

Industrial Pumps: Selection, Operation & Reliability

Training Course **Industrial Pumps: Selection, Operation & Reliability**

Course Language **English**

Course Duration Total Number of hours: 15 Hours

Course Objectives: The course objective is to provide “Industrial Pumps” training to engineers and technicians with the following topics

Course Key Topic Area Includes:

1.1. Pump Fundamentals & Types

- Basic hydraulic principles (head, flow, power, efficiency, specific speed)
- Centrifugal pumps (single-stage, multi-stage, etc.), Positive displacement pumps

2. Pump Selection & Sizing

- Process requirements: flow, head, pressure, fluid properties
- NPSH available vs. NPSH required, Pump performance curves

3. Pump Operation & Performance Behavior

- Start-up, shutdown, and normal operating procedures, Parallel and series
- Cavitation, Recirculation, surge, and off-design operation, Variable speed

4. Mechanical Components & Reliability Basics

- Seals and sealing systems (mechanical seals, packing, dry gas seals)
- Bearings and lubrication, Couplings and alignment, Vibration fundamentals

5. Condition Monitoring & Maintenance Strategies

- Vibration analysis basics, Reliability-Centered Maintenance (RCM)
- Failure Mode and Effects Analysis (FMEA) applied to pumps

6. Troubleshooting & Case Studies

- Structured troubleshooting methodology, Root cause analysis (RCA)

Course Content

At the end of the program the trainees will be able to:

1. Understand the fundamental principles of pump hydraulics and performance
2. Select the appropriate pump type for a given process application
3. Read and interpret pump performance curves and system curves
4. Identify common operational issues (cavitation, surge, vibration) and their root causes
5. Apply best practices for pump reliability, maintenance, and troubleshooting
6. Improve decision-making related to pump procurement, commissioning, and lifecycle management

Learning Outcomes

Target Audience	• Mechanical/Rotating Equipment Engineers • Process Engineers—who design systems and specify pump requirements • Maintenance Engineers/Technicians—who service, and repair pumps • Operations Engineers/Plant Operators – who run pumps daily and need to understand operating limits and warning signs • Reliability Engineers – focused on failure analysis, condition monitoring, and improving uptime
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Course Material /Technology used/ Details Relevant to the course.	<u>Course Materials</u> Presentation Slides (PDF/PPT) Pump Performance Curves & Datasheets Case Studies & Failure Reports Glossary of Terms – standardized terminology (API, ANSI, ISO references) Post-Course Assessment/Quiz <u>Technology/Tools Used</u> 3D Models/Animations Virtual/Interactive Pump Cutaways Video Demonstrations Vibration Analysis Tools/Data Samples
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Instructor Details & Brief Instructor Bio	Name: Ahmad K Sleiti Title/Dept: Professor / Department of Mechanical and Industrial Engineering Email: asleiti@qu.edu.qa
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