

# Introduction to GIS Analysis and Modeling

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## Geomatics Course

Course Title	Course Description	Duration (Days)
<p><b>Introduction to GIS Analysis and Modeling</b></p>	<p>GIS analysis is one of the major GIS functions, that performs heavy duty GIS processing to produce additional and analytical spatial information using various GIS analysis tools. The participants will be exposed to the various disciplines in problem identification, derive model of solutions, identify GIS tools to execute the application models, generate and study the result of the analysis. Participants will then examine both vector and raster data model and its impact on GIS analysis model and the output of the analysis. They will relate GIS analysis models for their on-the-job application through exploring and brainstorming session among the participants and tutors as appropriate.</p> <p><i>Objectives: After completion of the course, participants will be able to:</i></p> <ol style="list-style-type: none"> <li>1. <i>Understand what Is GIS Analysis for both vector and raster data models.</i></li> <li>2. <i>Understand what are the vector GIS analysis functionality - single and multi layer processing, and table processing</i></li> <li>3. <i>Understand what are the raster GIS analysis functionality - interpolation, density, distance, local, math, reclass, surface, zonal.</i></li> <li>4. <i>Understand GIS analysis problem solving life cycle.</i></li> <li>5. <i>Perform vector GIS analysis functions using ArcGIS desktop.</i></li> <li>6. <i>Perform raster GIS analysis functions using ArcGIS desktop - raster buffering, allocation (proximity), cost weighted, shortest path, density, interpolate to raster, contour, slope, aspect, hillshade, viewshed, cut/fill generation, cell statistics, neighbourhood statistics, zonal statistics, reclassify, raster calculation</i></li> <li>7. <i>Model the problems of some sample applications and perform analysis using ArcGIS desktop and Spatial Analyst extension.</i></li> </ol> <p><i>Pre-requisite: Working with Desktop ArcGIS</i></p> <p>Course Outline:</p> <ul style="list-style-type: none"> <li>• Chapter 1: What Is GIS Analysis <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Vector GIS</li> <li>▪ Raster GIS</li> </ul> </li> <li>• Chapter 2: Vector and Raster GIS Model <ul style="list-style-type: none"> <li>▪ Raster GIS Data Model</li> <li>▪ Vector GIS Data Model</li> </ul> </li> <li>• Chapter 3: Vector GIS Analysis <ul style="list-style-type: none"> <li>▪ GIS Analysis Functionality</li> <li>▪ Processing Tools</li> </ul> </li> <li>• Chapter 4: Raster GIS Analysis <ul style="list-style-type: none"> <li>▪ Raster GIS Functionality</li> <li>▪ Tools used for Analysis</li> </ul> </li> <li>• Chapter 5: GIS Analysis Problem Solving Life Cycle</li> </ul>	<p style="text-align: center;">2</p>

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Course Title	Course Description	Duration (Days)
	<ul style="list-style-type: none"> <li>▪ Problem Identification</li> <li>▪ Identify Sub-Problems</li> <li>▪ Define Solution Model using GIS Analysis Function</li> <li>▪ Define Data Layers and Data Types</li> <li>▪ Data Preparation</li> <li>▪ Obtaining Result</li> <li>• Chapter 6: Practical on Vector GIS Analysis                             <ul style="list-style-type: none"> <li>▪ Selection Tool</li> <li>▪ Buffer Tool</li> <li>▪ Dissolve Tool</li> <li>▪ Intersect Tool</li> <li>▪ Merging Tool</li> <li>▪ Clip Tool</li> <li>▪ Union Tool</li> </ul> </li> <li>• Chapter 7: Practical on Raster GIS Analysis                             <ul style="list-style-type: none"> <li>▪ Raster Buffering</li> <li>▪ Allocation (Proximity)</li> <li>▪ Cost Weight</li> <li>▪ Shortest Path</li> <li>▪ Density</li> <li>▪ Interpolate to Raster</li> <li>▪ Contour</li> <li>▪ Slope</li> <li>▪ Aspect</li> <li>▪ Hillshade</li> <li>▪ Viewshed</li> <li>▪ Cut/Fill</li> <li>▪ Cell Statistics</li> <li>▪ Neighborhood Statistics</li> <li>▪ Zonal Statistics</li> <li>▪ Reclassify</li> <li>▪ Raster Calculator</li> </ul> </li> </ul>	