Integrated CAD and GIS for Smart City Development Training Course

19 - 23 Oct 2026

Madrid

5900 € (Per Person)

Ref: #CAD4729_84583

Course Introduction / Overview:

The convergence of Computer-Aided Design (CAD) and Geographic Information Systems (GIS) represents a paradigm shift in urban planning and smart city development. This training course provides a comprehensive exploration of the integrated workflows that are essential for designing, managing, and optimizing the cities of the future. As discussed by prominent urban theorist Michael Batty in works like "The New Science of Cities," understanding the complex spatial relationships within urban environments is key to effective planning. This program moves beyond theoretical concepts to provide hands-on, practical skills in bridging the gap between the precise engineering detail of CAD and the powerful analytical capabilities of GIS. Participants will learn to create seamless data pipelines, perform advanced geospatial analysis, and develop 3D city models for enhanced visualization and decision-making. At BIG BEN Training Center, we have designed this curriculum to empower professionals with the tools to manage urban infrastructure, analyze spatial patterns, and contribute to sustainable and resilient smart city solutions, transforming complex data into actionable intelligence.

Target Audience / This training course is suitable for:

- Urban Planners and City Managers.
- Civil Engineers and Infrastructure Specialists.
- GIS Analysts and Technicians.
- CAD Drafters and Designers.
- Architects and Landscape Architects.
- Surveyors and Geomatics Professionals.
- Public Works Officials and Staff.
- Environmental Planners and Consultants.
- Asset Management Professionals.
- Smart City Project Managers.

Target Sectors and Industries:

- Urban Planning and Development.
- Civil Engineering and Construction.
- Government and Public Administration.
- Real Estate and Property Development.
- Utilities (Water, Gas, Electricity).
- Transportation and Logistics.
- Telecommunications.
- Environmental Management and Consulting.
- Emergency Services and Public Safety.

Target Organizations Departments:

- Planning and Urban Development.
- Engineering and Public Works.
- Information Technology (IT) and GIS Services.
- Asset and Infrastructure Management.
- Operations and Maintenance.
- Strategic Planning and Policy.
- Environmental and Sustainability Departments.
- Capital Projects and Construction.

Course Offerings:

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

- Master the fundamental principles of both CAD and GIS technologies and their roles in urban contexts.
- Execute seamless data conversion and integration processes between CAD and GIS platforms.
- Georeferenced CAD drawings accurately to align with real-world coordinate systems.
- Perform advanced geospatial analysis to support urban planning and decision-making.
- Develop and manage comprehensive 3D city models for visualization and simulation.
- Apply integrated workflows for smart infrastructure and asset management.
- Analyze transportation networks and utility systems using combined spatial data.
- Design and implement a complete CAD-GIS integration project for a smart city application.
- Evaluate and troubleshoot common data quality and compatibility issues.
- Understand the future trends in urban analytics, including digital twins and IoT integration.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and results-oriented. This course blends expert-led instruction with extensive hands-on exercises to ensure participants gain tangible skills. We believe in learning by doing, so a significant portion of the course is dedicated to practical labs where participants will work with real-world datasets to solve complex urban challenges. The curriculum incorporates detailed case studies of successful smart city projects from around the globe, providing valuable insights into industry best practices and innovative solutions. Collaborative group projects and workshops will encourage teamwork and peer-to-peer learning, simulating a real project environment. Interactive sessions, Q&A periods, and open discussions are integrated throughout the five days to foster a dynamic learning atmosphere. Our instructors provide continuous feedback and personalized guidance, ensuring that each participant can confidently apply the learned CAD and GIS integration techniques directly to their professional roles upon completion of the course.

Course Agenda (Course Units):

Unit One: Foundations of CAD, GIS, and Smart Cities

- Introduction to CAD principles and software environments.
- Fundamentals of Geographic Information Systems (GIS) and spatial data.
- Defining the smart city concept and its core components.
- Understanding vector and raster data models.
- Exploring coordinate systems, projections, and datums.
- The critical synergy between CAD and GIS for urban development.
- Review of key data formats (e.g., DWG, DGN, SHP, Geodatabase).

Unit Two: CAD and GIS Data Integration Techniques

- Methods for importing and exporting data between CAD and GIS.
- The process of georeferencing CAD data for spatial accuracy.
- Techniques for data transformation and schema mapping.
- Building and managing a unified spatial database.
- Best practices for data cleaning and quality assurance.
- Automating workflows with scripting and model building.
- Troubleshooting common integration challenges and errors.

Unit Three: Geospatial Analysis for Urban Planning

- Applying spatial analysis tools for urban insights.
- Conducting network analysis for transportation and utility planning.
- Performing site suitability and land use analysis.
- Modeling environmental impacts using integrated data.
- Demographic and socioeconomic analysis with GIS.
- Introduction to 3D spatial analysis for urban environments.
- Using geoprocessing tools to solve planning problems.

Unit Four: Advanced Applications in Smart City Management

- Principles of 3D city modeling and visualization.
- Introduction to the concept of Urban Digital Twins.
- Integrating real-time IoT sensor data with GIS maps.
- Workflow for smart infrastructure and asset management.
- Developing systems for emergency response and management.
- Urban simulation for traffic flow and pedestrian movement.
- Visualizing underground utilities and infrastructure.

Unit Five: Project Implementation and Future Trends

- Designing a comprehensive CAD-to-GIS project workflow.
- Capstone project. a case study from data integration to final analysis.
- Strategies for effective collaboration and data sharing among teams.
- The emerging role of AI and Machine Learning in geospatial analytics.
- The future of geodesign and smart urbanism.
- Ethical considerations in using integrated urban data.
- Final project presentations and course review.

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 cities become increasingly data-driven, what are the primary ethical considerations in using integrated CAD and GIS data for urban management and citizen monitoring?

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

This course distinguishes itself by focusing intensely on the practical integration and workflow between CAD and GIS, a critical and often overlooked skill gap in the industry. While many courses teach CAD or GIS in isolation, our curriculum is built around the synergy of these two domains, directly addressing the real-world challenges faced by urban planners and engineers. We move beyond software-specific commands to teach a holistic, problem-solving methodology. The curriculum emphasizes the creation of digital twins and the management of smart infrastructure, placing participants at the forefront of urban technology. Rather than just theoretical knowledge, the course is structured around a capstone project that simulates a complete smart city project lifecycle, from raw data integration to advanced analytical output. This hands-on, project-based approach ensures that participants not only learn the concepts but also master the application, empowering them to build more efficient, sustainable, and responsive urban environments immediately upon their return to the workplace.