



Mechanical Engineering

Pumps Operation and Maintenance

Course Introduction

Centrally positioned in industrial processes, pumps stand out as one of the most prevalent machines globally. Despite their widespread usage, pumps are frequently underestimated in their potential to enhance productivity or contribute to excessive costs when not operated correctly. Various factors and circumstances can lead to pump failure, necessitating swift removal from service. It is imperative for maintenance engineers, and particularly plant operators, to possess a thorough understanding of operational guidelines for the proper utilization of pumps in manufacturing and industrial settings, emphasizing adherence to best practices.

Target Audience

- Operators & Technicians – Handling pump operations, troubleshooting, and maintenance.
- Engineers (Mechanical, Electrical, Civil, etc.) – Designing, optimizing, and troubleshooting pump systems.
- Maintenance & Reliability Personnel – Ensuring pump efficiency and longevity.
- Supervisors & Managers – Overseeing pump performance and maintenance strategies.
- Procurement & Supply Chain Professionals – Sourcing pumps, parts, and maintenance services.

Learning Objectives

- Gain a comprehensive understanding of the different types of Pumps and the range of their applications.
- Understand the limits of Pumps operation.

- Identify the roles and responsibilities in the operation, maintenance and troubleshooting of pumps.
- Gain additional knowledge on Inspection and Maintenance of Centrifugal Pumps
- Read and interpret the performance curves of Pumps and provide overview of testing standards/codes.
- Understand Operation, maintenance & Troubleshooting aspects including the Start-up, priming, shut down.
- Conduct effective preventive and predictive maintenance of pumps.

Course Outline

• 01 DAY ONE

Basic Pump Principles

- How Pumps Work
- Head vs. Pressure
- Absolute and Gauge Pressures
- Work & Efficiency
- Flow & Head, Efficiency, Power

NPSH and Cavitation

- NPSH required
- NPSH available
- Vapor Pressure
- Types of Cavitation
- Effects & Prevention

Operation

- Start-Up, Priming, Shutdown
- Vibration Levels and their measurements
- Bearing Housing Temperatures
- Accessories (Shaft Seal, Bearing)

• 02 DAY TWO

Troubleshooting

- Why duties change
- Identifying problem applications
- Where do your pumps operate
- Instrumentation (reading from gauges)
- Fault finding and Failure Analysis
- Interpreting the Evidence
- Operator's Roles and Responsibilities

Bearings

- Types & Services
- Lubrication
- Maintenance & Seals

• 03 DAY THREE

Pump Classification

- PD, Centrifugal types
- Impellers, Liquids
- ANSI / API
- Specific Speed

Pump Curves

- Head, Eff. & Power
- NPSHr
- Family Curves
- The Affinity Laws
- Speed & Diameter
- Practical Application

• 04 DAY FOUR

System Curves

- Total Dynamic Head
- Elevation, Pressure & Losses
- Static head, friction head curve
- Pumps in Series & Parallel

Pump Operation/Pump Reliability

- Definitions
- Operating away from BEP
- Energy savings, Increased MTBF
- Bearing and Seal Life
- Shaft deflection
- Maintenance Operation & Design

• 05 DAY FIVE

Pump- Motor Alignment

- Types of Misalignments
- Alignment Techniques

Pump Packing

- Packing Procedures
- Failure & Leakage
- Components

Mechanical Seals

- Components
- Single & Double
- Support Systems

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 14, 2025	April 18, 2025	5 days	4250.00 \$	UAE - Abu Dhabi
July 28, 2025	Aug. 1, 2025	5 days	4250.00 \$	UAE - Dubai
Nov. 23, 2025	Nov. 27, 2025	5 days	4250.00 \$	KSA - Riyadh