Sustainable Process Design and Optimization Training Course



19 - 23 Oct 2026

Madrid

5900 € (Per Person)

Ref: #ACE2808_59905

Course Introduction / Overview:

This training course gives a comprehensive look into the principles of sustainable process design and optimization. As industries face increasing pressure to reduce their environmental impact and improve efficiency, the integration of sustainability metrics into process design has become essential. This course gives participants a solid foundation in the fundamental concepts of sustainable chemical engineering, including green chemistry, life cycle assessment (LCA), and pinch analysis for energy efficiency. We explore how to design new processes and optimize existing ones to reduce waste, minimize energy use, and use renewable resources. The curriculum is informed by leading academic research in the field. The book Sustainable Design of Chemical Processes: Principles and Case Studies by Marianne F. T. Van der Stegen serves as a foundational reference that gives an in-depth look at the subject. BIG BEN Training Center is committed to giving a forward-thinking curriculum that equips professionals with the skills needed to innovate and lead the transition to a more sustainable chemical industry.

Target Audience / This training course is suitable for:

- Chemical and process engineers.
- R&D scientists and chemists.
- Environmental and sustainability managers.
- Plant managers and operations staff.
- Academics and students in chemical engineering.
- Technical and engineering consultants.
- Corporate social responsibility professionals.

Target Sectors and Industries:

- Chemical manufacturing.
- Pharmaceuticals.
- Petrochemicals.
- Food and beverage.
- Biotechnology.
- Government agencies and environmental regulators.
- Energy and power generation.

Target Organizations Departments:

- Process design and engineering.
- Environmental, health, and safety (EHS).
- Research and development.
- Sustainability and corporate responsibility.
- Operations and production.
- Energy management.
- Strategic planning.

Course Offerings:

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

- Describe the principles of green chemistry and engineering.
- Use life cycle assessment to evaluate a process's environmental impact.
- Apply pinch analysis for heat and energy integration.
- Design processes with a focus on waste minimization and recycling.
- Optimize process parameters for energy efficiency.
- Evaluate renewable feedstocks and their use.
- Perform an economic analysis that includes environmental costs.
- Discuss regulatory frameworks and sustainability reporting.

Course Methodology:

This training course uses a blend 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: Fundamentals of Sustainability in Engineering.

- Introduction to sustainable engineering.
- Principles of green chemistry and green engineering.
- Metrics for sustainability assessment.
- The concept of circular economy.
- Regulatory drivers and global sustainability goals.

Unit Two: Life Cycle Assessment (LCA).

- The stages of life cycle assessment.
- Goal and scope definition.
- Inventory analysis and data collection.
- Impact assessment and interpretation.
- LCA software and tools.

Unit Three: Process Optimization for Efficiency.

- Introduction to process optimization.
- Pinch analysis for heat integration.
- Process flow optimization.
- Integrating utilities and cogeneration.
- Minimizing energy consumption.

Unit Four: Waste Minimization and Resource Use.

- The waste hierarchy.
- Process design for waste minimization.
- Water and solvent recycling.
- The use of renewable feedstocks.
- Case studies in resource efficiency.

Unit Five: Economics and Decision Making.

- Economic evaluation of sustainable projects.
- Including environmental costs in financial models.
- Decision-making tools for sustainable design.
- Case studies in industrial sustainability.
- The future of sustainable process design.

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 principles of sustainable process design be integrated with digital twin technology to create self-optimizing chemical plants that continuously reduce their environmental footprint?

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

This training course is unique because it bridges the gap between traditional process design and the growing demand for sustainability. While many courses discuss one or the other, our program gives a comprehensive framework for creating processes that are both profitable and environmentally sound. We don't just teach you about green engineering; we help you find out how to apply a life cycle assessment and pinch analysis to real industrial scenarios. The curriculum is heavily focused on practical case studies and hands-on exercises, enabling participants to make data-driven decisions that reduce costs and environmental impact. It’s an advanced program that gives professionals the skills needed to lead the transition to a more sustainable and circular economy.