Training Course on Industrial Internet of Things (IIoT) for Smart Oilfields

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The Industrial Internet of Things (IIoT) is revolutionizing the oil and gas industry, offering transformative potential to enhance operational efficiency, predictive maintenance, and data-driven decision-making. In the context of smart oilfields, IIoT integrates advanced sensor networks, real-time analytics, and cloud computing to enable intelligent monitoring and automated control of assets. Training Course Industrial Internet of Things (IIoT) for Smart Oilfields provides comprehensive training to industry professionals on how to harness IIoT technologies to modernize oilfield operations and improve ROI.

With global energy demand surging and exploration shifting toward more challenging environments, deploying IIoT solutions has become a strategic imperative. This training equips participants with hands-on skills and deep insights into smart sensors, edge computing, AI-based data analysis, cybersecurity, and cloud-based platforms for efficient upstream, midstream, and downstream operations. Participants will explore real-world case studies, pilot strategies, and system integrations that are reshaping digital oilfields.

Programme Curriculum

Training Course on Industrial IoT (IIoT) for Smart Oilfields

Introduction

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Course Objectives

1. Understand the fundamentals of Industrial IoT architecture in the energy sector.
2. Explore applications of edge computing and real-time data analytics in oilfields.
3. Implement predictive maintenance strategies using IIoT platforms.
4. Gain knowledge on smart sensor integration and connectivity protocols.
5. Analyze cybersecurity challenges and best practices in IIoT systems.
6. Examine the role of machine learning and AI in production optimization.
7. Learn deployment strategies for cloud-based SCADA systems.
8. Evaluate wireless communication technologies for remote oilfields.
9. Apply digital twin technology in asset monitoring and performance simulation.
10. Leverage big data analytics for resource planning and operational efficiency.
11. Develop and manage end-to-end IIoT pilot projects.
12. Understand regulatory compliance and data governance in IIoT.
13. Design scalable IIoT architecture for smart oilfield automation.

Target Audience

1. Oil & Gas Engineers
2. IT and IoT Project Managers
3. SCADA System Integrators
4. Maintenance and Reliability Engineers
5. Energy Data Scientists
6. Digital Transformation Officers
7. Petroleum Operations Managers
8. Regulatory Compliance Officers

Course Duration: 10 days

Course Modules

Module 1: Introduction to Industrial IoT for Oil & Gas

- What is IIoT and its role in smart oilfields
- Evolution from traditional to digital oilfields
- Components of IIoT architecture
- Benefits and challenges in adoption
- Overview of key technologies
- **Case Study: Chevron’s Digital Oilfield Transformation**

Module 2: Sensor Technologies and Data Acquisition

- Types of sensors in oilfield monitoring
- Data acquisition systems and protocols
- Wireless sensor networks (WSN)
- Real-time monitoring use cases
- Power efficiency and rugged design
- **Case Study: BP’s Use of Wireless Sensors in Remote Wells**

Module 3: Edge Computing in Harsh Environments

- Role of edge devices in oilfield automation
- Edge vs cloud computing in IIoT
- Edge hardware selection and deployment
- Data filtering and local analytics
- Reducing latency in remote operations
- **Case Study: Shell’s Edge Deployment in North Sea Platforms**

Module 4: Real-Time Data Processing and Analytics

- Streaming analytics platforms
- Role of Apache Kafka, MQTT, and Spark
- Data lakes and analytics pipelines
- KPI tracking and operational dashboards
- Integration with existing legacy systems
- **Case Study: Total’s Real-Time Monitoring for Leak Detection**

Module 5: Predictive Maintenance and Asset Health

- Vibration, pressure, and temperature analytics
- Predictive vs preventive maintenance
- Fault detection algorithms
- Maintenance scheduling optimization
- ROI of predictive maintenance
- **Case Study: ExxonMobil’s Predictive Pump Failure Detection**

Module 6: Cloud and SCADA Integration

- Cloud-based SCADA architectures
- Secure data pipelines to the cloud
- Multi-cloud vs hybrid cloud strategies
- SCADA visualization and control features
- Vendor comparison (Azure, AWS, GCP)
- **Case Study: Aramco’s SCADA-to-Cloud Migration**

Module 7: Cybersecurity in IIoT

- Common threats in IIoT systems
- Best practices in secure deployment
- Identity and access management (IAM)
- Intrusion detection and prevention systems
- NIST and ISA/IEC 62443 frameworks
- **Case Study: Cyberattack Response in Middle East Pipelines**

Module 8: AI and Machine Learning Applications

- AI models for production forecasting
- ML algorithms in fault diagnosis
- Intelligent anomaly detection
- Self-learning systems
- AI integration with ERP and MES
- **Case Study: AI-Driven Optimization at Equinor**

Module 9: Digital Twin and Simulation

- Building digital replicas of assets

- Simulation environments for planning
- Real-time data feed into twins
- Training and safety applications
- Visual modeling tools (ANSYS, Simulink)
- **Case Study: Petrobras' Digital Twin for Offshore Operations**

Module 10: Wireless Communication Technologies

- LPWAN, 5G, LoRaWAN, and satellite comms
- Choosing the right protocol
- Network design and reliability
- Range and bandwidth considerations
- Spectrum regulations
- **Case Study: ONGC's Private 5G for Wellsite Connectivity**

Module 11: Big Data in Oilfield Analytics

- Data collection strategies
- Storage architecture for massive datasets
- Hadoop and NoSQL databases
- Pattern recognition in exploration data
- Visualization platforms (Tableau, Power BI)
- **Case Study: Anadarko's Use of Big Data in Seismic Analysis**

Module 12: Compliance, Governance, and Regulations

- IIoT data governance frameworks
- Environmental and safety standards
- GDPR and data privacy
- Digital audits and traceability
- Best practice documentation
- **Case Study: Regulatory Alignment in Deepwater Drilling Projects**

Module 13: Human-Machine Interface (HMI) and Control Systems

- Designing intuitive HMI for field operators
- Mobile HMI apps and remote dashboards
- Alarm management and alerts
- Role of AR/VR in control rooms
- Integration with SCADA and PLCs
- **Case Study: HMI Transformation in Alberta Oil Sands**

Module 14: Project Planning and IIoT Implementation

- IIoT project lifecycle management
- Piloting vs full deployment
- Budgeting and ROI calculation
- Managing stakeholders and vendors
- Risk assessment strategies
- **Case Study: Successful Pilot-to-Production at Marathon Oil**

Module 15: Future of IIoT in Energy Sector

- Emerging technologies and innovations
- Autonomous operations and robotics
- Blockchain for oilfield transactions

- Green energy integration with IIoT
- Industry 5.0 implications
- **Case Study: Future-Ready Strategy of TotalEnergies**

Training Methodology

- Instructor-led sessions with interactive presentations
- Live demonstrations of IIoT platforms and tools
- Group activities and real-world problem solving
- Hands-on labs with cloud and edge computing simulators
- Case study analysis and open discussions
- Final assessment and certification

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

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