

Advanced ArcGIS Pro: Enterprise GIS, Spatial Analytics & Workflow Automation

Target Audience

This course is designed for professionals seeking to develop comprehensive skills in ArcGIS Pro for desktop GIS, spatial analysis, data management, cartography, web GIS, and workflow automation.

The program is suitable for:

- GIS Analysts and GIS Specialists
- GIS Engineers and Spatial Data Professionals
- Surveying and Geomatics Engineers
- Urban and Regional Planners
- Civil, Transportation, and Infrastructure Engineers
- Environmental Scientists and Natural Resource Professionals
- Utility, Telecom, Water, and Power Network Engineers
- Remote Sensing and Geospatial Analysts
- CAD, BIM, and Digital Twin Professionals integrating GIS workflows
- Government and Municipal GIS Personnel
- Asset Management Professionals
- Researchers, Academicians, and Students in Geospatial Sciences
- Professionals migrating from ArcMap to ArcGIS Pro
- Anyone interested in mastering enterprise GIS workflows using ArcGIS Pro

Course Objectives

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

1. Understand the ArcGIS Pro interface, project structure, and geospatial data management principles.
2. Create, organize, and maintain enterprise geodatabases using domains, subtypes, relationship classes, topology, and attribute rules.
3. Perform advanced geoprocessing and spatial analysis using native ArcGIS Pro tools and ModelBuilder.
4. Design high-quality cartographic products, interactive layouts, and professional map series.

5. Build and analyze 3D GIS scenes, LiDAR datasets, and raster imagery for visualization and decision-making.
6. Publish maps, feature layers, and scenes to ArcGIS Online and ArcGIS Enterprise while creating dashboards and field data collection solutions.
7. Automate GIS workflows using ArcPy, ModelBuilder, and AI-assisted productivity techniques to improve efficiency.
8. Complete an end-to-end GIS project that integrates data preparation, analysis, visualization, automation, and web publishing following Esri best practices.

Course Outcomes

After completing this training, participants will be able to:

- Navigate and utilize ArcGIS Pro efficiently for professional GIS projects.
- Design and manage enterprise geodatabases using industry-standard data management practices.
- Execute complex geoprocessing, spatial analysis, and modeling workflows.
- Produce publication-quality maps, layouts, and interactive 3D visualizations.
- Process and analyze raster imagery, remote sensing data, and elevation datasets.
- Publish GIS content to ArcGIS Online and ArcGIS Enterprise for collaborative workflows.
- Develop dashboards, web maps, and field data collection applications using the ArcGIS ecosystem.
- Automate repetitive GIS processes using Python (ArcPy) and ModelBuilder.
- Integrate ArcGIS Pro workflows with cloud services and modern AI-assisted GIS tools.
- Deliver complete GIS solutions from data acquisition through analysis, visualization, and web deployment.

Course Outline

The course comprises **40 hours of theory and lab sessions** and is divided into **12 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: ArcGIS Pro Fundamentals and User Interface

- Introduction to Geographic Information Systems (GIS)
- Overview of ArcGIS Pro
- ArcGIS Pro Licensing and Project Types
- Understanding the ArcGIS Pro Interface
- Ribbon, Panes, Catalog View, and Navigation
- Creating and Managing ArcGIS Projects (.aprx)
- Working with Portal Connections
- Project Organization and Best Practices
- Maps, Scenes, and Layouts
- Coordinate Systems and Spatial References
- Working with Basemaps
- Project vs. Dataset Structure

Module 2: Spatial Data Management

- GIS Data Models
- File Geodatabases
- Enterprise Geodatabases (Overview)
- Feature Classes and Feature Datasets
- Domains and Subtypes
- Relationship Classes
- Attribute Rules
- Data Validation Techniques
- Topology Concepts
- Versioning Fundamentals
- Data Editing Workflows
- Metadata Management
- Importing and Exporting GIS Data

- Working with CAD Data
- BIM Data Integration
- Data Conversion Tools

Module 3: Geoprocessing Fundamentals

- Introduction to Geoprocessing
- Toolboxes and Tool History
- Geoprocessing Environment Settings
- Batch Processing
- Data Selection Techniques
- Buffer Analysis
- Clip Operations
- Dissolve
- Merge
- Append
- Union
- Intersect
- Spatial Join
- Overlay Analysis
- Proximity Analysis
- Data Extraction

Module 4: ModelBuilder and Workflow Automation

- Introduction to ModelBuilder
- Creating Geoprocessing Models
- Variables and Parameters
- Iterators
- Conditional Processing
- Batch Automation
- Sharing Models
- Best Practices for Model Development

Module 5: Spatial Analysis

- Spatial Analyst Extension
- Raster Analysis Fundamentals
- Surface Analysis
- Density Analysis
- Suitability Analysis
- Spatial Statistics Fundamentals
- Hot Spot Analysis
- Cluster and Outlier Analysis
- Interpolation Methods
- Network Analyst Overview
- Business Analyst Overview

Module 6: Cartography and Map Production

- Principles of Cartographic Design
- Symbolology Techniques
- Graduated Symbols
- Dot Density Mapping
- Heat Maps
- Smart Mapping
- Labeling Fundamentals
- Advanced Maplex Labeling
- Annotation
- Map Layout Design
- Legends
- Scale Bars
- North Arrows
- Dynamic Text
- Map Series
- Print and Export Options

Module 7: 3D GIS and Digital Twin Fundamentals

- Introduction to 3D GIS
- Working with Local and Global Scenes
- Elevation Surfaces
- Multipatch Features
- LAS Datasets
- Point Cloud Visualization
- 3D Editing
- Building Scene Layers
- Digital Twin Concepts
- 3D Visualization Best Practices

Module 8: Imagery and Remote Sensing

- Raster Data Fundamentals
- Raster Functions
- Image Enhancement
- Image Classification
- Spectral Analysis
- Change Detection
- DEM Processing
- Terrain Analysis
- Orthophotos
- Satellite Imagery Workflows
- Image Services

Module 9: Web GIS and Enterprise Publishing

- Introduction to ArcGIS Online
- ArcGIS Enterprise Overview
- Publishing Feature Layers
- Publishing Tile Layers
- Publishing Scene Layers

- Web Maps
- Web Scenes
- Sharing and Collaboration
- Content Management
- Security and Permissions

Module 10: Dashboards, StoryMaps, and Experience Builder

- Introduction to ArcGIS Dashboards
- Dashboard Widgets
- Indicators and Charts
- Filters and Selectors
- Arcade Expressions
- StoryMaps Fundamentals
- Experience Builder Overview
- Interactive GIS Applications

Module 11: Field Operations

- Introduction to ArcGIS Field Maps
- Mobile Data Collection
- Offline Workflows
- Survey123 Fundamentals
- Smart Forms
- Data Synchronization
- Workforce Integration (Overview)
- Quality Assurance for Field Data

Module 12: Python Automation and Capstone Project

- Introduction to Python for ArcGIS Pro
- ArcPy Fundamentals
- Automating Geoprocessing Tasks
- Running Python Scripts in ArcGIS Pro
- Script Tools

- AI-Assisted GIS Workflows
- Microsoft Azure Integration (Overview)
- End-to-End GIS Workflow Automation