CONCEPT

Digital Oilfield and Integrated Operations: Surveillance, Automation and Roadmap

30 May – 10 June 2027
Riyadh - KAFD district five-star



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Introduction:

Digital oilfield programmes often stall after instrumentation and screens are installed: downhole gauge data sits unused in the historian, well test backlogs hide deferred barrels, and field, onshore and engineering teams still work in separate shifts and spreadsheets. This Core Concept course equips production, operations and asset managers to turn real-time field data into exception-based surveillance, integrated operations workflows, remote supervision and closed-loop optimisation of lifted wells. Participants build a Digital Oilfield Implementation Roadmap and Value Case for a case asset, ready for management review.

Course Objectives:

- Assess an asset's digital oilfield maturity and quantify deferred production, downtime and manning value levers
- Specify intelligent well instrumentation, SCADA, historian and data infrastructure needed for real-time production surveillance
- Design exception-based surveillance rules, integrated asset model uses and virtual metering checks for a well portfolio
- Organise integrated operations centres, collaboration workflows and decision rights between field, onshore and engineering teams
- Evaluate remote operation, closed-loop gas lift, pump and choke optimisation, alarm management and OT cybersecurity controls
- Build a digital oilfield implementation roadmap with governance, change plan, KPIs and a value case for a case asset

Target Audience:

- Managers accountable for oil and gas field production targets, deferment and well performance
- Operations leads responsible for gathering stations, processing facilities and field crews
- Automation and control systems managers who own field instrumentation, telemetry and control networks
- Asset and reservoir management leads who decide on field development and surveillance priorities
- Digital programme and operations technology leads who sponsor upstream data and collaboration centre projects

Course Outline:

Day 1: Digital Oilfield Value Case and Maturity Stages

- Digital Oilfield Definition: Instrumented Wells, Real-Time Data and Integrated Work Processes
- Value Levers: Deferred Barrels, Unplanned Shutdowns, Manning Levels and Energy Use
- Digital Oilfield Maturity Stages from Manual Readings to Autonomous Field Operation
- Asset Baseline Assessment Checklist for Wells, Facilities, Data and People
- Lessons from Stalled Digital Oilfield Pilots Across Onshore and Offshore Assets

Day 2: Field Instrumentation and Intelligent Well Completions

- Permanent Downhole Pressure and Temperature Gauges: Data Uses and Failure Modes
- Inflow Control Valves and Interval Control for Multi-Zone Commingled Wells
- Wellhead and Flowline Instrumentation: Multiphase Meters, Sand Detectors and Choke Position
- Distributed Fibre Optic Sensing for Temperature and Acoustic Well Profiling
- Instrumentation Specification Matrix by Well Type, Lift Method and Criticality

Day 3: SCADA, Historian and Upstream Data Infrastructure

- SCADA Architecture for Oilfields: RTUs, Telemetry Links and Supervisory Servers
- Process Historian Design: Tag Structure, Compression Settings and Data Retention
- Field Communication Options: Radio, Microwave, Satellite and Fibre Backhaul Trade-Offs
- Asset Hierarchy and Well Master Data Linking Tags to Wells, Zones and Facilities
- Upstream Data Flow Map from Sensor to Production Reporting and Allocation

Day 4: Real-Time Production Surveillance, Asset Models and Virtual Metering

- Exception-Based Surveillance Rules: Limits, Deviations and Well Health Scores
- Well Surveillance Dashboards: Rate, Pressure, Water Cut and Lift Performance Views
- Integrated Asset Model Uses: Reservoir, Well and Network Coupling at Overview
- Virtual Flow Metering Principles and Reconciliation Against Well Tests
- Production Deferment Tracking: Loss Categories, Root Causes and Recovery Actions

