Cyber-Physical Production Systems in Manufacturing 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

Cyber-Physical Production Systems (CPPS) represent the next evolution of Industry 4.0 smart manufacturing, integrating IoT (Internet of Things), AI-driven automation, digital twins, edge computing, robotics, and real-time data analytics to create fully connected, intelligent production environments. Cyber-Physical Production Systems in Manufacturing Training Course is designed to equip professionals with advanced knowledge of smart factories, cyber-physical integration, industrial AI, predictive maintenance, and autonomous manufacturing systems, enabling them to optimize production efficiency, reduce downtime, and enhance decision-making through data-driven intelligence.

As global manufacturing shifts toward Industry 5.0, smart automation, and hyper-connected industrial ecosystems, CPPS becomes a critical foundation for competitive advantage. This program focuses on bridging the gap between physical production systems and digital intelligence layers using cyber-physical integration, cloud manufacturing platforms, industrial cybersecurity, and digital twin simulation technologies. Participants will gain hands-on expertise in designing, managing, and optimizing next-generation manufacturing systems that are resilient, scalable, and highly efficient.

Programme Curriculum

Cyber-Physical Production Systems in Manufacturing Training Course

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Course Duration

5 days

Course Objectives

1. Understand Industry 4.0 and Industry 5.0 smart manufacturing ecosystems
2. Master Cyber-Physical Production Systems (CPPS) architecture and design
3. Apply Industrial IoT (IIoT) for real-time production monitoring
4. Implement AI-powered predictive maintenance strategies
5. Develop digital twin models for manufacturing simulation
6. Optimize smart factory automation workflows
7. Integrate edge computing in production environments
8. Enhance industrial cybersecurity for connected systems
9. Use big data analytics in manufacturing optimization
10. Deploy robotics and autonomous production systems
11. Improve supply chain digitization and smart logistics
12. Enable real-time decision-making using data-driven manufacturing
13. Build capability in cloud-based smart manufacturing platforms

Target Audience

- Manufacturing Engineers
- Industrial Automation Specialists
- Production Managers
- IoT Solution Architects
- Mechanical & Electrical Engineers
- Data Scientists in Manufacturing
- Supply Chain & Operations Managers
- Technology Consultants in Smart Manufacturing

Course Modules

Module 1: Introduction to CPPS & Smart Manufacturing

- Evolution from Industry 3.0 to Industry 5.0
- Core concepts of Cyber-Physical Production Systems
- Smart factory architecture overview
- Role of IoT, AI, and robotics in CPPS
- Case Study: Tesla Gigafactory smart manufacturing model

Module 2: Industrial IoT (IIoT) Integration

- Sensor networks in manufacturing systems
- Machine-to-machine (M2M) communication
- Real-time data acquisition systems
- IoT platforms for production monitoring
- Case Study: Siemens IIoT-enabled factory optimization

Module 3: Digital Twin Technology

- Concept of digital replication of physical systems
- Simulation of production environments
- Predictive modeling and optimization
- Lifecycle management using digital twins
- Case Study: GE Aviation digital twin engine monitoring

Module 4: Artificial Intelligence in Manufacturing

- Machine learning for predictive maintenance
- AI-driven production optimization
- Computer vision in quality control
- Autonomous decision-making systems
- Case Study: BMW AI-based defect detection system

Module 5: Smart Robotics & Automation

- Industrial robotic systems and cobots
- Autonomous production lines
- Adaptive robotics in dynamic environments
- Human-robot collaboration (HRC)
- Case Study: Amazon Robotics fulfillment centers

Module 6: Edge Computing & Cloud Manufacturing

- Edge vs cloud computing in production systems
- Real-time processing at the edge
- Cloud-based manufacturing execution systems (MES)
- Data synchronization across systems
- Case Study: Bosch connected manufacturing cloud platform

Module 7: Industrial Cybersecurity in CPPS

- Cyber threats in smart factories
- Secure communication protocols
- Risk mitigation strategies
- Data protection in connected systems
- Case Study: Stuxnet incident and industrial security lessons

Module 8: Smart Factory Optimization & Analytics

- Big data analytics in production systems
- KPI tracking and performance optimization
- Energy-efficient manufacturing systems
- Real-time dashboards and control systems

- Case Study: Toyota lean smart factory transformation

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

Start Date	End Date	Location	Price
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