

INDUSTRIAL HYDRAULIC CIRCUIT MASTERCLASS- HYDRAULIC WORKING PRINCIPLE & THE VARIOUS COMPONENTS USED IN A HYDRAULIC CIRCUIT

“Mastering the Operation, Design, and Troubleshooting of Hydraulic Systems in Industrial Applications”

Schedule		
Date	Venue	Fees (Face-to-Face)
01 – 05 Mar 2026	Doha, Qatar	USD 3495 per delegate

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

Introduction

Hydraulic systems are vital to a wide range of industrial applications, from manufacturing and construction to process control and heavy equipment operations. A deep understanding of hydraulic principles, components, and circuit design is essential for engineers and technicians responsible for system performance, safety, and reliability.

This intensive five-day masterclass offers in-depth training on hydraulic system operation, circuit layout, component functions, and troubleshooting techniques. Participants will explore real-world scenarios, interpret circuit diagrams, and gain hands-on knowledge of pumps, valves, actuators, filters, and fluid behavior under pressure.

Objectives

- By the end of this course, participants will be able to:
- Understand the principles of fluid power and hydraulic energy transmission
 - Identify, describe, and functionally analyze all major components in a hydraulic circuit
 - Interpret and troubleshoot hydraulic schematics and circuit logic
 - Optimize system performance through design and preventive maintenance
 - Apply safety standards in the operation and servicing of hydraulic systems

Why Attend

- Build foundational and advanced knowledge of industrial hydraulics
- Learn to read and analyze complex hydraulic circuit diagrams
- Prevent costly downtime through better fault detection and system care
- Improve the reliability and efficiency of machinery and systems
- Apply international best practices in fluid power safety and maintenance

Target Audience

This program is designed for:

- Maintenance and mechanical technicians
- Mechanical, plant, and hydraulic engineers
- Industrial machinery operators and supervisors
- Technicians involved in installation or servicing of hydraulic systems
- Professionals in power generation, oil & gas, manufacturing, and utilities

Individual Benefits

Key competencies that will be developed include:

- Hydraulic power transmission fundamentals
- Component selection and system configuration
- Pressure control and energy loss diagnostics
- Schematic interpretation and troubleshooting
- Safety and fluid contamination management

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Increased uptime through improved hydraulic system reliability
- Fewer failures and accidents due to better fault diagnosis
- Enhanced workforce technical capabilities
- Standardized maintenance and servicing procedures
- Greater operational efficiency in hydraulic machinery

Instructional Methodology

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

- Strategy Briefings – Hydraulic theory, system design, and power transmission principles
- Case Studies – Failure analysis and real-world circuit breakdowns
- Workshops – Hands-on exercises with circuit simulation and component analysis
- Peer Exchange – Knowledge sharing among engineers and field professionals
- Tools – Circuit diagrams, maintenance checklists, and troubleshooting flowcharts

Course Outline

Detailed 5-Day Course Outline

Training Hours: 07:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Hydraulic Fundamentals and System Overview

- Module 1: Principles of Hydraulic Energy Transmission (07:30 – 09:30) • Pascal’s Law, pressure, flow, and energy relationships
- Module 2: Types and Functions of Hydraulic Systems (09:45 – 11:15) • Open-loop vs closed-loop systems, industrial applications
- Module 3: Basic Hydraulic Circuit Elements (11:30 – 01:00) • Pumps, reservoirs, hoses, and pressure relief valves
- Module 4: Workshop – Building a Basic Hydraulic Circuit (02:00 – 03:30)

Day 2: Components and Operations

- Module 1: Hydraulic Pumps and Motors (07:30 – 09:30) • Gear, vane, and piston pump types and efficiency
- Module 2: Directional and Flow Control Valves (09:45 – 11:15) • Valve functions, symbols, and operational behavior
- Module 3: Hydraulic Actuators (11:30 – 01:00) • Cylinders, rotary actuators, and control options
- Module 4: Workshop – Simulating Control Valve Operations (02:00 – 03:30)

Day 3: Circuit Design and Schematic Reading

- Module 1: Hydraulic Symbols and Schematic Conventions (07:30 – 09:30) • Interpreting ISO/DIN hydraulic drawings
- Module 2: Designing Functional Circuits (09:45 – 11:15) • Load holding, sequencing, regeneration circuits
- Module 3: Pressure and Flow Control Techniques (11:30 – 01:00) • Accumulators, orifices, and counterbalance valves
- Module 4: Workshop – Analyzing a Complex Hydraulic Schematic (02:00 – 03:30)

Day 4: Maintenance and Troubleshooting

- Module 1: Fluid Contamination and Filtration (07:30 – 09:30) • Types of contamination and filter selection
- Module 2: Preventive Maintenance Practices (09:45 – 11:15) • Visual inspections, testing tools, and maintenance planning
- Module 3: Troubleshooting Methodology (11:30 – 01:00) • Diagnosing pressure loss, noise, overheating, and erratic motion
- Module 4: Workshop – Hydraulic Fault Diagnosis Simulation (02:00 – 03:30)

Day 5: Safety, Efficiency, and Wrap-Up

- Module 1: Hydraulic Safety and Best Practices (07:30 – 09:30) • Lockout/tagout, pressure hazards, and safe testing
- Module 2: System Efficiency and Optimization (09:45 – 11:15) • Reducing leaks, energy loss, and component wear
- Module 3: Review and Application of Key Concepts (11:30 – 01:00) • Recap and practical application discussions
- Module 4: Certification and Wrap-Up (02:00 – 03:30) • Final Q&A, participant presentations, and certificate distribution

Certification

Participants will receive a Certificate of Completion in Industrial Hydraulic Circuit Masterclass, validating their expertise in the operation, design, troubleshooting, and maintenance of industrial hydraulic systems and circuits.

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