ArcGIS Pro Professional with Reality Mapping & Photogrammetry

Target Audience

This course is designed for professionals and students who want to develop practical skills in desktop GIS, spatial analysis, and reality mapping using ArcGIS Pro. It is ideal for:

- GIS Analysts and GIS Professionals
- Surveyors and Geomatics Engineers
- Civil Engineers and Infrastructure Professionals
- Urban and Regional Planners
- Environmental Scientists and Natural Resource Professionals
- Remote Sensing and Geospatial Specialists
- Drone/UAV Operators and Photogrammetry Professionals
- Mining, Utility, and Asset Management Professionals
- Government and Municipal GIS Personnel
- Students, Researchers, and Educators in Geospatial Sciences
- ArcMap users transitioning to ArcGIS Pro
- Anyone interested in developing professional GIS and Reality Mapping skills

Course Objectives

The ArcGIS Pro Professional with Reality Mapping & Photogrammetry course is designed to provide participants with comprehensive knowledge of modern desktop GIS, spatial data management, drone image processing, and reality mapping workflows. The course combines theoretical concepts with extensive hands-on exercises to enable learners to efficiently manage, analyze, visualize, and publish geospatial information.

By the end of this course, participants will be able to:

1. Understand the ArcGIS platform, ArcGIS Pro architecture, and GIS workflows.
2. Navigate and customize the ArcGIS Pro interface for efficient project management.
3. Create, organize, and manage GIS projects, geodatabases, and spatial datasets.
4. Import, edit, query, and visualize vector, raster, CAD, BIM, and point cloud data.
5. Produce professional-quality 2D and 3D maps using advanced cartographic techniques.
6. Understand the principles of UAV-based reality mapping and digital photogrammetry.

7. Process drone imagery to generate orthomosaics, digital elevation models, dense point clouds, and textured 3D meshes.
8. Perform spatial analysis and automate GIS workflows using geoprocessing tools and ModelBuilder.
9. Create, edit, and maintain accurate GIS datasets for engineering, surveying, and environmental applications.
10. Publish and share GIS content, web maps, feature layers, and reality mapping products through ArcGIS Online and ArcGIS Enterprise.

Course Outcomes

Upon successful completion of this course, participants will be able to:

- Confidently operate ArcGIS Pro for professional GIS mapping and analysis projects.
- Create and manage GIS projects, geodatabases, and enterprise-ready spatial datasets.
- Perform advanced cartographic visualization in both 2D and 3D environments.
- Process UAV imagery to generate orthomosaics, DSMs, DTMs, dense point clouds, and textured 3D models.
- Apply photogrammetric workflows for terrain modeling, infrastructure mapping, and asset documentation.
- Edit and maintain high-quality spatial data using industry-standard GIS editing tools.
- Execute geoprocessing and spatial analysis workflows using core GIS analytical tools and ModelBuilder automation.
- Perform volume calculations, surface analysis, contour generation, and change detection using reality mapping datasets.
- Publish GIS data, web maps, scene layers, and reality mapping products to ArcGIS Online and ArcGIS Enterprise for collaboration.
- Apply end-to-end GIS and reality mapping workflows to real-world projects in surveying, engineering, infrastructure, mining, utilities, environmental management, and urban planning.

Course Outline

The course comprises **32 hours of theory and lab sessions** and is divided into **9 comprehensive modules**. Each module is followed by practical exercises and real-world site development workflows designed to reinforce learning and evaluate the participant's understanding of the concepts covered.

Table of Contents: -

Module 1: Getting Started with ArcGIS Pro

- Introduction to GIS and ArcGIS Pro
- ArcGIS Platform Overview
- Installation & Licensing
- ArcGIS Online & Enterprise Sign-in
- Understanding ArcGIS Pro Projects (.aprx)
- Working with Geodatabases
- Interface Overview

Module 2: ArcGIS Pro User Interface & Project Management

- Ribbon and Contextual Tabs
- Catalog Pane
- Views and Panes
- Project Organization
- Navigation in 2D & 3D
- Customizing the Interface
- Hands-on Exercises

Module 3: Working with GIS Data

- Spatial Data Models
- Vector & Raster Data
- CAD, BIM & LAS Data
- Importing GPS Data
- Working with Geodatabases
- Data Management
- Attribute Queries
- Spatial Queries

Module 4: Mapping & Cartographic Visualization

- Creating Maps
- Coordinate Systems
- Projections
- Symbology
- Labeling
- Annotation
- Time-enabled Layers
- 3D Visualization
- Hands-on Map Design

Module 5: Reality Mapping & Photogrammetry Fundamentals

- Introduction to Reality Mapping
- Principles of Photogrammetry
- UAV/Drone Image Acquisition
- Camera Calibration
- Ground Control Points (GCPs)
- RTK & PPK Concepts
- Image Quality Assessment
- Flight Planning Best Practices
- Coordinate Systems for Drone Data
- Reality Mapping Workflow Overview

Module 6: Drone Imagery Processing & Ortho Mapping

- Creating an Ortho Mapping Workspace
- Block Adjustment
- Tie Points
- Bundle Adjustment
- DEM Generation
- DSM vs DTM
- Orthomosaic Generation

- Seamline Editing
- Color Balancing
- Image Correction
- Quality Assessment
- Export Orthomosaics

Module 7: Reality Mapping Products & 3D Reconstruction

- Dense Point Cloud Generation
- Mesh Generation
- Textured Meshes
- Digital Surface Models
- Terrain Models
- Contours
- Building Extraction
- Surface Analysis
- Volume Calculations
- Change Detection
- Accuracy Assessment

Module 8: Editing & Data Creation

- Feature Editing
- Create Points
- Create Lines
- Create Polygons
- Editing Attributes
- Snapping
- Feature Templates
- Editing Imagery-derived Features

Module 9: Geoprocessing & Spatial Analysis

- Buffer
- Clip
- Intersect

- Union
- Dissolve
- Spatial Join
- Near Analysis
- Overlay Analysis
- Raster Analysis
- ModelBuilder