PRACTICAL
PUMPS - DESIGN, OPERATION AND MAINTENANCE
FOR CENTRIFUGAL AND POSITIVE
DISPLACEMENT PUMPS

YOU WILL LEARN HOW TO:

- Identify the various types of centrifugal pumps
- To use relevant pump terminology and understand their key applications
- Understand pump characteristics and interpret pump curves
- Perform a number of pump calculations
- Describe ancillary equipment associated with pumping circuits
- Draw up the correct operation, controls and procedures for operating pump systems
- Understand more about safety with pump systems and the management of risk
- Define pump reliability in terms of availability, criticality and wear characteristics
- Understand pump efficiency in terms of capital costs, maintenance costs and life cycle costs
- Understand the elements considered in selecting the right pump for a specific application
- Tackle issues relating to mechanical shaft seals failures
- Understand about pump drive options, alignment and pump drive sources
- Confidently test and commission pump sets
- Understand about condition monitoring of pumps and to optimise pump performance

WHO SHOULD ATTEND:

- Consulting engineers
- Maintenance engineers and technicians
- Plant engineers, managers and supervisors
- Plant operations and maintenance personnel
- Process control engineers and supervisors
- Pump sales and applications personnel
- Pump service contractors
- Pump users
The Program

DAY ONE

INTRODUCTION
- Terminology
- Pump definition and types
- Pump materials and components
- What constitutes a good centrifugal pump?
- Overview of statutory requirements
Practical tutorial

INTRODUCTION TO MECHANICAL SEALS
- Single and dual seal types
- Design considerations to address specific applications
- Troubleshooting failed mechanical seals

PUMPABLE FLUID CHARACTERISTICS
- Impact of:
  - Head
  - Density
  - Viscosity
  - Temperature
  - Corrosiveness
  - Erosion
Practical tutorial

THE PUMP AFFINITY LAWS
- The interaction between:
  - Head
  - Flow
  - Power draw
  - Implications of performance changes
  - System resistance

HYDRAULIC FORCES
- Axial forces
- Radial forces
- Effect of forces on component life

A TYPICAL PUMP CIRCUIT
- Effects on pumping
- Head
- Velocity
- Resistance
- Forces
- Expansion, contraction and vibration
- Environment
Practical tutorial

DAY TWO

TYPES OF PUMPS AND MATERIAL SELECTION
- Design considerations to address specific applications
- Material selection based on process fluid specifications: hazardous, density, viscosity, temperature, corrosiveness, erosion
Practical tutorial

PUMP DRIVES
- Pump drives:
  - Close coupled
  - Direct driven
  - Belt driven
  - Variable speed drives
  - Canned
  - Couplings
  - Alignment
  - Power sources
Practical tutorial

CONTROLS/SELECTION AND INSTALLATION
- Pump controls and instruments: safety and volume controls
- Pump selection:
  - Performance data
  - System flow resistance
  - Stability
- Pump installation issues:
  - Foundations and bases
  - Pipe connections
  - Vibration and force isolation
  - Environmental protection
Practical tutorial

COMMISSIONING AND PERFORMANCE MEASUREMENT
- Testing and commissioning
- Condition monitoring
- Optimising performance:
  - Inspection
  - Performance measurements
Practical tutorial

SUMMARY, OPEN FORUM AND CLOSING