Chemical Process Simulation Using Aspen Plus Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Chemical industries are rapidly evolving with the integration of advanced process simulation, digital twins, and AI-driven process optimization. The ability to model, simulate, and optimize chemical processes using tools like Aspen Plus has become a critical competency for engineers in petrochemicals, oil & gas, pharmaceuticals, specialty chemicals, and sustainable energy sectors. Chemical Process Simulation Using Aspen Plus Training Course is designed to equip participants with hands-on expertise in steady-state simulation, thermodynamic modeling, reaction engineering, and process optimization, enabling data-driven decision-making and improved plant efficiency.

In the era of Industry 4.0, decarbonization, energy efficiency, and process intensification, Aspen Plus plays a vital role in designing sustainable and cost-effective chemical processes. This course focuses on practical industrial applications including distillation, heat integration, reactor design, separation processes, and flowsheet development. Participants will gain strong proficiency in building robust simulation models, troubleshooting convergence issues, and performing sensitivity analysis to enhance process performance and reduce operational costs.

Programme Curriculum

Chemical Process Simulation Using Aspen Plus Training Course

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Course Duration

5 days

Course Objectives

1. Master Aspen Plus process simulation software
2. Understand chemical process modeling and flowsheet development
3. Apply thermodynamic property methods (NRTL, Peng-Robinson, SRK)
4. Perform steady-state process simulation and validation
5. Design and simulate chemical reactors and reaction kinetics
6. Optimize distillation column design and separation processes
7. Conduct heat integration and energy optimization studies
8. Develop process flow diagrams (PFD) and simulation workflows
9. Execute sensitivity analysis and optimization techniques
10. Improve process efficiency and cost reduction strategies
11. Troubleshoot simulation convergence and error handling
12. Apply Aspen Plus for petrochemical and refinery processes
13. Enable digital twin modeling for chemical plants

Target Audience

1. Chemical Engineers
2. Process Engineers in Oil & Gas Industry
3. Petrochemical Plant Operators & Designers
4. R&D Scientists in Chemical Manufacturing
5. Mechanical Engineers working in Process Industry
6. Industrial Chemists and Technologists
7. Energy and Sustainability Engineers
8. Final-year Chemical Engineering Students

Course Module

Module 1: Introduction to Process Simulation & Aspen Plus Basics

- Overview of **process simulation and digital engineering**
- Aspen Plus interface navigation and workspace setup
- Building first simple simulation flowsheet
- Understanding unit operations and stream definitions
- **Case Study:** Basic ammonia synthesis plant simulation

Module 2: Thermodynamics and Property Methods

- Selection of **thermodynamic property packages**
- Vapor-liquid equilibrium (VLE) modeling
- Equation of State vs activity coefficient models
- Phase behavior analysis and property estimation
- **Case Study:** Hydrocarbon phase equilibrium in gas processing

Module 3: Chemical Reaction Engineering in Aspen Plus

- Stoichiometric and kinetic reactor modeling
- Conversion, equilibrium, and rate-based reactors
- Reaction pathway development
- Catalyst and reaction parameter definition
- **Case Study:** Methanol synthesis reactor simulation

Module 4: Separation Processes – Distillation & Absorption

- RadFrac column configuration and design
- Tray and packed column modeling
- Absorption and stripping process simulation
- Column convergence and troubleshooting
- **Case Study:** Crude oil fractional distillation unit

Module 5: Heat Transfer & Heat Integration

- Heat exchanger modeling and simulation
- Energy balance and heat duty calculations
- Pinch analysis fundamentals
- Heat integration strategies
- **Case Study:** Heat recovery system in refinery process

Module 6: Solid Handling & Separation Systems

- Solid-fluid separation modeling
- Filtration, crystallization, and drying processes
- Particle properties and solids flow simulation
- Multiphase system handling
- **Case Study:** Pharmaceutical crystallization process

Module 7: Process Optimization & Sensitivity Analysis

- Optimization tools in Aspen Plus
- Design specification and convergence techniques
- Sensitivity analysis for key process variables
- Economic evaluation and cost optimization
- **Case Study:** Optimization of ethylene production plant

Module 8: Advanced Flowsheeting & Industrial Case Projects

- Complex plant-wide simulation integration
- Recycling and recycle loop handling
- Process intensification concepts
- Scale-up and industrial modeling challenges

- **Case Study:** LNG processing plant simulation and optimization

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com