

## THE INTERNET OF THINGS (IOT) IN PHARMACEUTICALS

*"Driving Innovation, Compliance, and Operational Excellence in Pharma Through Connected Technologies"*

### Schedule

Date	Venue	Fees (Face-to-Face)
07 - 11 Dec 2026	London - UK	USD 3495 per delegate

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

### Introduction

The pharmaceutical industry is under increasing pressure to enhance quality, ensure regulatory compliance, and optimize production efficiency. The Internet of Things (IoT) offers transformative potential in achieving these goals—enabling real-time monitoring, predictive maintenance, and intelligent automation across R&D, manufacturing, warehousing, and supply chain operations.

This 5-day intensive course equips pharma professionals, engineers, and digital transformation leaders with the knowledge and tools to deploy and manage IoT solutions in compliance-driven environments. Participants will explore applications in GMP-compliant manufacturing, cold chain monitoring, asset tracking, and digital batch records—while addressing cybersecurity, scalability, and regulatory integration.

### Objectives

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

- Understand the fundamentals and architectures of IoT in the pharmaceutical context
- Deploy IoT for process control, environmental monitoring, and quality assurance
- Leverage real-time data for predictive maintenance and traceability
- Integrate IoT solutions with MES, ERP, and LIMS systems
- Ensure compliance with GxP, FDA 21 CFR Part 11, and data integrity requirements

## Why Attend

- To ensure product quality, integrity, and traceability across the pharma value chain
- To reduce downtime, waste, and deviations through smart monitoring
- To digitize production and warehousing in line with Industry 4.0 goals
- To meet strict regulatory requirements using validated IoT-enabled systems
- To enhance decision-making with real-time operational insights

## Target Audience

This program is designed for:

- Pharmaceutical manufacturing and operations managers
- Quality assurance and regulatory compliance professionals
- Automation and instrumentation engineers
- Digital transformation leaders in life sciences
- IT, OT, and data integrity specialists in the pharma sector

## Individual Benefits

Key competencies that will be developed include:

- Design and deployment of IoT in GMP-regulated environments
- Integration with existing pharma IT systems (MES, SCADA, LIMS)
- Environmental monitoring and cleanroom control
- Cold chain and supply chain visibility using IoT
- Cybersecurity and audit readiness for digital pharma infrastructures

## Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Increased efficiency, reliability, and regulatory compliance
- Reduced deviations and faster deviation resolution
- Stronger data integrity and audit preparedness
- Streamlined production, packaging, and distribution
- Future-ready digital infrastructure for pharma operations

## Instructional Methodology

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

- Strategy Briefings: Pharma IoT use cases, compliance alignment, and implementation frameworks
- Case Studies: Real-world examples of IoT success in pharmaceutical environments
- Workshops: Designing validated IoT systems for GMP facilities and cold chain control
- Peer Exchange: Discussion on regulatory hurdles and smart factory transformation
- Tools: Risk assessments, sensor selection templates, audit logs, and implementation checklists

## 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: IoT Overview and Pharma Sector Applications

- Module 1: IoT Fundamentals and Smart Pharma Manufacturing (07:30 – 09:30) • Definitions, architectures, and trends in life sciences
- Module 2: IoT Use Cases in Pharmaceuticals (09:45 – 11:15) • Process control, packaging, and serialization
- Module 3: Workshop – Mapping IoT to Pharma Value Chain (11:30 – 01:00) • Exploration of potential sensor and automation points
- Module 4: Regulatory Landscape for Digital Pharma (02:00 – 03:30) • GxP, FDA 21 CFR Part 11, EU Annex 11

#### Day 2: Devices, Sensors, and Integration

- Module 5: Selecting Sensors and IoT Devices for Pharma (07:30 – 09:30) • Temperature, humidity, vibration, pressure, and contamination
- Module 6: Integration with MES, SCADA, and LIMS (09:45 – 11:15) • Ensuring data flow between operational systems
- Module 7: Workshop – Designing an IoT Architecture for a GMP Facility (11:30 – 01:00) • Connectivity planning and system interoperability
- Module 8: Data Integrity and Validation Requirements (02:00 – 03:30) • ALCOA+ principles and audit trail requirements

#### Day 3: Real-Time Monitoring and Quality Control

- Module 9: Environmental and Cleanroom Monitoring (07:30 – 09:30) • Particle counters, air handling, and alert systems
- Module 10: Real-Time Equipment and Utility Monitoring (09:45 – 11:15) • Boilers, chillers, air compressors, and HVAC
- Module 11: Workshop – Creating an IoT-Based Quality Dashboard (11:30 – 01:00) • KPI visualization and deviation response
- Module 12: Digital Batch Records and Traceability (02:00 – 03:30) • Data capture, electronic signatures, and audit readiness

#### Day 4: Supply Chain, Cold Chain, and Compliance

- Module 13: IoT for Warehouse and Inventory Control (07:30 – 09:30) • Smart shelving, RFID tracking, and barcode scanning
- Module 14: Cold Chain Monitoring and Remote Visibility (09:45 – 11:15) • Temperature loggers, geofencing, and alerts
- Module 15: Workshop – Designing a Pharma Cold Chain IoT System (11:30 – 01:00) • Alert thresholds, response workflows, and compliance
- Module 16: Risk Management and Cybersecurity (02:00 – 03:30) • Threat modeling, validation, and system hardening

#### Day 5: Strategy, Innovation, and Future Readiness

- Module 17: Building a Pharma IoT Deployment Strategy (07:30 – 09:30) • Roadmap creation, budgeting, and KPIs
- Module 18: AI and Predictive Analytics in Pharma IoT (09:45 – 11:15) • Maintenance, forecasting, and product quality
- Module 19: Workshop – Developing an IoT Pilot Plan (11:30 – 01:00) • Defining scope, compliance strategy, and success criteria
- Module 20: Wrap-Up and Certification (02:00 – 03:30) • Action plans, lessons learned, and future initiatives

## Certification

Participants will receive a Certificate of Completion in The Internet of Things (IoT) in Pharmaceuticals, validating their expertise in planning, deploying, and managing IoT technologies to enhance quality, compliance, and performance in pharmaceutical environments.

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