Process Equipment Design and Selection 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 Equipment Design and Selection Training Course equips engineers, plant managers, and process designers with advanced practical skills in equipment specification, optimization, and lifecycle management. Participants gain in-depth knowledge of pressure vessels, heat exchangers, pumps, compressors, and reactors, emphasizing efficient, cost-effective, and sustainable solutions. The course integrates industry best practices, international standards, and cutting-edge design tools, empowering professionals to make data-driven equipment selection decisions that enhance operational reliability, safety, and productivity.

Through this training, learners develop expertise in process simulation, material selection, corrosion control, and equipment sizing, enabling them to tackle complex process engineering challenges. The program emphasizes real-world case studies, hands-on calculations, and interactive problem-solving, ensuring that participants leave with actionable insights that drive performance optimization, energy efficiency, and compliance with global safety standards. By combining technical knowledge with practical applications, this course positions professionals at the forefront of modern chemical, petrochemical, and manufacturing industries.

Programme Curriculum

Process Equipment Design and Selection Training Course

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Course Duration

5 days

Course Objectives

1. Master process equipment design principles for pressure vessels, heat exchangers, and reactors.
2. Apply advanced material selection techniques to improve equipment longevity and reliability.
3. Perform accurate equipment sizing and rating using industry-standard formulas and software.
4. Analyze process simulation data to optimize equipment performance and energy efficiency.
5. Evaluate pumps, compressors, and turbines for operational efficiency and cost-effectiveness.
6. Implement corrosion prevention and control strategies in industrial processes.
7. Understand safety and risk management protocols for high-pressure and high-temperature systems.
8. Conduct cost-benefit analysis for equipment selection and lifecycle management.
9. Integrate sustainable design practices to minimize environmental impact.
10. Interpret and apply ASME, API, and ISO standards in equipment design and selection.
11. Develop troubleshooting and failure analysis skills for critical equipment.
12. Utilize digital tools and simulation software for design optimization.
13. Build practical experience through industry-relevant case studies and project-based learning.

8Target Audience

1. Process engineers
2. Mechanical engineers
3. Plant managers and supervisors
4. Project engineers
5. Maintenance and reliability engineers
6. Chemical engineers
7. Equipment procurement specialists
8. Industrial consultants

Course Modules

Module 1: Fundamentals of Process Equipment Design

- Overview of pressure vessels, heat exchangers, and reactors
- Basic design equations and principles
- Material properties and selection criteria
- Load and stress analysis techniques
- Case Study: Design optimization of a high-pressure reactor in a chemical plant

Module 2: Equipment Sizing and Rating

- Calculation methods for heat exchangers, pumps, and compressors
- Process flow analysis and capacity estimation
- Impact of operating conditions on equipment performance
- Use of simulation tools for sizing
- Case Study: Scaling a heat exchanger network for a petrochemical facility

Module 3: Material Selection and Corrosion Control

- Corrosion mechanisms and prevention strategies
- Material compatibility with process fluids
- Coatings and surface treatments
- Lifecycle cost analysis
- Case Study: Material failure analysis in a sulfuric acid plant

Module 4: Pumps, Compressors, and Fluid Handling

- Types of pumps and compressors and their applications
- Efficiency and performance analysis
- Cavitation and vibration troubleshooting
- Maintenance and reliability strategies
- Case Study: Energy optimization in pump selection for water treatment

Module 5: Heat Exchangers and Thermal Equipment

- Types and configurations of heat exchangers
- Heat transfer calculation and optimization
- Fouling and cleaning strategies
- Safety and design codes compliance
- Case Study: Retrofit of shell-and-tube heat exchangers in refineries

Module 6: Pressure Vessels and Storage Tanks

- Design under ASME Boiler & Pressure Vessel Code
- Stress and load analysis techniques
- Fabrication and welding considerations
- Inspection and testing procedures
- Case Study: Failure prevention in LPG storage tanks

Module 7: Safety, Standards, and Regulatory Compliance

- Risk assessment and HAZOP analysis
- Safety valve sizing and pressure relief systems
- Compliance with API, ISO, and OSHA standards
- Environmental regulations and sustainability considerations
- Case Study: Hazard analysis and mitigation in chemical reactors

Module 8: Practical Application and Case Studies

- Real-life process equipment challenges
- Simulation-based problem-solving
- Lifecycle and maintenance planning
- Cost optimization exercises

- Case Study: Integrated equipment design for a petrochemical plant

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