

Typical Syllabus for Postgraduate Diploma in Geoinformatics**Postgraduate Diploma in Geoinformatics****Syllabus***ROOTPIXIN Solutions Pvt. Ltd.*

Course Overview

This training programme delivers a complete grounding in Geoinformatics — from remote sensing and digital image processing to GIS, cartography, GPS, spatial data infrastructure, photogrammetry, and programming - culminating in a hands-on project/dissertation applying these tools to real-world case studies.

1. Introduction to Geoinformatics

- Fundamentals of Geoinformatics
- Overview of Geospatial Technologies
- Applications of Geoinformatics

2. Remote Sensing and Satellite Imagery

- Principles of Remote Sensing
- Electromagnetic Spectrum and Energy Interaction
- Types of Satellite Sensors (Optical, Thermal, Microwave/SAR)
- Spatial, Spectral, Radiometric and Temporal Resolution
- Image Interpretation and Analysis

3. Digital Image Processing (DIP)

- Image Pre-processing – Radiometric and Atmospheric Correction
- Image Rectification, Geo-referencing and Registration
- Image Enhancement Techniques – Contrast Stretching, Histogram Equalization, Spatial Filtering
- Image Transformation – Band Ratioing, Principal Component Analysis (PCA), Vegetation Indices (NDVI, SAVI)
- Image Classification – Supervised and Unsupervised Techniques
- Accuracy Assessment and Classification Validation
- Feature Extraction and Pattern Recognition
- Change Detection Techniques and Multi-temporal Image Analysis

4. Geographic Information Systems (GIS)

- GIS Principles and Components
- Data Collection and Data Management

- Spatial Data Analysis and Modeling
- GIS Software and Tools

5. Cartography and Map Design

- Principles of Cartography
- Map Projections and Coordinate Systems
- Thematic Mapping

6. Global Positioning System (GPS)

- GPS Principles and Applications
- GPS Data Collection and Processing

7. Web & Cloud-based GIS

- Concepts and Components
- Standards and Metadata
- Web & Cloud-based GIS

8. Spatial Analysis and Modeling

- Raster and Vector Data Analysis
- Terrain Analysis
- Land Use and Land Cover Change Detection

9. Digital Photogrammetry

- Concept of Aerial Photography
- Photogrammetry – Development, Classification and Uses
- Photographic Scale
- Creation of DEM / DTM

10. Programming for Geoinformatics

- Introduction to GIS Programming (e.g., Python)
- Automating GIS Tasks

11. Applications of Geoinformatics

- Environmental Management
- Urban Planning
- Disaster Management
- Agriculture and Forestry

12. Project Work / Dissertation

- Practical Application of Geoinformatics Tools
- Case Studies and Fieldwork

6-Month Training Schedule

modules across the year programme:

Module Focus	Key Topics Covered
Introduction to Geoinformatics; Remote Sensing & Satellite Imagery	Foundations of geospatial technology, EM spectrum, sensor types, resolution concepts, image interpretation basics
Digital Image Processing (DIP)	Pre-processing, rectification, enhancement, transformation (PCA / NDVI), classification, accuracy assessment, change detection
Geographic Information Systems (GIS)	GIS components, spatial data collection & management, spatial analysis / modeling, hands-on GIS software (QGIS/ ArcGIS)
Cartography & Map Design; Global Positioning System (GPS)	Map projections, coordinate systems, thematic mapping, GPS principles, field data collection and processing
Web & Cloud-based GIS; Spatial Analysis and Modeling; Digital Photogrammetry	Web / cloud GIS, metadata standards, raster-vector analysis, terrain & LULC change detection, aerial photography, DEM / DTM generation
Programming for Geoinformatics; Applications; Project Work / Dissertation	Python / R for GIS automation, sector applications (environment, urban, disaster, agriculture), capstone project / dissertation and fieldwork

Note: Each month includes practical lab sessions and software-based exercises (e.g., QGIS/ ArcGIS/ ERDAS Imagine/ ENVI, Python) alongside theoretical instruction. The final month is reserved primarily for the capstone project/dissertation and fieldwork.