



Mechanical Engineering

Practical Pump and Valve Technology

Course Introduction

Practical pump and valve technology is essential for engineers and technicians involved in the operation, maintenance, and optimization of fluid handling systems. Pumps and valves are critical components in a wide range of industries such as water treatment, oil and gas, chemical processing, and HVAC. Proper understanding of their selection, installation, operation, and maintenance is vital for improving system efficiency, ensuring safety, and minimizing operational costs. A deep understanding of pump and valve performance, including their interactions in a system, can help reduce energy consumption, improve reliability, and extend the lifespan of equipment. This training provides participants with the essential skills and knowledge needed to work effectively with pumps and valves in industrial applications.

This program will cover the fundamentals of pump and valve selection, installation, operation, and maintenance. It will explore different types of pumps and valves, their working principles, and performance characteristics. Participants will learn about common pump and valve issues, troubleshooting techniques, and how to optimize their performance.

Target Audience

This course is designed for engineers, technicians, and professionals working with pump and valve systems in industrial settings.

Learning Objectives

At the end of the training course, participants will be able to:

- Understand the basic principles of pump and valve operation, selection, and maintenance.
- Learn how to design, size, and select pumps and valves for different industrial applications.

- Gain troubleshooting skills for common pump and valve issues such as cavitation, leakage, and valve failure.
- Understand the importance of pump and valve maintenance to extend service life and prevent system failures.
- Learn techniques for optimizing pump and valve performance to reduce energy consumption and improve system reliability.

Course Outline

• 01 DAY ONE

Introduction to Pump and Valve Technology

- Overview of pumps and valves in fluid handling systems
- Key types of pumps: centrifugal, positive displacement, diaphragm, and peristaltic
- Key types of valves: ball, gate, globe, check, and pressure relief valves
- Basic principles of pump and valve operation
- Understanding flow, pressure, and head in pumping systems
- Materials used in pumps and valves (metals, plastics, ceramics)
- Importance of pump and valve maintenance in industrial systems

• 02 DAY TWO

Pump Selection and System Design

- Criteria for selecting the right pump for specific applications
- Calculating flow rates, pressure, and system head
- Understanding system curves and pump curves
- Impact of piping design and layout on pump performance
- Sizing pumps and determining NPSH (Net Positive Suction Head)
- Selecting materials for pumps based on fluid type and system conditions

• 03 DAY THREE

Valve Selection and Installation

- Criteria for selecting the right valve for specific applications
- Types of valve operation: manual, actuated, and automatic valves
- Valve sizing, pressure ratings, and flow characteristics
- Installing valves in piping systems: considerations and best practices

- Valve maintenance: inspection, cleaning, and sealing
- Safety considerations for valves in high-pressure systems

• 04 DAY FOUR

Troubleshooting and Maintenance of Pumps and Valves

- Common problems in pumps: cavitation, wear, leakage, and blockage
- Troubleshooting pumps: vibration analysis, pressure, and flow measurement
- Common valve issues: leakage, valve sticking, and corrosion
- Diagnosing and solving common pump and valve failures
- Preventative maintenance strategies for pumps and valves
- Importance of lubrication, seal integrity, and alignment

• 05 DAY FIVE

Optimizing Pump and Valve Performance

- Improving pump efficiency through system design and operation
- Using variable frequency drives (VFDs) to control pump speed and energy consumption
- Flow control and pressure regulation using valves
- Optimizing valve performance in regulating systems
- Monitoring and controlling pump and valve performance in real-time
- Retrofitting existing systems with more efficient pumps and valves

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 9, 2025	June 13, 2025	5 days	4250.00 \$	UAE - Abu Dhabi
Aug. 4, 2025	Aug. 8, 2025	5 days	4250.00 \$	UAE - Dubai
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 \$	UAE - Dubai

