



Consulting and Training | Reach New Heights

Course Name

Pumps Operation, Maintenance and Trouble Shooting

Sector Name

Mechanical Engineering

Document Type

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Pumps Operation, Maintenance and Trouble Shooting

Course Introduction

This course aims to convey the latest thinking and best practice of Rotating Equipment Machinery Components, especially Pumps, which we consider an important type of Rotating Equipment. will also explain to the participants about conditions monitoring and analysis via lectures, case studies, video films, and course activities.

The course gives a detailed advanced treatment of the detection, location, and diagnosis of faults and failures in Pumps. Case studies and examples are used throughout the course to emphasize key points and to underline the relevance and applicability of the topics being addressed.

The course will provide a refreshment of knowledge on how both them concepts and how it work and what are main problems they face during their operations are. Also, it will provide a solid foundation for technologists moving into a machine monitoring and diagnostic role.

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Target Audience

- ✓ Automotive Engineer
- ✓ Boiler Engineer
- ✓ Ceramics Engineer
- ✓ Equipment Engineer
- ✓ High-Pressure Engineer
- ✓ Marine Engineer
- ✓ Mechanical Design Engineer
- ✓ Mechanical Engineer
- ✓ Naval Architect
- ✓ Pipeline Engineer
- ✓ Power Engineer
- ✓ Rotating Equipment Engineer
- ✓ Senior Mechanical Engineer
- ✓ Turbine Engineer
- ✓ Validation Engineer

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Learning Objectives

- ✓ To familiarize participant with the different types of Pumps and the range of their applications.
- ✓ To deepen the participants' understanding of the limits of the pump's operation.
- ✓ Learn the Critical Symptoms of Pump Operation
- ✓ Enhance the knowledge on Pump Sealing and Rolling Elements
- ✓ Gain additional knowledge on the Inspection and Maintenance of Centrifugal Pumps
- ✓ Read and interpret the performance curves of Pumps and provide an overview of testing standards/codes.
- ✓ To Understand Operation, maintenance, & Troubleshooting aspects, including the Start-up, priming, and shut-down.
- ✓ To know Preventive and Predictive maintenance of Pumps
- ✓ To understand principles of Condition-Based Monitoring.

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Course Outline

✓ 01 DAY ONE

Module (01) Pump Theory

- ✓ Pumping Process Concept
- ✓ Physical Properties of Incompressible Fluid
- ✓ Operating Parameters (Head, Flow, rpm, Power, and Efficiency)
- ✓ Pump Arrangement: Series and Parallel
- ✓ Pump Types and Terminology

Module (02) Centrifugal Pump

- ✓ The Principle of Energy Transfer in a Centrifugal Pump
- ✓ Pump Applications 2.3 Centrifugal Pump Construction
- ✓ Classification of Centrifugal Pumps
- ✓ Types of Impellers
- ✓ Types of Casings
- ✓ Prime Mover of Pump
- ✓ Mechanical Features
- ✓ Pump Operation Procedures
- ✓ Pump Troubleshooting

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Course Outline

✓ 02 DAY TWO

Module (03) Positive Displacement Pumps (Linear Motion)

- ✓ Classification
- ✓ Reciprocating Pump
- ✓ Type and Discharge of Reciprocating Pumps
- ✓ Diaphragm Pump
- ✓ Principle of Operation
- ✓ Pump Troubleshooting

Module (04) Positive Displacement Pumps (Rotational Motion)

- ✓ Screw Pump
- ✓ Lobar Pump
- ✓ Gear and Vane Pump
- ✓ Principle of Operation
- ✓ Pump Troubleshooting

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Course Outline

✓ **03 DAY THREE**

Module (05) Cavitation Phenomena

- ✓ Concept of Cavitation
- ✓ Symptoms of Cavitation
- ✓ Effects of Cavitation
- ✓ How to Avoid Cavitation

Module (06) Pump Auxiliary System

- ✓ Bearings – failure modes and how to extend life
- ✓ Lubrication – different methods of lubrication
- ✓ Coupling and Alignment
- ✓ Mechanical Seals – maintain and repair them
- ✓ Gland Packing - types and how to change it
- ✓ Pump vibration monitors – how to avoid vibration
- ✓ Warm-up system – why and how it works

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Course Outline

✓ **04 DAY FOUR**

Module (07) Cavitation Phenomena

- ✓ Concept of Pump Cavitation
- ✓ General Symptoms of Cavitation
- ✓ Cavitation effects on the Pump and its parts
- ✓ How to avoid cavitation

Module (08) Pump Maintenance

- ✓ Planned Maintenance Activities
- ✓ Predictive and Preventive
- ✓ Reliability Programs

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Course Outline

✓ **05 DAY FIVE**

Module (09) Pump Troubleshooting

- ✓ Centrifugal Pumps Troubleshooting
- ✓ Reciprocating Pumps Troubleshooting
- ✓ Rotary Pumps Troubleshooting
- ✓ Auxiliary System Troubleshooting
- ✓ Power System
- ✓ Lube Oil System
- ✓ Sealing System
- ✓ Warm up and Cooling System

Module (10) Machine Failure (Pump Applications)

- ✓ Why Machine Failure?
- ✓ Types of Failure Causes
- ✓ Effect of Failure on the Plant
- ✓ Failure Cascading
- ✓ Failure Modes
- ✓ Chronic vs. Sporadic Failure
- ✓ Water hammer
- ✓ Overpressure
- ✓ Inspection and Maintenance of Pump

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 23, 2027	May 27, 2027	5 days	4250.00 \$	KSA , Al Khobar
Aug. 9, 2027	Aug. 13, 2027	5 days	4250.00 \$	UAE , Dubai
Jan. 24, 2027	Jan. 28, 2027	5 days	4250.00 \$	KSA , Riyadh
Nov. 9, 2026	Nov. 13, 2026	5 days	5950.00 \$	switzerland , Geneva

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