KOENIG SOLUTIONS · COURSE OUTLINE

AI-Driven Manufacturing and Operations Optimization

Learn to apply AI for process optimization, predictive maintenance, quality control, scheduling and workforce management in manufacturing.

4 Days	12	41	7
32 HOURS	MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers the application of artificial intelligence across manufacturing and operations, beginning with an introduction to AI-driven process optimization, predictive maintenance, quality control and robotics. It then addresses machine learning techniques for production analysis, anomaly detection and data-driven decision making, followed by AI methods for production scheduling, resource optimization, demand forecasting and supply chain management. The course also examines AI for workforce management and safety, tools and platforms such as TensorFlow and Azure ML, and concludes with ethical, regulatory and deployment considerations for implementing AI solutions in manufacturing settings.

WHO THIS COURSE IS FOR

- **Manufacturing Engineers**
- **Operations Managers**
- **Supply Chain Analysts**
- **Quality Control Engineers**
- **Production Planners**
- **Data Analysts**

TOOLS AND REQUIREMENTS

- Courseware: Unofficial
- Labs: AZ-400 LOD + Koenig DC

LEARNING OBJECTIVES

Learning Outcomes:

- Understand AI's role in transforming manufacturing and operations
- Apply AI for process optimization, predictive maintenance, and quality control
- Leverage AI for automation, robotic process automation (RPA), and human-machine collaboration
- Build and implement AI-driven models for production scheduling and supply chain optimization
- Use AI to improve workforce management and workplace safety
- Develop AI solutions using platforms like TensorFlow and Azure ML
- Implement AI strategies in real-world manufacturing scenarios while addressing deployment challenges and regulatory considerations

COURSE SYLLABUS

12 Modules, 41 Topics

01

Introduction to Artificial Intelligence in Manufacturing and Operations

TOPICS

- Overview of AI in Manufacturing
- Key Benefits and Challenges of AI Implementation
- **AI in Operations:** Efficiency and Cost Reduction

02

AI-Powered Process Optimization

TOPICS

AI for Predictive Maintenance · AI in Supply Chain and Inventory Management · AI for Quality Control and Defect Detection · Real-World Examples of Process Optimization

03

AI in Robotics and Automation

TOPICS

- AI for Robotic Process Automation (RPA)
- Using AI for Task Scheduling and Workflow Automation
- AI-Enhanced Human-Machine Collaboration

04

Machine Learning for Manufacturing

TOPICS

- Supervised Learning for Production Analysis
- Unsupervised Learning for Anomaly Detection
- Reinforcement Learning for Process Optimization
- **Case Studies:** AI-Driven Efficiency Improvements

05

AI for Quality Control

TOPICS

Computer Vision for Defect Detection · Automated Quality Assessment with AI · Implementing Real-Time Quality Monitoring

06

Data Analytics and AI-Driven Decision Making

TOPICS

- AI for Data-Driven Decision Support
- Predictive Analytics for Operational Efficiency
- Data Visualization and Insights for Manufacturing Operations
- Using AI to Automate Data-Driven Decisions

07

AI for Production Scheduling and Resource Optimization

TOPICS

- AI Algorithms for Optimizing Production Workflows
- Enhancing Resource Allocation with Machine Learning
- Predicting and Mitigating Bottlenecks in Production Lines

08

AI for Demand Forecasting and Supply Chain

TOPICS

- Using AI to Predict Market Demand
- AI in Supplier Management and Delivery Optimization
- Inventory Management with Machine Learning Models

09

AI for Workforce Management

TOPICS

- AI in Labor Scheduling and Productivity Analysis
- Monitoring Workforce Efficiency with AI Algorithms
- AI-Based Safety and Risk Management

10

AI Tools and Platforms for Manufacturing

TOPICS

- AI Software Platforms (e.g., TensorFlow, Azure ML)
- AI Workflow Management in Manufacturing Environments
- Integrating AI Solutions with Existing Manufacturing Systems
- **Case Study:** Choosing the Right AI Platform

11

Ethical and Regulatory Considerations

TOPICS

- Ethical Use of AI in Manufacturing Operations
- Ensuring Data Privacy and Security in AI Systems
- Regulatory Compliance for AI in Industrial Settings

12

7 Activities

Implementing AI in Manufacturing

TOPICS

- Roadmap for AI Implementation in Manufacturing
- Best Practices for Developing AI Solutions
- Challenges in AI Deployment and How to Overcome Them
- **Case Study:** Successful AI Deployments in Manufacturing

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
12	**Implementing AI in Manufacturing**	■ **Lab 1:** Predictive Maintenance with Machine Learning - Objective: Develop a predictive maintenance model using historical machine data ■ **Lab 2:** Quality Control Using Computer Vision - Objective: Use AI for visual defect detection in manufacturing products. Task: Train a computer vision model to identify defects in product images. ■ **Lab 3:** Supply Chain Optimization with Machine Learning - Objective: Implement machine learning models to optimize supply chain processes. Task: Create a demand forecasting model to predict future sales. ■ **Lab 4:** Production Scheduling and Resource Allocation - Objective: Use AI for optimizing production schedules and resource allocation. Task: Build an AI model to improve production workflows. ■ **Lab 5:** AI-Driven Decision Making - Objective: Implement AI-driven decision-making tools for real-time operations. Task: Use AI algorithms to support real-time operational decisions. ■ **Lab 6:** AI-Based Resource and Inventory Management - Objective: Leverage AI for optimizing inventory management in manufacturing. Task: Develop an AI model that balances supply with demand in real-time. ■ **Lab 7:** AI-Driven Safety and Risk Prevention - Objective: Implement AI-based safety solutions to monitor workforce safety. Task: Develop an AI tool to monitor safety-related metrics in the workplace.

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

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