

# € TRAINING

Fundamentals of Chemical Engineering



3 - 7 November 2024  
Cairo (Egypt)



# Fundamentals of Chemical Engineering

REF: KJ394 DATE: 3 - 7 November 2024 Venue: Cairo (Egypt) - Fee: 4465 Euro

## Introduction:

This training program provides a comprehensive understanding of the fundamental concepts of chemical engineering, focusing on the core principles that govern chemical processes. It empowers participants to understand and apply essential techniques in designing, operating, and optimizing chemical processes across various industries.

## Program Objectives:

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

- Understand the fundamental principles of chemical engineering and process design.
- Apply mass and energy balance techniques to chemical systems.
- Analyze and optimize chemical reaction processes and separations.
- Implement thermodynamic principles in process engineering.
- Develop problem-solving skills for complex chemical processes.

## Target Audience:

- Chemical Engineers.
- Process Engineers.
- Engineering Students.
- Professionals in the chemical, oil, gas, and pharmaceutical industries.
- Plant Operators and Technicians involved in chemical process operations.

## Program Outline:

### Unit 1:

#### Introduction to Chemical Engineering Principles:

- Overview of chemical engineering and its applications.
- Understanding chemical process design and operations.

- Fundamental principles: mass balance and energy balance.
- Role of chemical engineering in various industries.
- Safety and environmental considerations in chemical engineering.

## Unit 2:

### Mass and Energy Balances:

- Principles of conservation of mass and energy.
- Performing mass balance calculations for open and closed systems.
- Energy balance concepts for chemical processes.
- Application of the first and second laws of thermodynamics.

## Unit 3:

### Chemical Reaction Engineering:

- Overview of chemical kinetics and reaction rates.
- Reactor design and types: batch, continuous, and plug flow reactors.
- Reaction mechanisms and rate laws.
- Optimizing chemical reactions for improved yield and efficiency.
- Introduction to catalysis in chemical processes.

## Unit 4:

### Thermodynamics in Chemical Engineering:

- Fundamental thermodynamic principles and laws.
- Phase equilibrium and chemical equilibrium in processes.
- Thermodynamic properties of pure substances and mixtures.
- Heat engines and refrigeration cycles.
- Application of thermodynamics in process design and optimization.

## Unit 5:

## Separation Processes in Chemical Engineering:

- Overview of separation techniques: distillation, filtration, and extraction.
- Design and operation of separation equipment.
- Applications of mass transfer in separation processes.
- Performance optimization of separation systems.
- Case study: Designing an efficient distillation column for a chemical plant.