



External Training Course

Next-Gen Pumping Operations: Efficiency, Reliability & Smart Control

From 26 Oct. To 30 Oct. 2025

From 23 Nov. To 27 Nov. 2025

From 14 Dec. To 18 Dec. 2025

**Residence Inn by Marriott Dammam
Dammam, KSA**

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External Training Course:

**Next-Gen Pumping Operations:
Efficiency, Reliability & Smart Control**

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Fees: 1750 KD

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Course Overview:

This advanced training program provides a comprehensive understanding of the latest technologies, operational practices, and reliability strategies in oilfield pumping systems. Participants will explore how next-generation pump designs, automation, and data-driven monitoring can significantly improve efficiency, safety, and performance. The course combines fundamental theory with real-world field insights to ensure mastery in operating, maintaining, and optimizing petroleum pump systems.

Course Objectives:

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

- Understand the principles and performance characteristics of major oilfield pump types (ESP, PCP, Centrifugal, Jet Pumps).
- Implement advanced operational procedures for maximizing pump efficiency and production.
- Apply troubleshooting and diagnostic techniques to resolve common pump issues.
- Utilize condition monitoring and predictive maintenance tools effectively.
- Enhance pump reliability through smart control systems and automation.
- Integrate digital solutions (IoT, SCADA, AI analytics) for pump performance optimization.
- Develop energy-efficient pumping strategies for sustainable field operations.

Target Audience:

Production & Operations Staff.

Petroleum & Mechanical Engineers.

Maintenance and Reliability Professionals.

Oilfield Technicians & Supervisors.

Field Operators and Process Engineers.

Project and Asset Managers in Upstream Operations.

Training Methodology:

The course combines interactive lectures, practical case studies, diagnostic exercises, and advanced 3D system simulations. Real-world problem-solving sessions and group workshops will help participants strengthen their technical and analytical skills, ensuring full comprehension of both theoretical and operational aspects.

Organizational Impact:

Improved reliability and performance of pumping systems.

Reduced downtime and maintenance costs.

Enhanced operational safety and equipment longevity.

Stronger field productivity and energy efficiency.

Empowered technical teams capable of smart decision-making.

Personal Impact:

Gain a solid understanding of pump operation and optimization.

Develop expertise in troubleshooting and reliability analysis.

Learn advanced control and automation practices.

Build confidence in implementing digital and smart pumping strategies.

Strengthen professional growth and technical credibility.

Course Content & Outline:

Day 1: Fundamentals of Pumping Systems in Oilfield Operations

- Overview of Pumping Technologies in Petroleum Production
- Pump Types and Their Field Applications (ESP, PCP, Jet, Centrifugal)
- Hydraulic and Mechanical Principles of Pump Operation
- System Design Considerations and Flow Control
- Key Performance Indicators for Pump Efficiency

Day 2: Advanced Pump Operation & Control

- Start-up and Shutdown Procedures
- Steady-State Operation and Variable Flow Conditions
- Handling Gas Interference, Solids, and High Viscosity Fluids
- Pump Protection and Control Logic
- Field Safety Practices and Emergency Handling

Day 3: Troubleshooting & Performance Diagnostics

- Common Pump Failures and Root Cause Analysis
- Vibration, Pressure, and Temperature Monitoring
- Real-time Data Interpretation for Fault Detection
- Case Studies: Diagnosing Field Problems
- Optimizing Operational Setpoints for Longevity

Day 4: Reliability & Predictive Maintenance

- Reliability-Centered Maintenance (RCM) for Pumps
- Condition Monitoring Technologies (Vibration, Acoustic, Thermal)
- Predictive Analytics and Failure Prevention
- Lubrication, Sealing, and Alignment Best Practices
- Maintenance Planning and Performance Metrics

Day 5: Smart & Digital Pumping Operations

- IoT and SCADA Applications in Pumping Systems
- Data-Driven Decision Making for Efficiency Optimization
- Integrating AI and Digital Twins in Pump Management
- Case Studies: Smart Field Implementation
- Workshop: Designing a Smart Pumping Optimization Plan



Course Agenda:

(1st Day) Agenda

8.30	9.00	Opening Remarks (30 Min.).
9.00	11.30	<u>Discuss the main points of the training course:</u> • Fundamentals of Pumping Systems in Oilfield Operations. • Advanced Pump Operation & Control. • Troubleshooting & Performance Diagnostics. • Reliability & Predictive Maintenance. • Smart & Digital Pumping Operations.
11.30	12.00	Coffee Break
12.00	14.00	<u>Fundamentals of Pumping Systems in Oilfield Operations:</u> • Overview of Pumping Technologies in Petroleum Production. • Pump Types and Their Field Applications (ESP, PCP, Jet, Centrifugal). • Hydraulic and Mechanical Principles of Pump Operation. • System Design Considerations and Flow Control. • Key Performance Indicators for Pump Efficiency.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(2nd Day) Agenda

9.00	11.30	<u>Advanced Pump Operation & Control:</u> • Start-up and Shutdown Procedures. • Steady-State Operation and Variable Flow Conditions. • Handling Gas Interference, Solids, and High Viscosity Fluids.
11.30	12.00	Coffee Break
12.00	14.00	<u>Advanced Pump Operation & Control:</u> • Pump Protection and Control Logic. • Field Safety Practices and Emergency Handling.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(3rd Day) Agenda

9.00	11.30	<u>Troubleshooting & Performance Diagnostics:</u> • Common Pump Failures and Root Cause Analysis. • Vibration, Pressure, and Temperature Monitoring. • Real-time Data Interpretation for Fault Detection.
11.30	12.00	Coffee Break
12.00	14.00	<u>Troubleshooting & Performance Diagnostics:</u> • Case Studies: Diagnosing Field Problems. • Optimizing Operational Setpoints for Longevity.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(4th Day) Agenda

9.00	11.30	<u>Reliability & Predictive Maintenance:</u> • Reliability-Centered Maintenance (RCM) for Pumps. • Condition Monitoring Technologies (Vibration, Acoustic, Thermal). • Predictive Analytics and Failure Prevention.
11.30	12.00	Coffee Break
12.00	14.00	<u>Reliability & Predictive Maintenance:</u> • Lubrication, Sealing, and Alignment Best Practices. • Maintenance Planning and Performance Metrics.
14.00	14.30	Questions and Discussion
14.30		Buffet Lunch

(5th Day) Agenda

9.00	11.30	<u>Smart & Digital Pumping Operations:</u> • IoT and SCADA Applications in Pumping Systems. • Data-Driven Decision Making for Efficiency Optimization. • Integrating AI and Digital Twins in Pump Management.
11.30	12.00	Coffee Break
12.00	14.00	<u>Smart & Digital Pumping Operations:</u> • Case Studies: Smart Field Implementation. • Workshop: Designing a Smart Pumping Optimization Plan.
14.00	14.30	Questions, Discussion & Conclusion Training Course.
14.30		Buffet Lunch