Manufacturing Excellence and Industry 4.0 Innovation Training Course



20 - 24 Dec 2026

Manama

4400 € (Per Person)

Ref: #INN1441_229683

Course Introduction / Overview:

This training course provides a comprehensive exploration of the convergence between traditional manufacturing excellence principles and the transformative power of Industry 4.0. In today's competitive landscape, simply being lean is not enough; organizations must embrace digital transformation to achieve next-level performance. This program is meticulously designed to bridge the gap between established methodologies like Lean and Six Sigma and the disruptive technologies of the fourth industrial revolution, including the Industrial Internet of Things (IIoT), big data analytics, and artificial intelligence. As articulated by Klaus Schwab in his seminal work, "The Fourth Industrial Revolution," the fusion of physical, digital, and biological worlds is fundamentally altering industries. This course, offered by BIG BEN Training Center, translates these high-level concepts into a practical, actionable framework for implementation. Participants will learn not just the 'what' of these technologies, but the 'how' and 'why' of integrating them to create smart factories, optimize supply chains, and foster a culture of continuous, data-driven innovation for sustainable operational excellence.

Target Audience / This training course is suitable for:

- Operations Managers and Directors.
- Plant and Factory Managers.
- Production and Manufacturing Engineers.
- Continuous Improvement and Lean Specialists.
- Supply Chain and Logistics Professionals.
- Quality Assurance and Control Managers.
- IT and OT Professionals in the manufacturing sector.
- Product Development and R&D Leaders.
- Strategic Planners and Business Transformation Leaders.

Target Sectors and Industries:

- Automotive and Aerospace Manufacturing.
- Pharmaceuticals and Medical Device Manufacturing.
- Electronics and Semiconductor Production.
- Consumer Packaged Goods (CPG) and Food & Beverage.
- Heavy Industry and Machinery.
- Energy, Oil, and Gas sectors.
- Logistics and Supply Chain Management.
- Governmental bodies and regulatory agencies overseeing industrial development.

Target Organizations Departments:

- Operations and Production.
- Engineering and Maintenance.
- Quality Assurance and Control (QA/QC).
- Supply Chain Management and Procurement.
- Information Technology (IT) and Operational Technology (OT).
- Research and Development (R&D).
- Strategic Planning and Corporate Development.
- Human Resources and Workforce Training.

Course Offerings:

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

- Integrate foundational Lean Six Sigma principles with modern Industry 4.0 technologies.
- Develop a strategic roadmap for digital transformation within a manufacturing environment.
- Evaluate and select appropriate IIoT, AI, and big data solutions for specific operational challenges.
- Design a framework for implementing a smart factory, including digital twin technology.
- Utilize data analytics for predictive maintenance and advanced quality control.
- Analyze the impact of Industry 4.0 on supply chain visibility and resilience.
- Identify and mitigate cybersecurity risks associated with connected industrial systems.
- Lead change management initiatives to foster a culture of digital-first continuous improvement.
- Measure the ROI of Industry 4.0 projects and justify investment to stakeholders.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring that participants can translate theoretical knowledge into real-world application. Our approach moves beyond traditional lectures to foster a dynamic learning environment. The course heavily utilizes case study analysis of leading companies that have successfully navigated their digital transformation journey, allowing participants to dissect real-world strategies, challenges, and outcomes. Collaborative group workshops and simulation exercises will be central to the learning process, where attendees will work in teams to design a smart factory blueprint, develop an IIoT implementation plan, and solve complex operational problems. Interactive sessions, expert-led discussions, and peer-to-peer knowledge sharing are encouraged to explore diverse perspectives. Ample time is allocated for Q&A and personalized feedback from the instructor, ensuring that each participant's unique challenges and organizational contexts are addressed. This blended learning approach guarantees a rich, immersive experience that builds both competence and confidence in leading manufacturing innovation.

Course Agenda (Course Units):

Unit One Foundations of Manufacturing Excellence and Industry 4.0

- The Evolution from Lean Manufacturing to Operational Excellence.
- Core Principles of Lean: The Five Principles and Eight Wastes.
- Introduction to Six Sigma and the DMAIC/DMADV Methodologies.
- Defining Industry 4.0: The Nine Pillars of Technological Advancement.
- The Synergy between Continuous Improvement and Digital Transformation.
- Historical Context: From Industry 1.0 to the Smart Factory.
- Assessing Organizational Readiness for Industry 4.0 Adoption.

Unit Two Core Technologies of the Fourth Industrial Revolution

- Industrial Internet of Things (IIoT) Architecture and Sensor Technology.
- Big Data and Analytics: From Data Collection to Actionable Insights.
- Artificial Intelligence (AI) and Machine Learning in Manufacturing.
- Cloud and Edge Computing for Industrial Applications.
- Robotics and Autonomous Systems: Cobots and AGVs.
- Additive Manufacturing (3D Printing) for Prototyping and Production.
- Augmented Reality (AR) and Virtual Reality (VR) for Operations and Training.

Unit Three Implementing the Smart Factory

- Developing a Strategic Roadmap for Smart Factory Implementation.
- System Integration: Connecting OT and IT Systems.
- The Role of Manufacturing Execution Systems (MES) in Industry 4.0.
- Digital Twin Technology: Creating Virtual Models of Physical Assets.
- Automating Processes with Robotic Process Automation (RPA).
- Smart Asset Management and Connected Equipment.
- Energy Management and Sustainability in the Smart Factory.

Unit Four Data-Driven Operations and Supply Chain 4.0

- Predictive Maintenance: Moving from Reactive to Proactive Strategies.
- Advanced Quality Control (Quality 4.0) using Machine Vision and AI.
- Leveraging Big Data for Process Optimization and Yield Improvement.
- Building a Resilient and Transparent Supply Chain with Industry 4.0.
- Smart Warehousing and Inventory Management.
- Blockchain Applications for Supply Chain Traceability and Security.
- Demand Forecasting and Planning with Advanced Analytics.

Unit Five Strategy, Leadership, and the Future of Manufacturing

- Cultivating a Culture of Innovation and Digital Fluency.
- Leading Change: Managing the Human Element of Digital Transformation.
- Cybersecurity for Industrial Control Systems (ICS) and OT Environments.
- Calculating the Return on Investment (ROI) for Industry 4.0 Projects.
- Ethical Considerations and the Future of Work in Automated Environments.
- Exploring Future Trends: 5G, Quantum Computing, and Industry 5.0.
- Final Project: Developing a Business Case for an Industry 4.0 Initiative.

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 automation and AI become more integrated into manufacturing, what is the evolving role of the human workforce, and how can leaders ethically manage this transition to augment human capabilities rather than simply replace them?

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

This course distinguishes itself by providing a holistic, strategic integration of two critical domains: traditional manufacturing excellence and cutting-edge Industry 4.0 innovation. Unlike programs that focus solely on technology or exclusively on lean principles, this curriculum is built on the synergy between them. It addresses the critical challenge of how to embed digital tools into a pre-existing culture of continuous improvement, ensuring technology serves strategy, not the other way around. The focus is less on the technical specifications of individual tools and more on developing a strategic mindset for orchestrating a full-scale digital transformation. We emphasize the 'how-to' of implementation, from building a business case and managing organizational change to mitigating cybersecurity risks in an interconnected environment. The curriculum moves beyond theoretical concepts by using practical case studies, implementation frameworks, and strategic planning workshops. Participants will leave not just with knowledge of new technologies, but with a comprehensive, actionable roadmap for leading their organizations toward a smarter, more efficient, and resilient future in manufacturing.