Advanced Oil and Gas Process Engineering Training Course

Professional Development Training Course Outline

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

Course Introduction

Advanced Oil and Gas Process Engineering Training course is meticulously designed to equip both aspiring and seasoned professionals with the specialized knowledge and skills required to excel in the modern **petroleum industry**. This program offers a deep dive into the complex processes of **hydrocarbon exploration, production, and refining**, emphasizing **operational excellence**, **process optimization**, and **sustainable practices**. Participants will gain a comprehensive understanding of the entire **oil and gas value chain**, from **upstream operations** to **downstream processing**, preparing them to navigate the industry's evolving challenges, including **digital transformation** and the **energy transition**.

This intensive training focuses on **practical application** and **real-world problem-solving**, moving beyond theoretical concepts to provide hands-on experience in **process design**, **troubleshooting**, and **asset management**. Through a blend of expert-led instruction, interactive workshops, and detailed case studies, participants will master cutting-edge **process engineering tools and technologies**. The curriculum is structured to enhance technical competencies, improve **safety management**, and foster **critical thinking** skills that are crucial for making informed, high-stakes decisions that drive **operational efficiency** and **profitability** in a highly competitive global market.

Programme Curriculum

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Course Objectives

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

1. Master fundamental and advanced process engineering principles in the oil and gas sector.
2. Analyze and optimize complex hydrocarbon processing systems for maximum efficiency.
3. Implement advanced separation technologies and heat exchange optimization techniques.
4. Design and troubleshoot oil and gas production facilities and equipment.
5. Evaluate and manage process safety risks and HSE compliance.
6. Apply process control and instrumentation to enhance operational stability.
7. Utilize digital twin technology and data analytics for predictive maintenance.
8. Understand advanced refining processes and petrochemical production.
9. Develop robust corrosion management and pipeline integrity strategies.
10. Assess the economic viability of new and existing projects.
11. Integrate sustainable engineering practices and decarbonization strategies.
12. Lead process improvement initiatives and manage asset integrity.
13. Conduct root cause analysis and troubleshooting for process deviations.

Organizational Benefits

- Improved process optimization and design lead to reduced operating costs and increased throughput.
- A stronger focus on process safety and risk management minimizes the likelihood of incidents and costly shutdowns.
- Investing in high-value training boosts employee engagement, career progression, and morale, reducing turnover.
- Equipping teams with skills in new technologies like AI and digital twins accelerates a company's digital transformation.
- A highly skilled workforce can innovate faster, improve product quality, and adapt to market changes more effectively than competitors.
- Training on the latest safety, environmental, and industry regulations ensures the organization remains compliant and avoids penalties.
- A deeper understanding of technical and economic factors allows for better strategic planning and investment decisions.

Target Audience

- Process Engineers
- Production Engineers
- Chemical Engineers
- Operations Managers
- Refinery Technicians
- HSE Managers
- Project Managers
- Engineering Consultants

Course Modules

Module 1: Advanced Hydrocarbon Processing & Thermodynamics

- Advanced concepts in fluid dynamics and heat transfer.
- Multi-phase flow analysis and modeling.
- Thermodynamic properties of hydrocarbon mixtures.
- Case Study: **Analyzing a complex heat exchanger network to improve thermal efficiency.**
- Case Study: **Simulating multi-phase flow in a subsea pipeline to prevent hydrate formation.**

Module 2: Separation & Treatment Technologies

- Advanced distillation and fractionation processes.
- Gas dehydration and sweetening using desiccants and solvents.
- Oil and water separation, including produced water treatment.
- Case Study: **Optimizing a crude oil distillation column to increase valuable product yield.**
- Case Study: **Designing a produced water treatment system to meet environmental discharge standards.**

Module 3: Process Safety & Risk Management (PSM)

- Hazard and Operability (HAZOP) studies and LOPA analysis.
- Layers of Protection Analysis (LOPA) and Safety Integrity Level (SIL) determination.
- Emergency shutdown systems (ESD) and pressure relief valve sizing.
- Case Study: **Conducting a HAZOP study on a new gas processing facility to identify potential risks.**
- Case Study: **Evaluating the integrity of a refinery's pressure relief system after a near-miss incident.**

Module 4: Process Control & Instrumentation

- Advanced control loops and distributed control systems (DCS).
- Field instrumentation for flow, level, pressure, and temperature.
- Alarm management and process tuning.
- Case Study: **Tuning a PID controller on a distillation column to improve product quality stability.**
- Case Study: **Designing an advanced control strategy for an LNG liquefaction process.**

Module 5: Facilities Design & Equipment Sizing

- Piping and instrumentation diagrams (P&ID) and process flow diagrams (PFD).
- Sizing and selection of pumps, compressors, and heat exchangers.
- Introduction to advanced process simulation software (e.g., Aspen HYSYS).
- Case Study: **Designing the layout of a new compressor station to meet production targets.**

- Case Study: **Sizing a centrifugal pump for a high-viscosity crude oil pipeline.**

Module 6: Pipeline & Asset Integrity

- Pipeline integrity management systems (PIMS) and smart pigging.
- Corrosion mechanisms and control, including cathodic protection.
- Risk-based inspection (RBI) and Fitness for Service (FFS) assessments.
- Case Study: **Developing a PIMS for an aging natural gas pipeline to prevent leaks.**
- Case Study: **Performing an RBI on a storage tank to determine its remaining service life.**

Module 7: Digital Transformation & AI in Process Engineering

- Introduction to **Industrial Internet of Things (IIoT)** and sensors.
- **Digital twin technology** for real-time process monitoring and simulation.
- Predictive maintenance using **AI and machine learning**.
- Case Study: **Implementing a digital twin of an offshore platform to optimize production.**
- Case Study: **Using machine learning to predict equipment failure in a gas plant.**

Module 8: Economics, Sustainability & Future Trends

- Project economics, cost estimation, and profitability analysis.
- Carbon capture, utilization, and storage (CCUS) technologies.
- Hydrogen production and the role of **new energies** in the oil and gas sector.
- Case Study: **Conducting a feasibility study for a new CCUS project at a refinery.**
- Case Study: **Analyzing the economic impact of integrating renewable energy sources into an oil and gas facility.**

Training Methodology

The course uses a blended, **hands-on** training methodology combining interactive lectures, group discussions, and **real-world case studies**. The approach emphasizes **practical application** and **problem-solving** through:

- Live Instructor-Led Sessions: Engaging lectures with industry experts.
- Interactive Workshops: Small group exercises to apply concepts.
- Process Simulation Software: Hands-on practice with industry-standard tools.
- Case Study Analysis: Detailed examination of real-world scenarios and challenges.
- Q&A and Discussion Forums: Encouraging peer-to-peer learning and knowledge sharing.

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
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

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