Advanced ArcGIS Pro for Environmental and Geological Mapping Training Course



16 - 20 Nov 2026

Cape town

4600 € (Per Person)

Ref: #CAD4279_271211

Course Introduction / Overview:

This intensive training course is designed to elevate participants' skills in ArcGIS Pro, focusing specifically on its powerful applications in environmental and geological mapping. In an era where spatial data is crucial for decision-making, mastering advanced GIS techniques is no longer optional but essential for professionals in these fields. This program moves beyond basic GIS operations to explore complex spatial analysis, 3D visualization, and sophisticated data management workflows. As highlighted by Graeme F. Bonham-Carter in his seminal work, "Geographic Information Systems for Geoscientists: Modelling with GIS," the integration of diverse datasets is key to unlocking new insights. This course embodies that principle, teaching participants how to integrate remote sensing data, geological surveys, and environmental monitoring information to create comprehensive and predictive models. BIG BEN Training Center has structured this curriculum to provide a hands-on, problem-solving experience, ensuring that participants can immediately apply learned techniques to real-world challenges, from environmental impact assessments to mineral exploration. By the end of this course, you will be proficient in leveraging the full analytical power of ArcGIS Pro to produce high-quality, defensible cartographic products and spatial analyses that inform critical environmental and geological projects.

Target Audience / This training course is suitable for:

- Geologists and Exploration Geologists.
- Environmental Scientists and Consultants.
- GIS Analysts and Technicians.
- Hydrologists and Hydrogeologists.
- Natural Resource Managers.
- Geotechnical Engineers.
- Urban and Regional Planners.
- Surveyors and Cartographers.
- Researchers and Academics in Earth Sciences.
- Governmental Agency Staff involved in land management.

Target Sectors and Industries:

- Environmental Consulting and Management.
- Mining and Mineral Exploration.
- Oil and Gas Exploration and Production.
- Governmental Agencies (e.g., Environmental Protection, Geological Surveys).
- Civil Engineering and Construction.
- Renewable Energy Sector (e.g., wind and solar farm siting).
- Agriculture and Forestry Management.
- Water Resource Management.
- Disaster Management and Risk Assessment.
- Conservation and Non-Governmental Organizations (NGOs).

Target Organizations Departments:

- Geospatial and GIS Departments.
- Exploration and Geology Departments.
- Environmental, Health, and Safety (EHS) Departments.
- Research and Development (R&D).
- Planning and Surveying Departments.
- Asset Management and Operations.
- Regulatory Compliance and Permitting.
- Site Assessment and Remediation Teams.
- Infrastructure and Engineering Departments.
- Data Science and Analytics Units.

Course Offerings:

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

- Master the ArcGIS Pro interface and optimize project workflows for complex analyses.
- Perform advanced geoprocessing tasks for environmental and geological data.
- Integrate and analyze various data types, including raster, vector, and remote sensing imagery.
- Conduct sophisticated terrain and hydrological analysis using 3D Analyst and Spatial Analyst tools.
- Create detailed geological maps, including cross-sections and structural interpretations.
- Model environmental phenomena such as pollutant dispersion or habitat suitability.
- Automate repetitive mapping and analysis tasks using Model Builder and basic Python scripting.
- Develop professional-grade cartographic outputs for reports and presentations.
- Utilize ArcGIS Online for data sharing and collaborative mapping projects.
- Apply best practices for spatial data management and quality control.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring that participants gain tangible skills. This course emphasizes a hands-on, learning-by-doing approach, where theoretical concepts are immediately reinforced through practical exercises using real-world environmental and geological datasets. Each module is structured around case studies, such as conducting a site suitability analysis for a new facility or mapping a mineral deposit. Participants will work both individually and in collaborative teams to solve complex spatial problems, mirroring a professional work environment. Our expert instructors facilitate learning through a blend of live demonstrations, guided tutorials, and open-floor Q&A sessions. The training encourages critical thinking and provides a platform for participants to discuss challenges specific to their own work. Continuous feedback is a cornerstone of our approach, with instructors providing personalized guidance to help each participant overcome hurdles and master advanced ArcGIS Pro functionalities. This immersive and supportive learning environment ensures that attendees leave with the confidence and competence to tackle any geospatial challenge in their respective fields.

Course Agenda (Course Units):

Unit One Introduction to Advanced Concepts in ArcGIS Pro

- Fundamentals of the ArcGIS Pro interface for scientific analysis.
- Setting up projects for environmental and geological mapping.
- Advanced data management techniques using geodatabases.
- Understanding coordinate systems and projections for large-scale projects.
- Importing and integrating diverse data formats (CAD, GPS, tabular data).
- Customizing the ArcGIS Pro environment for efficiency.
- Introduction to ArcGIS Online and collaborative workflows.

Unit Two Advanced Data Acquisition and Geoprocessing

- Sourcing and processing satellite imagery and aerial photography.
- Working with Digital Elevation Models (DEMs) for terrain analysis.
- Advanced vector data editing and topology rules for data integrity.
- Mastering core geoprocessing tools for spatial analysis.
- Executing complex queries with SQL and definition queries.
- Georeferencing historical maps and non-spatial data.
- Batch processing techniques for handling large datasets.

Unit Three Spatial Analyst for Environmental Modeling

- Principles of raster analysis and the Spatial Analyst extension.
- Performing surface analysis: slope, aspect, and hillshade.
- Watershed delineation and hydrological modeling.
- Conducting suitability and site selection analysis using weighted overlay.
- Modeling vegetation indices (NDVI) from satellite imagery.
- Analyzing land use and land cover change over time.
- Creating density maps for hotspot analysis of environmental incidents.

Unit Four Geological Mapping and Subsurface Analysis

- Techniques for digitizing and attributing geological maps.
- Creating professional cartographic symbols for geological features.
- Generating geological cross-sections and fence diagrams.
- Introduction to 3D visualization of geological data.
- Analyzing structural geology data (strike and dip).
- Interpolation techniques for creating subsurface models (e.g., Kriging).
- Mapping mineral potential and exploration targets.

Unit Five Automation, Cartography, and Project Delivery

- Automating workflows with Model Builder for repetitive tasks.
- Introduction to Python scripting for custom geoprocessing tools.
- Advanced cartographic principles for publication-quality maps.
- Designing effective map layouts with dynamic elements.
- Creating 3D scenes and animations for presentations.
- Sharing maps and analyses via ArcGIS Online and Story Maps.
- Final project: Integrating environmental and geological analysis in a comprehensive case study.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As predictive geological models become more sophisticated with GIS, what are the ethical considerations in resource exploration and environmental conservation?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by moving beyond a generic, tool-focused approach to ArcGIS Pro and immersing participants in the specific, complex challenges of environmental and geological sciences. Unlike standard GIS training, every module, exercise, and case study is meticulously crafted to reflect real-world scenarios faced by geologists and environmental professionals. We focus on the "why" behind the analysis, not just the "how" of clicking buttons. The curriculum uniquely integrates both environmental and geological workflows, demonstrating how these often-separate disciplines can be combined within a single GIS project for more holistic and insightful analysis, such as assessing the environmental impact of a proposed mining operation. Furthermore, the course places a strong emphasis on advanced analytical and modeling techniques—such as hydrological modeling, subsurface interpolation, and suitability analysis—that are critical for predictive work and informed decision-making. Participants will not just learn to make maps; they will learn to conduct defensible spatial science, automate complex tasks, and communicate their findings effectively through high-impact visualizations and 3D scenes, providing a level of practical mastery and critical thinking that is rarely found in other programs.