

Scandinavian Academy
Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Fundamentals of Mechanical Technology

Code	City	hotel	Start	End	price	Language - Hours
CM-119SA	Jeddah	Hotel Meeting Room	2026-12-13	2026-12-17	12950 SR	En - 25

INTRODUCTION

Chemical engineering is at the heart of much of the chemical, oil, gas, and petrochemical industries. The chemical engineer is interested in the transportation and transformation of solids, liquids and gases, but must also be familiar with many of the other engineering disciplines including mechanical, electrical and instrumentation. Of specific importance are separation processes including distillation, heat transfer, hydraulics and fluid flow, reaction engineering, but also process control and economics. These are the fundamental principles of chemical engineering.

This programme considers the areas of chemical engineering that are most commonly encountered, and will provide an understanding of the fundamentals to the non-specialist, and a refresher to practising engineers, with examples that will be drawn from a range of process industries including oil and gas processing, petrochemicals, chemical manufacturing .

In this programme you will:

- Learn to interpret flowsheets and process flow diagrams
- Develop and understand mass and energy balances in process design
- Learn about fluid flow, pumps and compressors, and mixing
- Discuss heat transfer equipment and their design, including heat exchangers
- Understand distillation and separations used in oil and gas processing
- Discuss effluent minimisation and treatment
- Learn how to control processes
- Perform a basic economic analysis of a project
- Understand the safety and environmental responsibility on process engineers

PROGRAMME OBJECTIVES

Using case studies from the oil, gas and chemical industry to illustrate the material, participants attending the programme will:

- Learn to interpret flowsheets and process flow diagrams
- Understand the use of mass and energy balances in process design
- Gain a basic understanding of fluid flow, including pumping and mixing
- Study examples relevant to the oil and gas industry
- Design a heat exchanger and know advantages/disadvantages of different types
- Understand distillation and separations used in oil and gas processing
- Appreciate the need to control environmental pollution from industry
- Learn how to control processes
- Perform a basic economic analysis of a project

TRAINING METHODOLOGY

In addition to formal lectures. videos and discussions, the participants will learn by active participation through the use of problem-solving exercises, group discussions and analysis of real-life case studies.

PROGRAMME SUMMARY

This programme identifies the areas of chemical engineering that are most commonly encountered and are fundamental to its understanding, enhancing process design and operation and enabling fruitful dialogue between the non-specialist and the engineer. Programme examples will be drawn from a range of process industries including the oil and gas processing, petrochemicals and chemical manufacturing industries.

PROGRAMME OUTLINE

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
- Introduction to Thermodynamics
- Two-phase and Multi-phase Flow
- Principle of process relief devices and process design of relief systems
- Pumps and Compressors
- Mixing and Mixers
- Workshop Session

Heat Transfer

- Thermal conductivity
- Conduction and convection
- Insulation
- Heat transfer coefficients

- Heat exchangers, type and sizing
- Chemical reactions
- Reaction kinetics

Introduction to catalysis and Green Chemistry

- Workshop session
- Introduction To Separation Processes
- Distillation basics
- Phase behaviour and vapour/liquid equilibria
- Distillation Equipment
- Distillation Troubleshooting
- Gas/Liquid separation
- Absorption and adsorption
- Solid Liquid separation
- Air and water pollution control
- Effluent treatment
- Workshop Session

Process Control & Economics Basics

- Measured variables
- Simple feedback control
- SIS and SIL
- Process Utilities
- Air
- Water and cooling water
- Steam
- Electricity and power generation
- 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

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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