Applied GIS & Remote Sensing: Concepts, Applications, and Spatial Analysis Using ArcGIS

Course Outline

Instructor: **Md. Yeamun Hasan Soumick**
GIS Instructor, StatX
Research Assistant, University of Rajshahi
Open Mapping GURU | Humanitarian OpenStreetMap Team (HOT)
Former Research Assistant, Cox's Bazar Development Authority (CoxDA)
Former Research Intern, Centre for Resilience and Youth (CRY), Bangladesh

Day 1	**Introduction to GIS & ArcGIS Interface** • Definition and concept of GIS • Importance and necessity of GIS • Applications of GIS in different sectors • Introduction to ArcGIS software • ArcGIS interface overview • Basic navigation and map interaction tools
Day 2	**GIS Data Types & Data Management** • Types of GIS data: Vector and Raster • Understanding shapefiles and CSV data • Importing spatial and tabular data into ArcGIS • Layer management • Symbology and visualization techniques • Attribute table overview
Day 3	**Attribute Data Handling & Query Analysis** • Structure and function of attribute tables • Attribute data management • Select by Attribute operation • Query building and filtering data • Field Calculator: concepts and applications
Day 4	**Basic Spatial Analysis Techniques** • Introduction to spatial analysis • Buffer analysis • Clip operation • Intersect operation • Simple area-based spatial analysis • Real-world application examples • Mini project

Day 5	**Cartography & Thematic Mapping** • Principles of good map design • Elements of a map (title, legend, scale, north arrow) • Thematic mapping techniques • Creating different thematic maps • Layout view customization • Exporting maps for print and presentation • Mini project
Day 6	**Remote Sensing Fundamentals & Satellite Image Processing** • Basic concepts of Remote Sensing • Electromagnetic spectrum overview • Introduction to satellite data • Landsat and Sentinel satellites • Downloading satellite imagery • Loading and visualizing satellite images in ArcGIS
Day 7	**Spectral Indices & DEM-Based Analysis Spectral Indices** • Concept and importance of indices • NDVI (Normalized Difference Vegetation Index) • NDWI (Normalized Difference Water Index) • NDBI (Normalized Difference Built-up Index) • Raster Calculator usage • DEM Analysis • Digital Elevation Model (DEM) concepts • Slope analysis • Aspect analysis • Hillshade visualization • Mini project