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Course Name

Advanced Industrial Cybersecurity for Control Systems

Sector Name

Instrumentation & Controls

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Advanced Industrial Cybersecurity for Control Systems

Course Introduction

Technology innovations like IIoT, edge computing, Cloud, artificial intelligence, advanced 3D visualization, and digital twins are creating transformative opportunities for industries. However, these advancements also pose challenges and questions for automation, instrumentation, and control systems.

Instrumentation and control systems

In this special course, we focus on the Industry 4.0 revolution and its impact on instrumentation and control systems. Attendees will explore how automation and instrumentation can maximize the advantages of these groundbreaking technologies. The course will provide insights into the digital transformation process, its applications in control systems, and its influence across various industrial sectors.

Key topics include integration between digitalized systems such as process control systems, predictive maintenance systems, inventory management systems, and ERP systems. We will also examine how the data and digitalization revolutions affect automation and instrumentation systems in industries like Oil & Gas, Petrochemical, Power Generation, Water/Wastewater Treatment, Pharmaceuticals,

Food and Beverage, Transportation, Pulp and Paper, and Steel industries.

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Target Audience

The course is for professionals securing operational technology (OT) environments, including control engineers, system administrators, cybersecurity managers, OT vendors, security consultants, and IT/OT personnel in critical infrastructure sectors.

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Learning Objectives

- ✓ Understand the technologies of the Industry 4.0 revolution.
- ✓ Evaluate the impact of these technologies on instrumentation and control systems.
- ✓ Navigate the digital transformation process for instrumentation and control systems.
- ✓ Harness data to generate analytics and process insights for better decision-making.
- ✓ Leverage skills to enhance overall productivity and efficiency in plant or process operations through a digital transformation journey.

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Course Outline

✓ 01 Day One

Foundations of Control Systems and Industry 4.0

- ✓ History of control systems and technological development.
- ✓ Understanding the rapid evolution of technology.

Industry 4.0 overview:

- ✓ Big Data.
- ✓ Data Science and Data Analytics.
- ✓ Internet of Things (IoT).
- ✓ Cybersecurity.
- ✓ Cloud Computing.
- ✓ Virtualization and Business Intelligence.
- ✓ Virtual and Augmented Reality.
- ✓ Artificial Intelligence (AI).
- ✓ Future opportunities and threats for instrumentation and control systems.

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Course Outline

✓ 02 Day Two

Applications of Industry 4.0 in Instrumentation and Control Systems 4. Industry 4.0 applications for instrumentation and control systems:

- ✓ Field devices.
- ✓ Control systems (DCS, PLC, SCADA, TMC, SIS).
- ✓ Servers and workstations.
- ✓ IIoT and cybersecurity.

Process control advancements:

- ✓ Data analytics and production optimization.
- ✓ AI applications in dynamic simulation.

Industry 4.0 for troubleshooting and maintenance:

- ✓ Predictive maintenance modeling.
- ✓ AI-based maintenance systems.
- ✓ Virtual and augmented reality tools for maintenance.

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Course Outline

✓ 03 Day Three

Integration and Case Studies 7. Business and process integration:

- ✓ Business intelligence dashboards.
- ✓ Asset and inventory management system integration.
- ✓ ERP system integration.

Case studies:

- ✓ ADNOC’s Panorama Unified Operations Centre.
- ✓ General Electric’s Industry 4.0 initiatives.
- ✓ Emerson’s Industry 4.0 solutions.
- ✓ Schneider AVEVA’s Industry 4.0 implementations.

Project: Digital transformation of a control system:

- ✓ Selecting technologies.
- ✓ Defining KPIs for transformation.
- ✓ Process, measurement, and execution planning.

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Course Outline

✓ 04 Day Four

Cybersecurity for Industrial Control Systems 10. Cybersecurity fundamentals in the context of Industry 4.0:

- ✓ Threat landscapes and vulnerabilities in control systems.
- ✓ Common attack vectors: malware, ransomware, and phishing.

Developing a cybersecurity strategy:

- ✓ Risk assessment and management frameworks.
- ✓ Security standards and compliance (e.g., IEC 62443).

Practical implementations:

- ✓ Firewalls, intrusion detection systems (IDS), and intrusion prevention systems (IPS).
- ✓ Encryption, access control, and secure communication protocols.
- ✓ Incident response and recovery plans.
- ✓ **Case study:** Cybersecurity breach analysis and lessons learned.

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Course Outline

✓ 05 Day Five

Hands-on Workshop and Future Trends 14. Workshop: Implementing a digital transformation strategy for a simulated plant:

- ✓ Mapping current system capabilities.
- ✓ Identifying areas for digital enhancement.
- ✓ Drafting a comprehensive implementation plan.
- ✓ Measuring expected outcomes and ROI.

Emerging technologies in Industry 4.0:

- ✓ Digital twins and their role in process optimization.
- ✓ Advanced 3D visualization for real-time monitoring.
- ✓ Quantum computing applications in industrial processes.
- ✓ Blockchain technology for secure supply chain management.

Course conclusion:

- ✓ Review and recap of key learnings.
- ✓ Certificate distribution and participant feedback.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 18, 2027	April 22, 2027	5 days	4250.00 $	KSA , Riyadh
Aug. 2, 2027	Aug. 6, 2027	5 days	4950.00 $	Austria , Vienna
Dec. 7, 2026	Dec. 11, 2026	5 days	2150.00 $	Virtual , Online
Feb. 1, 2027	Feb. 5, 2027	5 days	4250.00 $	UAE , Abu Dhabi

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