

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: Process & Mechanical Engineering Essentials

Code	City	hotel	Start	End	price	Language - Hours
CM-511SA	Al Baha	Hotel Meeting	2027-09-12	2027-09-23	22950 SR	En - 50

Why Choose this Course?

This combined course focuses on the central areas of Process and Mechanical Engineering and guides the delegates in developing both fundamental and practical understandings of key issues. Process engineering is at the heart of much of the chemical, oil, gas, and petrochemical industries.

Process and Mechanical engineers are interested in the safe containment, transportation and transformation of solids, liquids and gases. Of specific importance are separation processes including distillation, heat transfer, hydraulics and fluid flow, reaction engineering, process control and economics. It also focuses on sound mechanical engineering principles, together with other engineering techniques including inspection, monitoring and condition evaluation, that enable mechanical engineers to design and maintain the equipment required by process engineers.

This course will feature:

- Practical introduction to the fundamentals of process engineering
- Practical introduction to the fundamentals of Mechanical Engineering, Equipment and Materials
- Key areas applicable to major process industries especially oil, gas & petrochemical
- Process and Mechanical Engineering influence on Safety and Risk, Failure Modes and Maintenance
- The links between the two engineering disciplines

The Structure

This comprehensive programme consists of two modules which can be booked as a 10 Day Training event, or as individual, 5 Day courses.

Module 1 - Process Engineering Essentials: Upstream & Downstream Process Control & Optimisation

Module 2 - Mechanical Engineering Essentials: Rotating & Static Equipment & Structural Integrity

What are the Goals?

By the end of this course, participants will be able to:

- Apply practical understanding of central issues in process & mechanical engineering in oil, gas, petrochemical, chemical, and allied facilities
- Understand fundamental principles used in processes & facilities & apply practical understanding of essential process units & classes of units involved in separations, heat exchange & reactions.
- Apply practical understanding to static & rotating mechanical equipment & related condition mentoring & inspection techniques.
- Understand mechanical testing methods, Failure Mechanisms & Fitness for Service, NDT & principles of corrosion & corrosion protection.
- Perform relevant calculations & analyses to assist in operation, sizing, & troubleshooting of chemical processes & mechanical equipment.

Who is this Course for?

This course is suitable to a wide range of professionals but will greatly benefit technical and non-technical personnel in the chemical, petrochemical, oil and process and mechanical industries with a need to understand and discuss fundamental process and

mechanical engineering:

- Petroleum Engineers
- Maintenance & Production Engineers
- Process Engineers
- R&D Chemists, Plant Chemists
- Economists & Business Managers

How will this be Presented?

This course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This includes formal lectures and discussions, active participation through the use of problem-solving exercises, videos, group discussions, analysis of real-life case studies, and industry best practices. Case studies and examples will cover a range of levels, making the course also suitable non-technical Staff.

The Course Content

Module 1: Process Engineering Essentials: Upstream & Downstream Process Control & Optimisation

Day One

Introduction and Fundamentals of Process Engineering

- Mass and energy balances
- Reactor types
- Process & Engineering Diagrams
- Flammability
- Electrical area classification
- Risk Management and Hazard Studies

Day Two

Hydraulics and Fluid flow

- Pressure and head & Bernoulli`s theorem
- Flow of liquids, Reynolds number and pressure drop in pipes
- Two-phase and multi-phase flow
- Enthalpy and thermodynamics
- Principle of process relief devices and process design of relief systems
- Mechanical Equipment – Pumps, Compressors & Mixers

Day Three

Heat Transfer and Reaction Engineering

- Heat Transfer Mechanisms
- Heat transfer coefficients and calculation
- Heat exchangers, type and sizing
- Catalysis and Reaction Engineering
- Chemical reactions & kinetics
- Green Chemistry & Engineering and Sustainability

Day Four

Distillation Processes and Equipment

- Phase behavior and vapour/liquid equilibria
- Gas/Liquid separation
- Distillation equipment - Columns and vessels
- Troubleshooting of process equipment
- Overview of Other Separation Processes

- Effluent treatment [in refinery and petrochemical] industries

Day Five

Process Control and Economics

- Classification of control systems
- Measured variables
- Simple feedback control
- Preliminary economic analysis
- Fixed and variable costs, break even analysis
- Estimating the cost of process equipment and plants

Module 2: Mechanical Engineering Essentials: Rotating & Static Equipment & Structural Integrity

Day Six

Introduction & Fundamentals of Materials Selection, Types & Failures

- Engineering Material Properties and Selection
- Materials Testing
- Types of Metals
- Static Strength and Fitness For Service
- Materials Failure Mechanisms
- Mechanical Design, Standards and Codes

Day Seven

Static Equipment, Valves, Piping & Fitness for Service

- Valves Types and Characteristics
- Valve Selection
- Valve Actuators
- Piping Systems and Pipe Supports
- Overview of API 570 - Inspection & repair of Pipelines & Piping
- Fitness for Service, API 579 overview

Day Eight

Rotating Equipment, Pumps & Compressors

- Pump Types, Positive Displacement and Dynamic
- Pump curves
- Pump Selection
- Types of Compressors
- Compressor Performance Curves

Day Nine

Corrosion & Corrosion Protection

- Corrosion Fundamentals
- Types of Corrosion
- Corrosion Inspection and Monitoring
- Corrosion Minimization
- Corrosion Protection

Day Ten

Mechanical Maintenance

- Strategies & Philosophies
- Code and Standards
- Condition Monitoring

Non Destructive Inspection techniques

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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