GTC Transforming Emerging Economies
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Advanced Chemical Reaction Engineering

COURSE OVERVIEW

This advanced course explores the key principles that govern real-world chemical reactors, focusing on reaction kinetics, heat and mass transfer, and fluid dynamics beyond idealized models. It emphasizes the design, analysis, and optimization of industrial reactors, including non-ideal flow, catalytic systems, and transport limitations. Participants will learn to apply advanced mathematical and computational tools to model and solve complex reactor problems. In addition, participants will be able to design, analyze, and optimize sophisticated reactor systems across diverse industrial applications, supporting roles in research, development, and process intensification.

WHO SHOULD ATTEND?

This course is ideal for Chemical Engineers, Process Engineers, and Reactor Design Engineers working with complex reaction systems. It is also suited for R&D Scientists, Catalysis Specialists, Process Intensification Teams, and graduate-level engineers aiming to deepen their expertise in advanced reaction engineering for industrial applications.

COURSE OUTCOMES

Delegates will gain the skills and knowledge to:

- Analyze and apply rate equations for complex homogeneous and heterogeneous catalytic reactions.
- Design and model non-ideal reactors using residence time distribution (RTD) and tank-in-series/dispersion models.
- Evaluate the effects of internal and external transport limitations on heterogeneous reaction rates.
- Develop mathematical models for multiphase reactors, including fluidized beds, trickle beds, and slurry reactors.
- Optimize reactor configurations and operating conditions for selectivity, yield, and safety in complex reaction networks.
- Formulate and solve reactor stability problems, particularly in exothermic reaction systems.

KEY COURSE HIGHLIGHTS

At the end of the course, you will understand;

- The principles of non-ideal reactor design using residence time distribution analysis.
- How to model and predict transport limitations in heterogeneous catalytic systems.
- Advanced design methodologies for multiphase reactors including fluidized and trickle beds.
- Strategies for optimizing reactor performance in complex reaction networks.
- Methods for assessing and managing stability risks in exothermic systems.
- The application of sophisticated kinetic analysis to industrial catalytic processes.
- Modern approaches to reactor design for process intensification applications.

All our courses are dual-certificate courses. At the end of the training, the delegates will receive two certificates.
1. A GTC end-of-course certificate
2. Continuing Professional Development (CPD) Certificate of completion with earned credits awarded