Advanced Automation Systems Design in Manufacturing Training Course

Professional Development Training Course Outline

Category	Manufacturing	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Advanced Automation Systems Design in Manufacturing Training Course is designed to equip learners with cutting-edge competencies in smart manufacturing, Industrial Automation, Industry 4.0 technologies, and intelligent production systems. As global manufacturing rapidly evolves toward fully digitized and connected ecosystems, organizations are increasingly adopting IIoT (Industrial Internet of Things), AI-driven automation, robotics integration, PLC/SCADA systems, and digital twin technologies to optimize productivity, reduce downtime, and enhance operational efficiency. This course provides a structured pathway to mastering these advanced systems, enabling professionals to design, implement, and manage next-generation automated manufacturing environments.

With a strong emphasis on cyber-physical systems, predictive maintenance, edge computing, machine learning in manufacturing, and smart factory architecture, this training bridges the gap between traditional manufacturing engineering and modern intelligent automation frameworks. Participants will gain hands-on knowledge of system design, process optimization, real-time data analytics, and integrated control systems. The course is ideal for engineers, technicians, and industry professionals aiming to advance their expertise in automated production lines, robotics process automation (RPA), and AI-powered manufacturing systems, ensuring alignment with global digital transformation trends in industrial operations.

Programme Curriculum

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Course Duration

10 days

Course Objectives

1. Understand core principles of Industry 4.0 smart manufacturing ecosystems
2. Design and integrate PLC-based automation control systems
3. Implement SCADA systems for real-time industrial monitoring
4. Develop skills in Industrial Internet of Things (IIoT) architecture
5. Apply AI and machine learning for predictive maintenance
6. Configure and program industrial robotics and robotic arms
7. Analyze and optimize manufacturing process automation workflows
8. Design digital twin models for production systems
9. Implement edge computing solutions in manufacturing environments
10. Enhance system efficiency using data-driven manufacturing analytics
11. Develop secure cyber-physical manufacturing systems
12. Optimize production using lean automation and smart factory design
13. Integrate MES (Manufacturing Execution Systems) with ERP platforms

Target Audience

- Manufacturing Engineers
- Automation and Control Engineers
- Industrial Maintenance Technicians
- Electrical and Electronics Engineers
- Robotics Engineers and Technicians
- Production Managers and Supervisors
- Industry 4.0 Consultants
- Technical Students in Mechanical/Electrical Engineering

Course Modules

Module 1: Fundamentals of Advanced Manufacturing Systems

- Evolution of manufacturing technologies
- Introduction to smart factories

- Role of automation in modern industries
- Cyber-physical systems overview
- Case Study: Transition from traditional to smart factory in automotive industry

Module 2: Industry 4.0 Framework

- Core principles of Industry 4.0
- Smart manufacturing ecosystems
- Connected devices and systems
- Digital transformation strategies
- Case Study: Siemens digital factory implementation

Module 3: PLC Systems Design

- PLC architecture and components
- Ladder logic programming basics
- Industrial control applications
- Troubleshooting PLC systems
- Case Study: Automated packaging line control system

Module 4: SCADA Systems Integration

- SCADA architecture and functions
- Real-time monitoring systems
- Human Machine Interface (HMI)
- Data acquisition systems
- Case Study: Power plant SCADA control system

Module 5: Industrial Robotics

- Types of industrial robots
- Robotic arm programming
- Motion control systems
- Safety standards in robotics
- Case Study: Robotic welding in automotive manufacturing

Module 6: Industrial IoT (IIoT)

- IoT sensors in manufacturing
- Connectivity protocols (MQTT, OPC-UA)
- Data collection and transmission
- Smart device integration
- Case Study: Smart factory IoT deployment in electronics industry

Module 7: Artificial Intelligence in Manufacturing

- AI fundamentals in industrial systems
- Machine learning applications
- Predictive maintenance models
- Quality control automation
- Case Study: AI-based defect detection in semiconductor production

Module 8: Digital Twin Technology

- Concept of digital twin systems
- Simulation of manufacturing processes
- Real-time system synchronization
- Performance optimization techniques
- Case Study: Aerospace production line digital twin implementation

Module 9: Edge Computing Systems

- Edge vs cloud computing
- Real-time processing at edge
- Industrial edge devices
- Latency reduction techniques
- Case Study: Smart factory edge analytics deployment

Module 10: Manufacturing Execution Systems (MES)

- MES architecture and functions
- Production tracking systems
- Workflow automation
- Integration with ERP systems
- Case Study: MES implementation in pharmaceutical manufacturing

Module 11: Predictive Maintenance Systems

- Condition monitoring techniques
- Sensor-based diagnostics
- AI predictive algorithms
- Failure prevention strategies
- Case Study: Wind turbine predictive maintenance system

Module 12: Smart Factory Design

- Smart factory architecture
- Automation integration strategies
- Data-driven production systems
- Energy-efficient manufacturing
- Case Study: Fully automated smart warehouse system

Module 13: Cybersecurity in Industrial Automation

- Industrial network security
- Cyber-physical threats
- Secure communication protocols
- Risk mitigation strategies
- Case Study: Cyberattack prevention in manufacturing plant

Module 14: Robotics Process Automation (RPA)

- RPA fundamentals in industry
- Software-based automation tools

- Workflow optimization
- Human-robot collaboration
- Case Study: RPA in supply chain automation

Module 15: Advanced System Integration & Optimization

- System interoperability techniques
- Multi-platform integration
- Performance optimization tools
- Future trends in automation
- Case Study: End-to-end smart factory integration project

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

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