Flexible Manufacturing Systems (FMS) Training Course

Professional Development Training Course Outline

Category	Manufacturing	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Flexible Manufacturing Systems (FMS) represent the backbone of modern Industry 4.0 smart manufacturing ecosystems, enabling highly adaptable, automated, and integrated production environments. Flexible Manufacturing Systems (FMS) Training Course is designed to provide in-depth knowledge of CNC automation, robotics integration, industrial IoT (IIoT), and real-time production control systems that define next-generation manufacturing. Participants will explore how FMS bridges the gap between traditional manufacturing and digitally connected, AI-driven smart factories, improving productivity, reducing lead time, and enhancing operational flexibility.

In today’s competitive industrial landscape, organizations are rapidly adopting cyber-physical systems, digital twin technology, lean automation, and predictive maintenance strategies to optimize manufacturing efficiency. This course equips learners with practical and theoretical insights into computer-integrated manufacturing (CIM), production scheduling algorithms, MES/ERP integration, and intelligent material handling systems. By the end of the program, participants will be capable of designing, analyzing, and optimizing flexible manufacturing setups that align with global smart factory standards and sustainable production goals.

Programme Curriculum

Flexible Manufacturing Systems (FMS) Training Course

Introduction

Flexible Manufacturing Systems (FMS) represent the backbone of modern Industry 4.0 smart manufacturing ecosystems, enabling highly adaptable, automated, and integrated production environments. Flexible Manufacturing Systems (FMS) Training Course is designed to provide in-depth knowledge of CNC automation, robotics integration, industrial IoT (IIoT), and real-time production control systems that define next-generation

manufacturing. Participants will explore how FMS bridges the gap between traditional manufacturing and digitally connected, AI-driven smart factories, improving productivity, reducing lead time, and enhancing operational flexibility.

In today's competitive industrial landscape, organizations are rapidly adopting cyber-physical systems, digital twin technology, lean automation, and predictive maintenance strategies to optimize manufacturing efficiency. This course equips learners with practical and theoretical insights into computer-integrated manufacturing (CIM), production scheduling algorithms, MES/ERP integration, and intelligent material handling systems. By the end of the program, participants will be capable of designing, analyzing, and optimizing flexible manufacturing setups that align with global smart factory standards and sustainable production goals.

Course Duration

5 days

Course Objectives

1. Understand core principles of Flexible Manufacturing Systems (FMS) architecture
2. Apply Industry 4.0 smart factory concepts in production environments
3. Analyze CNC machine integration and automation workflows
4. Implement robotic material handling systems in FMS setups
5. Optimize production using real-time scheduling algorithms
6. Integrate Industrial IoT (IIoT) for connected manufacturing systems
7. Utilize Digital Twin technology for simulation and optimization
8. Apply Lean Manufacturing principles in automated environments
9. Evaluate predictive maintenance strategies using AI and data analytics
10. Design cyber-physical manufacturing systems (CPMS)
11. Integrate ERP and MES systems for production control
12. Improve efficiency using smart supply chain and logistics automation
13. Develop competency in advanced manufacturing process optimization

Target Audience

1. Manufacturing engineers and production supervisors
2. Industrial automation engineers
3. Mechanical and mechatronics engineering students
4. Maintenance and plant operations managers
5. Robotics and CNC machine operators
6. Supply chain and logistics professionals
7. Industry 4.0 consultants and digital transformation experts
8. Technical trainers and vocational instructors

Course Modules

Module 1: Introduction to Flexible Manufacturing Systems

- Evolution of manufacturing systems
- FMS architecture and components
- Types of automation systems
- Benefits of flexibility in production
- Smart factory integration basics

- **Case Study:** Automotive assembly plant transitioning from batch production to FMS for reduced downtime

Module 2: CNC Systems and Machine Integration

- CNC machine fundamentals
- Tool path programming basics
- Machine interoperability in FMS
- Automated tool changing systems
- CNC performance optimization
- **Case Study:** Aerospace manufacturer integrating CNC cells into a flexible production line

Module 3: Robotics in Manufacturing Systems

- Industrial robot types and applications
- Robotic arms in material handling
- Vision systems and sensors
- Human-robot collaboration (HRC)
- Robot programming and calibration
- **Case Study:** Electronics manufacturing plant using robots for precision PCB assembly

Module 4: Industrial IoT (IIoT) and Smart Connectivity

- IoT architecture in manufacturing
- Sensor networks and data acquisition
- Cloud-based monitoring systems
- Machine-to-machine (M2M) communication
- Real-time production tracking
- **Case Study:** Smart factory implementing IoT sensors for predictive production optimization

Module 5: Production Planning and Scheduling

- Dynamic scheduling algorithms
- Job sequencing techniques
- Bottleneck analysis in FMS
- Real-time adaptive planning
- Capacity utilization strategies
- **Case Study:** Automotive supplier optimizing job shop scheduling using AI-based systems

Module 6: Digital Twin and Simulation Technology

- Concept of digital twin systems
- Virtual manufacturing environments
- Simulation for process optimization
- Real-time synchronization with physical systems
- Risk reduction through modeling
- **Case Study:** Heavy machinery company using digital twins to reduce prototype development time

Module 7: ERP, MES, and System Integration

- ERP system fundamentals
- Manufacturing Execution Systems (MES)

- Data flow between enterprise layers
- Production monitoring dashboards
- Integration challenges and solutions
- **Case Study:** FMCG company integrating ERP-MES for end-to-end production visibility

Module 8: Predictive Maintenance and Smart Optimization

- Condition monitoring systems
- AI-driven predictive analytics
- Failure pattern detection
- Maintenance scheduling optimization
- Asset lifecycle management
- **Case Study:** Steel manufacturing plant reducing downtime using predictive maintenance analytics

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	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com