Data Integration in Manufacturing Systems 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

Data Integration in Manufacturing Systems Training Course is designed to equip professionals with cutting-edge skills in industrial data connectivity, smart manufacturing, IIoT integration, and real-time production analytics. As modern factories evolve into highly connected digital ecosystems, the ability to integrate heterogeneous data sources from PLCs, SCADA systems, MES platforms, ERP systems, and IoT sensors has become a critical competency for achieving operational excellence and Industry 4.0 transformation.

This training course provides hands-on exposure to advanced data integration architectures, cloud-based manufacturing data pipelines, edge computing frameworks, and interoperability standards such as OPC UA, MQTT, and REST APIs. Participants will learn how to unify production data, improve decision-making through real-time analytics, reduce downtime using predictive insights, and enable seamless digital thread connectivity across the manufacturing value chain.

Programme Curriculum

Data Integration in Manufacturing Systems Training Course

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Course Objectives

1. Master Industrial Data Integration Architecture Design
2. Implement Smart Manufacturing Data Pipelines
3. Enable IIoT Connectivity and Device Interoperability
4. Develop Real-Time Production Data Streaming Solutions
5. Integrate ERP, MES, and SCADA Systems Seamlessly
6. Apply OPC UA and MQTT Communication Protocols
7. Build Cloud-Based Manufacturing Data Platforms
8. Implement Edge Computing for Factory Automation
9. Enable Predictive Maintenance through Data Fusion
10. Improve Manufacturing Process Optimization using Analytics
11. Strengthen Cyber-Physical System Integration
12. Deploy Digital Twin Data Synchronization Models
13. Enhance Industrial Data Governance and Security

Target Audience

- Manufacturing Engineers
- Automation Engineers
- Data Engineers in Industrial IT
- Plant Managers and Operations Leaders
- Industrial IoT Solution Architects
- SCADA/MES System Developers
- ERP Integration Specialists
- Digital Transformation Consultants

Course Modules

Module 1: Introduction to Industry 4.0 Data Ecosystem

- Evolution of smart factories
- Data-driven manufacturing overview
- Key digital transformation trends
- Industrial connectivity landscape
- Case Study: Automotive smart factory transformation

Module 2: Manufacturing Data Architecture Fundamentals

- Layered architecture models
- OT vs IT integration
- Data flow mapping techniques
- System interoperability basics
- Case Study: FMCG plant data architecture redesign

Module 3: Industrial Communication Protocols

- OPC UA fundamentals
- MQTT messaging systems
- Modbus and Profinet overview
- REST API integration
- Case Study: PLC-to-cloud communication setup

Module 4: SCADA & MES Integration

- SCADA system data extraction
- MES workflow integration
- Production data synchronization
- Real-time monitoring dashboards
- Case Study: Pharmaceutical production monitoring system

Module 5: ERP System Integration in Manufacturing

- ERP manufacturing modules
- Data exchange mechanisms
- Supply chain synchronization
- Order-to-production workflows
- Case Study: ERP-MES integration in textile industry

Module 6: Industrial IoT (IIoT) Data Integration

- Sensor data acquisition
- IoT gateway architecture
- Device interoperability
- Streaming data pipelines
- Case Study: Smart sensor deployment in assembly line

Module 7: Edge Computing in Manufacturing

- Edge vs cloud processing
- Latency reduction strategies
- Edge analytics deployment
- Real-time decision systems
- Case Study: CNC machine edge analytics

Module 8: Cloud Manufacturing Platforms

- AWS/Azure industrial services
- Cloud data lakes for manufacturing
- Hybrid architecture models
- Scalable storage solutions
- Case Study: Cloud-enabled factory monitoring system

Module 9: Real-Time Data Streaming & Processing

- Event-driven architecture
- Apache Kafka in manufacturing

- Stream processing engines
- Real-time dashboards
- Case Study: Defect detection in production line

Module 10: Data Integration Tools & Middleware

- ETL/ELT pipelines
- Industrial middleware platforms
- API management tools
- Data synchronization strategies
- Case Study: Multi-factory integration system

Module 11: Predictive Maintenance Integration

- Machine health monitoring
- AI-based failure prediction
- Vibration and sensor analytics
- Maintenance scheduling automation
- Case Study: Predictive maintenance in power plant

Module 12: Digital Twin Data Integration

- Digital twin architecture
- Real-time simulation models
- Data synchronization techniques
- Virtual commissioning systems
- Case Study: Digital twin in automotive manufacturing

Module 13: Manufacturing Data Security & Governance

- Industrial cybersecurity risks
- Data encryption techniques
- Access control frameworks
- Compliance standards
- Case Study: Secure smart factory implementation

Module 14: Data Visualization & Manufacturing Dashboards

- KPI design principles
- BI tools for manufacturing
- Real-time visualization systems
- Decision support dashboards
- Case Study: OEE dashboard implementation

Module 15: End-to-End Smart Factory Integration Project

- Full system integration design
- Cross-platform connectivity
- Data pipeline optimization
- Performance evaluation
- Case Study: Fully integrated smart manufacturing plant

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

Start Date	End Date	Location	Price
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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