Data Analytics and IIoT for Smart Maintenance Training Course

16 - 20 Nov 2026

Barcelona

5900 € (Per Person)

Ref: #INM6143_58112

Course Introduction / Overview:

This course is an in-depth program that bridges the gap between traditional maintenance practices and the digital world. It is designed to equip professionals with the essential skills to use data analytics and the Industrial Internet of Things (IIoT) for smarter, more efficient maintenance operations. Participants will learn how to leverage sensor data, predictive models, and real-time monitoring to anticipate equipment failures, optimize maintenance schedules, and reduce downtime. The curriculum covers key concepts like condition monitoring, root cause analysis, and the implementation of IIoT devices in an industrial setting. By the end of this program, attendees will be able to transform raw data into actionable intelligence, moving their organizations from reactive to proactive maintenance strategies. This is a critical skill set in today's data-driven industrial landscape. The course draws on principles from authors like John D. MacGregor's work on Statistical Process Control, which provides a strong foundation for using data to improve operational outcomes. This training, offered by BIG BEN Training Center, emphasizes practical, hands-on application and real-world case studies to ensure participants can immediately apply what they learn to their jobs. This course is about more than just technology; it is about building a modern, data-informed maintenance culture.

Target Audience / This training course is suitable for:

- Maintenance managers and engineers.
- Operations and plant supervisors.
- Reliability engineers and specialists.
- Data analysts in industrial settings.
- IIoT and automation engineers.
- IT professionals working with operational technology.
- Government agency personnel managing critical infrastructure.

Target Sectors and Industries:

- Manufacturing and production.
- Oil and gas.
- Utilities and energy.
- Transportation and logistics.
- Mining and heavy industry.
- Smart infrastructure and smart cities.
- Government agencies.

Target Organizations Departments:

- Maintenance and reliability.
- Operations and production.
- Engineering.
- IT and digital transformation.
- Asset management.
- Health, safety, and environment (HSE).

Course Offerings:

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

- Implement and manage IIoT sensor data for condition monitoring.
- Use data analytics to predict equipment failures and optimize maintenance schedules.
- Apply root cause analysis using data from connected devices.
- Develop and deploy a proactive, predictive maintenance strategy.
- Integrate IIoT solutions with existing enterprise asset management (EAM) systems.
- Analyze operational data to improve overall equipment effectiveness (OEE).
- Interpret data visualizations and dashboards to make informed decisions.

Course Methodology:

This course uses a blended learning approach that combines theoretical knowledge with practical, hands-on application. The training begins with interactive lectures and discussions that introduce core concepts of data analytics and IIoT. Participants then engage in practical exercises using simulated industrial datasets to practice data analysis, visualization, and predictive modeling. The curriculum includes detailed case studies drawn from various industries, allowing attendees to apply their skills to real-world maintenance challenges. This approach encourages critical thinking and problem-solving in a collaborative environment. Team-based activities foster an understanding of how to implement these technologies across different departments. Throughout the course, a strong emphasis is placed on using popular data analysis tools and platforms without tying participants to a specific vendor. Instructors from BIG BEN Training Center provide personalized feedback and guidance, ensuring a deep understanding of the material. This methodology ensures participants leave with both the theoretical knowledge and the practical skills needed to lead digital transformation in their maintenance operations.

Course Agenda (Course Units):

Unit One: Foundations of Smart Maintenance and IIoT

- Introduction to the Industrial Internet of Things (IIoT).
- Understanding the benefits of smart maintenance.
- Key components of an IIoT system for maintenance.
- Data collection methods from sensors and industrial equipment.
- The journey from reactive to proactive maintenance.
- Introduction to data analytics for maintenance.
- Cybersecurity considerations for IIoT in an industrial environment.

Unit Two: Data Acquisition and Management

- Selecting the right sensors and gateways for asset monitoring.
- Data types in a maintenance context (vibration, temperature, pressure).
- Structuring and cleaning industrial data for analysis.
- Introduction to data storage solutions for IIoT data.
- Developing a data acquisition strategy for critical assets.
- Real-time data streaming and processing.
- Data governance and quality control for IIoT data.

Unit Three: Predictive Analytics and Machine Learning

- Fundamentals of predictive maintenance modeling.
- Using historical data to build simple predictive models.
- Applying machine learning algorithms to predict equipment failure.
- Identifying key performance indicators (KPIs) for maintenance.
- Interpreting model outputs and confidence levels.
- Techniques for anomaly detection in sensor data.
- Case studies in predictive maintenance for industrial machinery.

Unit Four: Condition Monitoring and Root Cause Analysis

- Techniques for effective condition monitoring.
- Vibration analysis and its role in machinery health.
- Using data to perform a data-driven root cause analysis (RCA).
- Developing and implementing alarm systems for critical assets.
- Creating maintenance dashboards for real-time insights.
- Using IIoT data to track asset health over time.
- Integrating condition monitoring data with maintenance workflows.

Unit Five: Implementation and Strategic Planning

- Building a business case for a smart maintenance initiative.
- Developing a phased implementation plan for IIoT solutions.
- Change management strategies for adopting new technologies.
- Best practices for collaborating with IT and operational teams.
- Measuring the return on investment (ROI) of smart maintenance.
- Creating a roadmap for future IIoT and data analytics initiatives.
- Final course project: developing a smart maintenance plan for a case study company.

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 data analytics and IIoT become central to maintenance, how do organizations balance the need for technological advancement with the critical role of human expertise and hands-on skill?

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

This course is distinguished by its unique focus on the practical application of data analytics and IIoT directly to maintenance and reliability challenges. While other programs may cover these topics in a general sense, our curriculum is specifically tailored to the needs of industrial professionals. We don't just teach technology; we show participants how to use it to solve real-world problems like reducing unplanned downtime and optimizing asset performance. The course's methodology is heavily hands-on, providing participants with the opportunity to work with datasets and real-world case studies in a structured environment. This ensures they gain not just theoretical knowledge but also the practical skills needed to implement these strategies in their own organizations. Furthermore, the course emphasizes the strategic aspect of digital transformation, helping participants build a compelling business case for smart maintenance initiatives. Offered by BIG BEN Training Center, the program goes beyond a simple introduction to tools and instead cultivates a deep, strategic understanding of how data and IIoT can fundamentally change a maintenance organization for the better.