Advanced Separation Processes for Chemical Industries Training Course

19 - 23 Oct 2026

Boston

7500 € (Per Person)

Ref: #ACE9528_59656

Course Introduction / Overview:

This training course gives a comprehensive look into the principles and use of advanced separation processes in chemical industries. Separation technology is a cornerstone of chemical engineering, but traditional methods like distillation can be energy-intensive and not always effective for complex mixtures. This course gives participants a solid foundation in modern, non-thermal separation techniques that offer higher efficiency, selectivity, and sustainability. We explore a range of cutting-edge methods, including membrane-based separations, adsorption, and reactive separation systems. The curriculum is informed by leading academic research in the field. For instance, the book Industrial Separation Processes: Fundamentals by André B. de Haan, H. Burak Eral, and Boelo Schuur serves as a foundational reference. BIG BEN Training Center is committed to giving a forward-thinking curriculum that equips professionals with the skills needed to innovate, optimize processes, and meet modern industrial challenges.

Target Audience / This training course is suitable for:

- Chemical and process engineers.
- R&D scientists and chemists.
- Operations and plant managers.
- Environmental and sustainability professionals.
- Product development specialists.
- Academics and students in chemical engineering.
- Consultants in process optimization.

Target Sectors and Industries:

- Chemical and petrochemical manufacturing.
- Pharmaceuticals.
- Oil and gas.
- Food and beverage.
- Biotechnology.
- Government agencies and environmental regulators.
- Water treatment.

Target Organizations Departments:

- Process design and engineering.
- Research and development.
- Operations and production.
- Sustainability and corporate responsibility.
- Quality control.
- Energy management.
- Manufacturing.

Course Offerings:

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

- Describe the principles of modern membrane separations.
- Apply adsorption and ion exchange for purification.
- Evaluate reactive and enhanced distillation techniques.
- Understand the use of chromatography on an industrial scale.
- Design and model a simulated moving bed process.
- Compare the economics and sustainability of various separation methods.
- Analyze case studies of advanced separations in different industries.
- Select the most suitable separation process for a given mixture.

Course Methodology:

This training course uses a mix of theoretical instruction, guided exercises, and hands-on projects to give a dynamic learning experience. The curriculum combines theoretical lectures with real-world case studies to bridge the gap between academic concepts and practical application. Participants will use hands-on activities, including group workshops and scenario-based exercises, to reinforce their understanding of key topics. We use discussions and Q&A sessions to encourage a collaborative learning environment, where participants can share experiences and insights. The course also includes an in-depth analysis of successful and unsuccessful projects from various industries to highlight best practices and common pitfalls. This approach gives participants the confidence to apply their new knowledge directly to their professional roles. At BIG BEN Training Center, we believe that an engaging and interactive format is key to mastering new skills, so we focus on giving immediate feedback and continuous support throughout the training. The methods are designed to ensure every participant leaf with a clear, practical skill set.

Course Agenda (Course Units):

Unit One: Membrane Separation Processes.

- Introduction to membrane technologies.
- Gas separation membranes.
- Pervaporation and membrane distillation.
- Reverse osmosis and nanofiltration.
- Designing and operating membrane modules.

Unit Two: Adsorption and Ion Exchange.

- Fundamentals of adsorption and isotherms.
- Pressure swing adsorption (PSA).
- Temperature swing adsorption (TSA).
- Ion exchange principles and applications.
- Simulated moving bed (SMB) chromatography.

Unit Three: Reactive and Enhanced Distillation.

- Introduction to reactive distillation.
- Design and modeling of reactive distillation columns.
- Pressure swing distillation.
- Extractor and azeotropic distillation.
- Hybrid separation systems.

Unit Four: Chromatographic and Crystallization Separations.

- Principles of preparative chromatography.
- Industrial-scale chromatography for purification.
- Crystallization from solution.
- Melt and zone refining crystallization.
- Supercritical fluid extraction.

Unit Five: Process Selection and Integration.

- Process selection for complex mixtures.
- Energy efficiency in separation processes.
- Economic analysis of advanced separations.
- Integrating separation processes into a plant.
- Future trends in separation technology.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

How can the development of novel materials, such as metal-organic frameworks (MOFs), fundamentally change the efficiency and sustainability of gas and liquid separation processes?

What unique qualities does this course offer compared to other courses?

This training course is unique because it goes beyond the basics of traditional separations like distillation to give a deep look at modern, high-efficiency methods that are essential for today's chemical industry. While many courses may touch on these topics, our program gives a comprehensive and practical view of technologies like membrane separation, adsorption, and reactive distillation. We don't just teach you about the concepts; we help you find out how to select and implement the right technology for a given industrial challenge. The curriculum is heavily focused on real-world case studies and problem-solving exercises, enabling participants to apply what they learn to real-world scenarios. It's an advanced program that gives professionals the skills needed to innovate and optimize processes for both economic and environmental benefit.