Day 5: Integrated Operations Centres and Week-One Case Asset Diagnosis

- Integrated Operations Centre Models: Onshore Support, Collaboration Rooms and Follow-the-Sun Cover
- Roles and Decision Rights Between Field Crews, Control Room and Engineering Specialists
- Daily Production Optimisation Meeting Workflow and Action Log
- Case Asset Data Pack Review: Well Portfolio, Deferment History and Instrument Gaps
- Week-One Findings Brief on Surveillance Gaps and Priority Workflows

Day 6: Remote Operations, Unmanned Facilities and Closed-Loop Optimisation

- Normally Unmanned Installations: Design Philosophy, Visit Frequency and Maintenance Campaigns
- Remote Operations Centre Staffing, Handover and Situational Awareness Practices
- Automation Levels for Oilfields: Advisory, Supervised Setpoint and Closed-Loop Control
- Closed-Loop Gas Lift Allocation and Submersible Pump Speed Control Strategies
- Automated Choke Management for Slugging, Sand and Reservoir Pressure Limits

Day 7: Alarm Management, OT Cybersecurity and Data Governance

- Alarm Management Lifecycle: Philosophy, Rationalisation, Flood Suppression and Alarm KPIs
- Operator Interface Design for Remote Control Rooms and Event Handling
- OT Cybersecurity Overview: Zones and Conduits, Remote Access and Patch Windows
- Production Data Governance: Data Owners, Quality Rules and Tag Validation
- Digital Oilfield Risk Register: Technology, Integration, Vendor Lock-In and Cyber Exposure

Day 8: People, Change and Stakeholder Engagement in Integrated Operations

- New Work Patterns for Field Operators, Surveillance Engineers and Control Room Staff
- Competence Matrix for Surveillance, Remote Operation and Collaboration Roles
- Stakeholder Map for Asset Leadership, Field Crews, Automation, IT and Contractors
- Resistance Patterns in Remote Operation Rollouts and Engagement Tactics
- Communication and Training Plan for an Integrated Operations Wave

Day 9: KPIs, Value Tracking and Continuous Improvement

- Digital Oilfield KPI Tree: Uptime, Deferment, Surveillance Coverage and Response Time
- Benefit Tracking Method: Baseline, Attribution Rules and Sign-Off by Finance
- Business Case Model: Capital Cost, Operating Savings, Production Gain and Payback
- Benchmarking Surveillance and Automation Performance Across Assets
- Post-Implementation Review and Improvement Backlog for Integrated Operations

Day 10: Capstone: Digital Oilfield Implementation Roadmap and Value Case

- Case Asset Target-State Definition for Wells, Facilities, Data and Operations Centre
- Programme Roadmap Build: Foundation, Surveillance, Integration and Automation Waves
- Value Case Assembly with Benefit Profile, Costs and Risk Allowances
- Programme Governance: Steering Committee, Stage Gates and Benefit Owners
- Roadmap and Value Case Presentation to a Mock Asset Leadership Board

Skills You Will Gain:

- Digital Oilfield Maturity Assessment
- Intelligent Well Instrumentation Specification
- Exception-Based Surveillance Design
- Production Deferment Analysis
- Integrated Operations Workflow Design
- Closed-Loop Lift Optimisation Oversight
- Alarm Rationalisation
- Digital Programme Benefit Tracking

Why Attend This Course:

- Return with a Digital Oilfield Implementation Roadmap and Value Case built on a case asset and ready to adapt to your own field
- Challenge automation and data platform proposals with a clear view of instrumentation, telemetry and historian requirements
- Move surveillance teams from routine well reviews to exception-based work with defined decision rights
- Compare remote operation and integrated operations practice with peers from operators and service companies

Conclusion:

Digital oilfield value appears only when instrumented wells, reliable data and redesigned work processes are managed as one programme. Week one builds the capability: value case and maturity, intelligent wells, SCADA and historian infrastructure, exception-based surveillance, asset models and virtual metering, and integrated operations centres. Week two adds depth: unmanned facilities and closed-loop optimisation, alarm management, OT cybersecurity, data governance, people change and value tracking. The capstone produces a Digital Oilfield Implementation Roadmap and Value Case for a case asset.