

THE INTERNET OF THINGS (IOT) IN CHEMICAL PROCESSING & CHEMICAL MANUFACTURING

"Harnessing Smart Technologies to Optimize Chemical Operations and Drive Digital Transformation"

Schedule

Date	Venue	Fees (Face-to-Face)
21 - 25 Dec 2026	London, UK	USD 3495 per delegate

► Available delivery methods: Face-to-Face & Online Training

Introduction

The chemical processing and manufacturing industry is embracing digital transformation to boost productivity, ensure safety, and improve sustainability. The Internet of Things (IoT) enables real-time monitoring, predictive maintenance, and intelligent automation across chemical plants and facilities. By leveraging IoT technologies, chemical companies can optimize processes, reduce unplanned downtime, and enhance regulatory compliance.

This 5-day intensive course provides chemical engineers, plant managers, and digital transformation leaders with a deep understanding of how IoT can be effectively integrated into chemical manufacturing operations. Participants will explore architectures, use cases, implementation strategies, and security considerations specific to the sector.

Objectives

By the end of this course, participants will be able to:

- Understand the fundamentals of IoT systems and their applications in chemical manufacturing
- Design IoT frameworks for process optimization, monitoring, and control
- Apply sensor-based technologies to improve safety, efficiency, and product quality
- Analyze IoT-generated data for predictive maintenance and real-time decision-making
- Address cybersecurity, data integrity, and scalability in IoT deployments

Why Attend

- To improve plant efficiency and reduce downtime through connected technologies
- To ensure safety and environmental compliance using real-time monitoring
- To modernize legacy equipment with IoT-enabled retrofitting
- To leverage predictive analytics for proactive asset maintenance
- To build a roadmap for IoT integration in chemical manufacturing

Target Audience

This program is designed for:

- Chemical and process engineers
- Plant managers and operations supervisors
- Automation, instrumentation, and control professionals
- IT and OT specialists in industrial environments
- Digital transformation leaders and project managers

Individual Benefits

Key competencies that will be developed include:

- Understanding of industrial IoT architectures and protocols
- Ability to evaluate and deploy sensors and smart devices
- Integration of IoT with SCADA, DCS, and MES systems
- Application of predictive maintenance and anomaly detection models
- Ensuring data security and reliability in plant-wide IoT networks

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Increased production efficiency and process reliability
- Enhanced health, safety, and environmental (HSE) compliance
- Cost savings through early fault detection and energy optimization
- Strategic planning for Industry 4.0 initiatives in chemical manufacturing
- Improved collaboration between engineering, IT, and operations teams

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings: IoT frameworks, smart manufacturing trends, and use cases
- Case Studies: Successful IoT applications in chemical plants and refineries
- Workshops: Sensor mapping, architecture design, and data analytics
- Peer Exchange: Group discussions on implementation challenges and solutions
- Tools: IoT device selection guides, dashboard templates, and ROI calculators

Course Outline

Detailed 5-Day Course Outline

Training Hours: 7:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Introduction to IoT in the Chemical Industry

- Module 1: Fundamentals of IoT and Industrial Applications (07:30 – 09:30) • IoT components, network layers, and real-time systems
- Module 2: The Digital Landscape in Chemical Manufacturing (09:45 – 11:15) • Industry 4.0, digital twins, and smart factories
- Module 3: Workshop – Identifying IoT Opportunities in a Process Plant (11:30 – 01:00) • Mapping potential IoT applications across units
- Module 4: IT/OT Convergence and Communication Protocols (02:00 – 03:30) • MQTT, OPC UA, Modbus, and sensor integration

Day 2: IoT Architecture and Device Integration

- Module 5: Industrial IoT Architecture and Data Flow (07:30 – 09:30) • Edge computing, gateways, cloud and hybrid models
- Module 6: Sensor Selection and Deployment (09:45 – 11:15) • Temperature, pressure, flow, vibration, gas detection sensors
- Module 7: Workshop – Designing an IoT Sensor Network (11:30 – 01:00) • Coverage planning, redundancy, and calibration
- Module 8: Connecting IoT to Existing Control Systems (02:00 – 03:30) • SCADA, DCS, MES, and PLC integration techniques

Day 3: Data Analytics, Visualization, and Decision Support

- Module 9: Real-Time Monitoring and Alerts (07:30 – 09:30) • Dashboards, KPIs, and automated thresholds
- Module 10: Predictive Maintenance and Anomaly Detection (09:45 – 11:15) • Using IoT data for asset reliability and downtime prevention
- Module 11: Workshop – Creating a Predictive Maintenance Model (11:30 – 01:00) • Analyzing sample data from plant assets
- Module 12: Visualization Tools and Reporting Dashboards (02:00 – 03:30) • Power BI, Grafana, and plant analytics platforms

Day 4: Cybersecurity, Safety, and Compliance

- Module 13: Industrial IoT Security and Risk Management (07:30 – 09:30) • Threat vectors, secure protocols, and data protection
- Module 14: Compliance and Regulatory Considerations (09:45 – 11:15) • Process safety, emissions monitoring, and traceability
- Module 15: Workshop – Conducting a Cyber Risk Assessment (11:30 – 01:00) • Identifying vulnerabilities in IoT architecture
- Module 16: Ensuring High Availability and Data Integrity (02:00 – 03:30) • Backup systems, failover strategies, and audit trails

Day 5: Implementation Roadmap and Strategic Planning

- Module 17: Developing a Business Case for IoT Projects (07:30 – 09:30) • ROI analysis, budgeting, and value mapping
- Module 18: IoT Project Planning and Change Management (09:45 – 11:15) • Phased deployment, training, and stakeholder buy-in
- Module 19: Workshop – Drafting an IoT Integration Roadmap (11:30 – 01:00) • Creating a deployment plan for a sample plant
- Module 20: Wrap-Up and Certification (02:00 – 03:30) • Review, feedback, and strategic next steps

Certification

Participants will receive a **Certificate of Completion in The Internet of Things (IoT) in Chemical Processing & Chemical Manufacturing**, validating their ability to plan, implement, and manage IoT initiatives that enhance operational excellence and safety in chemical facilities.

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