MERCURY

# Chemical Engineering and Plant Design Training

15 – 19 March 2027
Brussels (Belgium)



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**Ref:** 10001_263009 **Date:** 15 – 19 March 2027 **Location:** Brussels (Belgium) **Fees:** 6200 Euro

## Introduction:

Chemical Engineering is a multifaceted field incorporating principles from physics, chemistry, applied mathematics, and economics to process, produce, transport, and properly manage chemicals, materials, and energy. A critical component of chemical engineering is plant design, which emphasizes the creation of a functional and safe facility that effectively delivers the intended products or services.

Chemical engineers harness their knowledge and expertise to transform raw materials into valuable products such as pharmaceuticals, fuels, chemicals, and plastics, not only through manufacturing but also by conducting and designing innovative experimental research to improve production methods, mitigate environmental impacts, and conserve resources.

## Targeted Groups:

- Chemical Engineers.
- Plant Engineers.
- Petrochemical Engineers.
- Consulting Engineers.
- Engineering Managers.
- Maintenance Engineers/Technicians.
- Project Engineers.
- Process Control Engineers.

## Course Objectives:

By the end of this chemical engineering and plant design course, participants will:

- Gain an understanding of the technical concepts involved in chemical plant and engineering and the intricacies of plant layout.
- Develop insights into process and piping design with a focus on application in plant chemical engineering.
- Enhance knowledge of core chemical engineering theories and concepts within a working chemical engineering plant.

## Targeted Competencies:

At the end of this chemical engineering and plant design training, participants competencies will:

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- Understanding of control valve manifolds.
- Familiarity with common abbreviations within chemical plant engineering.
- Grasp of fluid properties essential for preliminary chemical engineering plant design.
- Knowledge of volume and velocity in fluid systems.
- Recognition of symbols used in chemical engineering plant design software.

## Understanding Plant Design in Chemical Engineering:

What is plant design in chemical engineering? This module will explore this question by exploring the elements of designing a chemical processing plant. The chemical engineering and plant design course will cover aspects of preliminary plant design, including plant layout, integration of engineering principles, safety considerations, and economic evaluation.

Participants in this chemical engineering and plant design training will learn about the latest software and tools used in chemical engineering plant design projects, enhancing their capacity to plan, design, and analyze chemical processing systems efficiently. One of the key challenges in chemical engineering is plant design and economics for chemical engineers. In this portion of the training, we will address the economic considerations that play a pivotal role in plant design.

This chemical engineering and plant design training involves analyzing plant design and economics for chemical engineers' solutions and integrating cost-analysis and profitability assessment strategies to optimize the plant's financial performance. Engineering solutions will strictly adhere to the best practices and ethical standards expected from certificate holders in chemical engineering and plant design.

## Course Content:

### Unit 1: Chemical Processes:

- Objectives.
- Principles.
- Unit operations and Unit processes with examples.

### Unit 2: Pipe Fittings:

- Purpose.
- Fitting end preparations.
- Elbows.
- Reducers.
- Weld Tees.
- Threadolet and lateral.
- Screwed and socket weld fittings.
- Pipe nipples.

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## Unit 3: Process Flow Diagrams:

- Types
- Icons and examples.
- Steam information table.
- Utilities - heating and cooling.
- Equipment Specs.

## Unit 4: Chemical Kinetics and Reactor Design:

- Terminology.
- Order of reaction.
- Fractional conversion.
- Types of reactors.
- Design equations for the Reactor.
- Batch reactor.
- Mixed flow CSTR reactor.
- Plug flow reactor PFR.

## Unit 5: Process Control and Instrumentation:

- P&ID Basics and information.
- Terminologies.
- Instruments abbreviations.
- P&ID Legend sources.
- Equipment classes.
- Locally mounted instruments.
- Symbols used.
- Remote control.
- Control valve manifolds.
- Need for process control.

## Unit 6: Plant Layout and Piping Design:

- Basic concepts.
- Processing facilities.
- Equipment and piping.

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## Unit 7: Design of Process Plant:

- Learn about the factors to consider.
- Design tasks.
- Required Qualifications and Skills.
- Thumb rules.
- Common Abbreviations.

## Unit 8: Procedures and The Workflow Methods:

- Physical quantities and units used in the design.
- Associated Organizations.

## Unit 9: Fluid:

- Basic concepts.
- Fluid properties.
- Practical problems.

## Unit 10: Fluid Flows:

- Fluid pressure.
- Continuity equation.
- Volume and velocity.
- Laminar and turbulent flows.
- Reynolds number.
- Friction factor and Pressure drop.
- Bernoulli's equation.

## Conclusion:

Upon completing the course, participants will obtain a Certificate in Chemical Engineering and Plant Design, acknowledging their enhanced skills and comprehensive understanding of plant design chemical engineering fundamentals and practical applications.