Crude Oil Distillation Technologies 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

Crude Oil Distillation Technologies Training is designed to equip learners with advanced knowledge of petroleum refining processes, atmospheric and vacuum distillation systems, hydrocarbon separation, and refinery optimization technologies. This course provides in-depth exposure to modern crude oil processing units, energy efficiency strategies, process control systems, and downstream refining operations, ensuring participants understand how crude oil is transformed into valuable petroleum products such as gasoline, diesel, jet fuel, and petrochemical feedstocks.

In today’s rapidly evolving energy sector, mastering refinery operations, distillation column design, process simulation, and digital refinery technologies is essential for operational excellence and sustainability. This training bridges theoretical knowledge with real-world refinery applications, focusing on process safety, emissions reduction, advanced control systems, and optimization of crude unit performance. Participants will gain practical insights into improving refinery yield, minimizing energy losses, and ensuring compliance with global environmental standards.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. Understand crude oil composition and classification techniques
2. Master atmospheric distillation unit (ADU) operations
3. Learn vacuum distillation system design and optimization
4. Apply advanced process control (APC) in refinery operations
5. Improve hydrocarbon separation efficiency and yield optimization
6. Analyze heat integration and energy recovery systems
7. Develop skills in refinery process simulation software
8. Understand fractionation column internals and tray design
9. Implement refinery safety and hazard management systems
10. Optimize crude unit throughput and operational efficiency
11. Study emissions control and environmental compliance in refineries
12. Apply digital twin and Industry 4.0 technologies in refining
13. Enhance troubleshooting skills for distillation unit upsets and failures

Target Audience

- Petroleum Engineers
- Refinery Process Engineers
- Chemical Engineers in Oil & Gas Industry
- Operations and Production Supervisors
- Maintenance Engineers in Refineries
- Energy Consultants and Analysts
- Graduate Engineering Students
- Government Energy and Regulatory Professionals

Course Modules

Module 1: Introduction to Crude Oil & Refining Fundamentals

- Composition of crude oil and API gravity analysis
- Global crude oil classification systems
- Overview of refining value chain
- Basic refinery flow diagrams
- Hydrocarbon family identification
- **Case Study:** Analysis of Brent vs. Saudi crude processing efficiency differences in global refineries

Module 2: Atmospheric Distillation Unit (ADU) Operations

- Preheating and desalting of crude oil

- Atmospheric tower operation principles
- Fractionation zones and temperature control
- Product cut points
- Operational troubleshooting
- **Case Study:** Optimization of ADU throughput in a Middle East refinery to reduce energy consumption by 12%

Module 3: Vacuum Distillation Unit (VDU) Technology

- Vacuum system design and operation
- Heavy residue processing
- Vacuum column internals and packing
- Steam ejector systems
- Residue upgrading strategies
- **Case Study:** Conversion of atmospheric residue into feedstock for FCC units in a European refinery

Module 4: Heat Integration & Energy Optimization

- Heat exchanger network design
- Pinch analysis in refineries
- Energy recovery systems
- Furnace and reboiler efficiency
- Fuel consumption reduction strategies
- **Case Study:** Energy optimization project reducing refinery fuel gas usage by 18%

Module 5: Process Control & Automation Systems

- Distributed Control Systems (DCS)
- SCADA applications in refinery operations
- Advanced Process Control (APC) strategies
- Real-time monitoring systems
- Alarm management and safety interlocks
- **Case Study:** Implementation of APC in a crude distillation unit increasing yield by 6%

Module 6: Distillation Column Design & Internals

- Tray vs. packed columns
- Vapor-liquid equilibrium principles
- Column efficiency and pressure drop
- Reflux ratio optimization
- Column troubleshooting techniques
- **Case Study:** Retrofit of tray design improving separation efficiency in an Asian refinery

Module 7: Refinery Safety, Risk & Environmental Compliance

- HAZOP and HAZID methodologies
- Fire and explosion risk management
- Emission control technologies
- Environmental regulations
- Process safety management systems
- **Case Study:** Risk mitigation strategy reducing refinery incidents by 30%

Module 8: Digital Refining & Industry 4.0 Applications

- Digital twin technology in refineries
- AI and machine learning for predictive maintenance
- Big data analytics in process optimization
- Smart sensors and IoT integration
- Cybersecurity in refinery systems
- **Case Study:** Digital twin deployment improving crude unit uptime by 20%

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
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:

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