Digital Infrastructure and Smart Grid Mapping Training Course



14 - 18 Dec 2026

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4100 € (Per Person)

Ref: #CAD4852_271326

Course Introduction / Overview:

The global shift towards smart cities and resilient infrastructure necessitates a profound transformation in how we design, manage, and operate civil systems. This course provides a comprehensive exploration of civil infrastructure digitization and advanced smart grid mapping, moving beyond theoretical concepts to practical implementation strategies. It addresses the critical convergence of civil engineering, geospatial information systems (GIS), and information technology to build the intelligent, interconnected environments of the future. As detailed by experts like Dr. James Momoh in his seminal work, "Smart Grid: Fundamentals of Design and Analysis," the modernization of our energy grids is a cornerstone of this evolution. This program, offered by BIG BEN Training Center, is meticulously designed to equip professionals with the skills to lead this change. Participants will delve into digital twin technology, IoT integration, and data-driven asset management, learning to create and interpret complex smart grid maps that are essential for efficient operations, predictive maintenance, and strategic urban planning.

Target Audience / This training course is suitable for:

- Civil Engineers and Urban Planners.
- Electrical Engineers and Grid Operators.
- GIS Analysts and Specialists.
- Infrastructure Project Managers.
- Utility Asset Managers.
- Government Regulators and Policy Makers.
- Technology Consultants in the energy and infrastructure sectors.
- Construction and Engineering Managers.
- Data Scientists focused on urban systems.
- Telecommunications Engineers involved in grid communication.

Target Sectors and Industries:

- Energy and Utilities (Electricity, Water, Gas).
- Public Works and Transportation.
- Telecommunications.
- Engineering and Construction Firms.
- Environmental Management and Consulting.
- Governmental bodies including municipalities and federal agencies.
- Real Estate and Urban Development.
- Technology and Software Development for infrastructure.

Target Organizations Departments:

- Engineering and Design.
- Operations and Maintenance.
- Planning and Development.
- Information Technology (IT) and Geospatial Services (GIS).
- Asset Management.
- Regulatory Compliance and Policy.
- Project Management Office (PMO).
- Research and Development (R&D).

Course Offerings:

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

- Master the fundamental principles of civil infrastructure digitization.
- Develop and interpret advanced smart grid maps using GIS technology.
- Integrate IoT sensors and data streams for real-time infrastructure monitoring.
- Apply digital twin concepts for infrastructure lifecycle management.
- Analyze geospatial data to optimize utility network performance.
- Implement cybersecurity protocols for critical smart grid infrastructure.
- Evaluate different technologies for energy grid modernization.
- Develop strategic plans for phased smart city infrastructure implementation.
- Manage projects involving the digitization of large-scale civil assets.
- Understand the regulatory and policy frameworks governing smart grids.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, practical, and highly interactive, ensuring that participants can translate learned concepts into real-world capabilities. This course moves beyond traditional lectures by incorporating a blend of expert-led presentations, in-depth case study analyses of successful smart grid implementations, and hands-on workshops using simulated GIS mapping scenarios. Collaborative group projects will challenge participants to work in teams to solve complex infrastructure digitization problems, fostering critical thinking and teamwork. Interactive sessions, including Q&A panels with instructors and peer-to-peer knowledge sharing, are central to the learning experience. We emphasize a continuous feedback loop, where participants receive constructive input on their work throughout the course. This dynamic and engaging approach ensures a deep understanding of both the technical and strategic aspects of smart grid mapping and digital infrastructure management, preparing attendees to lead transformative projects within their organizations.

Course Agenda (Course Units):

Unit One: Fundamentals of Digital Infrastructure and Smart Grids

- Introduction to civil infrastructure digitization.
- Core concepts and components of a smart grid.
- The evolution from traditional grids to intelligent networks.
- Key drivers for digitization: efficiency, resilience, and sustainability.
- Understanding the role of GIS in modern infrastructure management.
- Introduction to regulatory standards and policy frameworks.
- Case study on a pioneering smart city infrastructure project.

Unit Two: Geospatial Technology and Advanced Grid Mapping

- Principles of Geographic Information Systems (GIS) for utilities.
- Geospatial data acquisition techniques: LiDAR, drones, and satellite imagery.
- Creating and managing a utility network geodatabase.
- Advanced techniques in smart grid mapping and visualization.
- Network tracing and analysis for fault detection and load balancing.
- 3D modeling and visualization of infrastructure assets.
- Workshop: Hands-on exercise in basic grid mapping.

Unit Three: Integrating IoT and Sensor Networks

- The role of the Internet of Things (IoT) in smart infrastructure.
- Types of sensors for monitoring energy, water, and transportation systems.
- Designing and deploying sensor networks for data collection.
- Communication protocols and network architecture for IoT.
- Real-time data processing and analytics for operational intelligence.
- SCADA systems and their integration with modern smart grids.
- Case study on IoT for predictive maintenance in a utility company.

Unit Four: Digital Twins and Asset Management

- Introduction to digital twin technology for civil infrastructure.
- Building and maintaining a digital twin from GIS and BIM data.
- Lifecycle asset management using a digital twin model.
- Utilizing predictive analytics for infrastructure maintenance and planning.
- Simulating grid performance and disaster scenarios.
- Data integration challenges and solutions for digital twins.
- Strategic implementation of an asset management digitization program.

Unit Five: Strategy, Security, and Future Trends

- Developing a strategic roadmap for smart grid implementation.
- Cybersecurity threats and mitigation strategies for critical infrastructure.
- Data privacy considerations in smart infrastructure.
- The role of AI and machine learning in grid optimization.
- Integrating renewable energy sources into the smart grid.
- Future trends in urban technology and infrastructure digitization.
- Final project: Developing a digitization proposal for a model city.

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:

Considering the massive capital investment required, how can developing nations strategically phase the implementation of smart grid technologies to balance economic constraints with the urgent need for resilient infrastructure?

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

This course distinguishes itself by providing a holistic and strategic perspective that bridges the critical gap between traditional civil engineering and cutting-edge digital technology. While many programs focus narrowly on either GIS software or electrical grid theory, this training integrates them into a unified framework for modern infrastructure management. We move beyond simply teaching how to use tools and instead focus on the strategic application of technologies like digital twins, IoT, and advanced data analytics to solve real-world problems. The curriculum is built around practical case studies and forward-looking strategies, preparing participants not just for today's challenges but for the future evolution of smart cities. The emphasis on policy, cybersecurity, and project management provides a comprehensive skill set, empowering attendees to lead complex digitization projects from conception to completion. This course is designed for future leaders who need to understand the complete ecosystem of digital infrastructure, not just a single component of it.