Process Flow Sheet Design 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

Process Flow Sheet Design is a critical discipline in chemical engineering, process engineering, plant design, and industrial optimization, forming the backbone of efficient, safe, and cost-effective production systems. Process Flow Sheet Design Training Course equips learners with advanced competencies in process simulation, PFD development, P&ID fundamentals, mass and energy balance, equipment integration, and process optimization strategies. It is designed to align with modern industry demands in oil & gas, petrochemicals, pharmaceuticals, renewable energy, hydrogen economy, and sustainable process design, where digital engineering and AI-assisted process modeling are rapidly transforming traditional workflows.

This training emphasizes hands-on mastery of process flow diagram development, Aspen HYSYS/Plus simulation concepts, pinch analysis, unit operations integration, debottlenecking, and process safety considerations (HAZOP-ready design thinking). Participants will gain the ability to translate conceptual process ideas into fully optimized engineering flow sheets that improve plant efficiency, CAPEX/OPEX reduction, carbon footprint minimization, and operational reliability. The course bridges theory with real-world engineering applications using industry case studies and simulation-driven design scenarios.

Programme Curriculum

Process Flow Sheet Design Training Course

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Course Objectives

1. Master Process Flow Diagram (PFD) development using industry standards
2. Understand mass balance and energy balance optimization techniques
3. Apply process simulation tools
4. Design efficient unit operations integration systems
5. Develop competency in process equipment selection and sizing
6. Improve plant efficiency through debottlenecking strategies
7. Apply Pinch Analysis for heat integration and energy optimization
8. Strengthen understanding of process safety and HAZOP-ready design logic
9. Implement sustainable process engineering and green design principles
10. Enhance skills in process optimization and cost reduction
11. Build expertise in P&ID interpretation and development fundamentals
12. Learn digital twin concepts in process engineering workflows
13. Apply industry case-driven decision-making for real plant design scenarios

Target Audience

1. Chemical Engineers and Process Engineers
2. Mechanical Engineers in plant design roles
3. Oil & Gas industry professionals
4. Petrochemical plant operators and designers
5. Pharmaceutical manufacturing engineers
6. Energy and renewable process engineers
7. Final-year engineering students
8. Technical consultants and EPC contractors

Course Modules

Module 1: Fundamentals of Process Flow Sheet Design

- Process design lifecycle and engineering workflow
- PFD vs P&ID differentiation and applications
- Standard engineering symbols and conventions
- Process documentation structure
- Case Study: Crude oil stabilization unit flow sheet

Module 2: Mass and Energy Balance Applications

- Steady-state and dynamic balance systems
- Component and overall material balance
- Energy integration fundamentals
- Process efficiency calculations
- Case Study: Ethanol production plant balance model

Module 3: Process Simulation Fundamentals

- Introduction to simulation environments
- Thermodynamic property packages
- Flow sheet building logic
- Sensitivity analysis basics
- Case Study: Natural gas sweetening simulation

Module 4: Unit Operations Integration

- Reactors, separators, heat exchangers integration
- Process configuration selection
- Equipment interaction effects
- Scale-up considerations
- Case Study: Ammonia synthesis loop optimization

Module 5: Heat Integration & Pinch Analysis

- Energy recovery systems design
- Hot and cold stream analysis
- Minimum energy requirement calculations
- Utility system optimization
- Case Study: Refinery heat exchanger network redesign

Module 6: Process Safety & Risk-Based Design

- Inherent safety principles
- HAZOP methodology integration
- Relief systems and safety valves
- Risk mitigation design strategies
- Case Study: LNG plant safety flow redesign

Module 7: Process Optimization & Debottlenecking

- Plant capacity enhancement techniques
- Bottleneck identification tools
- Optimization algorithms overview
- Cost-performance trade-offs
- Case Study: Petrochemical plant capacity expansion

Module 8: Sustainable & Digital Process Engineering

- Green engineering principles
- Carbon footprint reduction strategies
- Digital twin in process systems
- AI-assisted process design concepts

- Case Study: Hydrogen production plant optimization

Training Methodology

- 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
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Physical	$0

Start Date	End Date	Location	Price
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0

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

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