



Mechanical Engineering

# Essentials of Process Engineering Program

## Course Introduction

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Process engineering covers a huge part in the operation of chemical, oil, gas, and petrochemical industries. Professionals involved in process engineering must have an in-depth understanding of engineering disciplines including mechanical, electrical and instrumentation, separation processes including distillation, heat transfer, hydraulics and fluid flow, process control and economics. These are the fundamental principles of process engineering. This training course is designed to provide participants with concepts related to the essential areas of process engineering that are most commonly encountered in the industry.

## Target Audience

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- 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

# Learning Objectives

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- Gain a comprehensive understanding of the essential and fundamental concepts of process engineering.
- Know how to interpret flowsheets and process flow diagrams
- Discover the distillation and separations used in oil and gas processing
- Understand mass and energy balances in process design, fluid flow, pumps and compressors, and mixing.
- Explore heat transfer equipment and their design, including heat exchangers
- Learn how to effectively control processes
- Identify the safety and environmental responsibility on process engineers

# Course Outline

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- **01 DAY ONE**

- **Process Engineering Fundamentals**

- Introduction
    - Basic Concepts to remember
    - Flow diagrams
    - Piping and Instrumentation Diagrams (P&IDs)
    - Process equipment
    - Introduction to mass and energy balances
    - Batch vs Continuous
    - Risk Assessments and Hazard Studies
    - Flammability and Electrical Area Classification
    - Workshop Session
    - Fluid Flow
    - Pressure and Head
    - Bernoulli's Theorem
    - Flow of Liquids
    - Reynolds number, pressure drop in pipes
    - Compressible flow
    - Principle of process relief devices and process design of relief systems
    - Two-phase and Multi-phase Flow

- Pumps and Compressors
- Mixing and Mixers
- Workshop Session

## • 02 DAY TWO

### Heat Transfer

- Thermal conductivity
- Conduction and convection
- Insulation
- Heat transfer coefficients
- Heat exchangers, type and sizing
- Workshop session
- Introduction to Separation Processes
- Distillation basics
- Phase behavior and vapour/liquid equilibria
- Distillation Equipment
- Distillation Troubleshooting
- Gas/Liquid separation
- Absorption and adsorption
- Solid Liquid separation
- Effluent treatment
- Workshop Session

## • 03 DAY THREE

### Process Control & Economics Basics

- Measured variables
- Simple feedback control
- SIS and SIL
- Process Utilities
- Process Economics
- Preliminary economic analysis
- Fixed and variable costs, break even
- Calculating raw materials usage
- Scale up and six tenths rule
- Estimating the cost of process equipment and plants

# Confirmed Sessions

| FROM           | TO            | DURATION | FEEs       | LOCATION        |
|----------------|---------------|----------|------------|-----------------|
| July 14, 2025  | July 18, 2025 | 5 days   | 3250.00 \$ | UAE - Dubai     |
| Sept. 29, 2025 | Oct. 1, 2025  | 3 days   | 3250.00 \$ | UAE - Dubai     |
| Nov. 17, 2025  | Nov. 19, 2025 | 3 days   | 3250.00 \$ | UAE - Abu Dhabi |