Network Analysis
	<ul style="list-style-type: none"> Definition and types of Network Applications of Network How to create a road network Finding the shortest path within a road network Finding the service area of a facility