

**SYLLABUS FOR ADVANCED DIPLOMA IN GIS &
GEOSPATIAL TECHNOLOGY
(2026-2027)**



**KAJAL REKHA INSTITUTE OF GEOSPATIAL SCIENCE
KAJAL EDUCARE AND CAREER CONSULTANCY
WEST BENGAL-711401**

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Advanced Diploma in GIS & Geospatial Technology

Duration: 1 Year (52 Weeks)

Classes per Week: 2

Hours per Class: 2 Hours

Total Contact Hours: 208 Hours

Mode: Hybrid (Offline + Online Lab Support)

Software: QGIS (Open Source), ArcGIS Pro, ArcMap

Target Group: UG/PG Students (Geography, Environmental Science, Disaster Management, Planning), Professionals, Researchers

Programme Objectives

- Develop a strong conceptual understanding of GIS principles
- Gain hands-on expertise in QGIS and ArcGIS
- Apply GIS in disaster management, urban planning, transport geography, and environmental monitoring
- Execute real-world GIS projects independently
- Prepare for research, consultancy, and industry careers

DETAILED SYLLABUS (UNIT-WISE)

ADGT101T: Fundamentals of GIS & Cartography

Unit	Topics
Unit I	Concept, Scope & Evolution of GIS; Components of GIS; Spatial & Non-Spatial Data; Vector & Raster Models; Coordinate Systems; Map Projections
Unit II	Cartographic Principles; Scale; Generalization; Thematic Mapping; Classification Methods; Digital Cartography
Unit III	GIS Data Sources (Survey Maps, Census, GPS, OSM, Satellite Data)
Unit IV	Practical: Software Interface; Georeferencing; Digitization; Map Layout & Export

ADGT102P: GIS Data Handling & Spatial Database

Unit	Topics
Unit I	Attribute Table Creation; Data Editing; Field Calculator; Data Join & Relate
Unit II	Geodatabase Concept; Topology Rules; Data Projection; Data Conversion
Unit III	Spatial Tools: Clip, Merge, Dissolve, Buffer, Overlay, Query
Unit IV	Practical: Geodatabase Creation; Topology Error Correction; Data Processing Exercise

ADGT103P: Spatial Analysis (QGIS & ArcGIS)

Unit	Topics
Unit I	Vector Analysis: Buffer, Overlay, Network Analysis
Unit II	Raster Analysis: DEM, Slope, Aspect, Hydrology Tools
Unit III	Suitability Modelling: Weighted Overlay; Multi-Criteria Analysis
Unit IV	Practical: Flood Risk Mapping; Accessibility Mapping; Urban Growth Analysis

ADGT104P: Remote Sensing & Image Processing

Unit	Topics
Unit I	EMR; Satellite Sensors; Resolution Types
Unit II	Image Enhancement; Supervised & Unsupervised Classification
Unit III	NDVI; LULC Mapping; Change Detection
Unit IV	Practical: NDVI Map; LULC Map; Accuracy Assessment

ADGT105T: Spatial Statistics & GeoAI Basics

Unit	Topics
Unit I	Spatial Statistics: Mean Centre; Standard Distance; Moran's I
Unit II	Hotspot Analysis: Spatial Autocorrelation
Unit III	Introduction to Python; ArcPy Basics; Model Builder
Unit IV	GeoAI Concepts; Machine Learning in GIS; Practical Script Execution

ADGT106P: GIS Applications

Unit	Topics
Unit I	Disaster GIS: Hazard & Vulnerability Mapping
Unit II	Transport GIS: Network Analysis; Route Optimization
Unit III	Urban GIS: Land Use; Infrastructure Mapping
Unit IV	Environmental GIS: Watershed; Forest Cover; Pollution Mapping

ADGT107D: Project / Dissertation

Component	Details
Proposal Submission	Study Area Selection & Research Design
Data Collection	Primary & Secondary Data
GIS Analysis	Spatial & Statistical Analysis
Report Writing	5,000–7,000 Words
Presentation	Viva & Project Defense