MERCURY

Fundamentals of Process Technology Training Course

14 – 18 June 2027
Amsterdam (Netherlands)



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Ref: 6050_300961 **Date:** 14 – 18 June 2027 **Location:** Amsterdam (Netherlands) **Fees:** 6200 Euro

Introduction to Process Technology

Process engineering is the cornerstone of various sectors, such as the chemical, oil, gas, and petrochemical industries. To excel in this field, a comprehensive understanding of not just process technology but also mechanical, electrical, and instrumentation engineering disciplines is essential.

Process engineers play a vital role in focusing on the transport and transformation of matter in forms such as solids, liquids, and gasses. Their expertise is particularly critical for separation processes, including distillation, heat transfer, Hydraulics and fluid flow, and reaction engineering, as well as process control and economics, which form part of the definition of process technology.

Enrolling in a process technology degree program can be a transformative step for individuals looking to establish or advance a career in the realms of chemical, petrochemical, oil, and gas industries. A degree in process technology prepares graduates for a challenging, rewarding career focused on the technical aspects of industrial operations.

Process Engineering Technologies: A Definition and Certification

When addressing the definition of process technology, it is essential to consider the broad array of activities involved in the design, operation, control, and optimization of chemical, physical, and biological processes. Process technology involves utilizing advanced process technologies to refine raw materials into valuable products and to maintain system efficiency within industrial plants.

For professionals seeking to certify their expertise in process technology, various process technology certificate programs, and process technology degree paths are available. These educational trajectories ensure that individuals possess the specialized knowledge and skills to thrive in dynamic industrial environments.

Seeking a process technology certification illustrates a commitment to understanding the fundamentals of technology within the industrial process sector. Certification provides recognition for proficiency in the foundational elements of process and technology, which are critical to the roles of engineers and technicians in modern process-driven industries.

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Targeted Groups

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

Course Objectives

By the end of this process technology training program, participants will be able to:

- Grasp the fundamental process and technology principles involved in processing facilities.
- Implement practical knowledge of process management technology principles, such as Hydraulics and fluid flow.
- Interpret lessons from past safety incidents within the oil and gas process technology sector.
- Execute pertinent calculations and analyses to support processing technologies in operation, sizing, and troubleshooting.
- Gain an overview of how different engineering disciplines interact from a company's perspective, distinctly within the context of process technology programs.

Targeted Competencies

At the end of this fundamentals of process technology course, the target competencies will be able to:

- Understand the practicality of essential process engineering technologies and unit operations for separations.
- Heat exchange and reactions.
- Knowledge of hydraulics and process control technology as it pertains to fluid flow.
- Learn skills to support operations in sizing and troubleshooting process technology systems.

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Course Content

Unit 1: Introduction and Fundamentals of Process Engineering

- Process engineering basics and the technology process involved.
- Learn about mass and energy balances and their relevance in process technology courses.
- Differentiate between batch and continuous processes.
- Understand the types of reactors and their applications in processing technologies.
- Process equipment and flow diagrams essentials, P&IDs.
- Concepts of flammability.
- Electrical area classification.
- Risk management and hazard studies are integral elements of the process technology program.
- Learn about Hydraulics and fluid flow.
- Process in technology: Pressure and head dynamics.
- Understand Bernoulli's theorem and its field applications.
- Flow of liquids.
- Reynolds number and pressure drop in pipes.
- Two-phase and multiphase flow.
- Enthalpy and thermodynamics.
- Process safety: Relief devices and process design for relief systems.
- Design principles for pressure vessels and piping.
- Pumps.
- Compressors.
- Mixers.
- Understand mechanical equipment types and application guidelines.

Unit 2: Heat Transfer and Reaction Engineering

- Basics of heat transfer.
- Thermal conductivity.
- What are the conduction and convection processes?
- Understand the significance of insulation in maintaining process efficiency.
- Calculation of heat transfer coefficients.
- Heat exchanger types and sizing.
- Steam reboilers.
- Condensers and subcooling.
- Intro to energy recovery systems.
- Learn about catalysis and its role in advanced process technologies.
- Chemical reactions are a foundational principle in technology fundamentals.
- Reaction kinetics is a foundational principle in technology fundamentals.
- Introduction catalysis.
- Green chemistry initiatives and engineering.
- Learn about considerations for reactor design and operation.

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Unit 3: Distillation Processes and Equipment

- Understand distillation as a pivotal gas processing technology.
- Phase behavior and vapor/liquid equilibria in process technologies.
- Gas/Liquid separation techniques and equipment.
- Distillation equipment: Columns and vessels, sizing, and selection guidelines.
- What are columns and vessels, and how do you pick sizing and selection guidelines?
- What are the column and vessel internals, and how do pick types and selection guidelines work?
- Troubleshooting process equipment issues.

Unit 4: Separation Processes and Equipment

- Overview of separation processes beyond distillation.
- Dive into absorption and adsorption mechanisms.
- Details on amine sweetening as part of gas processing technology.
- Learn about solid-liquid separation and its industrial relevance.
- Manage effluent treatment in the refinery and petrochemical industries.

Unit 5: Process Control and Economics

- Understand the basics of process control technology.
- Different classifications of control systems.
- Understand measured variables in control processes.
- Learn about the principles of simple feedback control.
- Overview of process economics as a fundamental technology concept.
- Techniques for preliminary economic analysis.
- Distinguish fixed and variable costs, including break-even analysis.
- Learn about the strategy for calculating the usage of raw materials.
- Understand the methods for estimating the cost of process equipment and plants.