Training Course on Petroleum Refining

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Training Course on Petroleum Refining provides an in-depth understanding of **petroleum refining**, a critical sector within the **oil and gas industry**. Participants will gain essential knowledge of the complex processes involved in transforming **crude oil** into a wide array of valuable products, including transportation fuels, petrochemical feedstocks, and lubricants. The course covers everything from the fundamental properties of crude oil and initial separation techniques to advanced conversion processes and product upgrading. Strong emphasis is placed on understanding refinery operations, process optimization, safety protocols, and environmental considerations, equipping individuals with the skills necessary to excel in this dynamic and technologically advanced field.

The curriculum is designed to cater to a diverse audience, including engineers, operators, technicians, and management personnel seeking to enhance their expertise in **refinery operations** and **process technology**. Through a blend of theoretical learning and practical insights into **refining processes**, participants will develop a strong foundation in the key unit operations, including distillation, cracking, reforming, and treating. Furthermore, the course explores the economic aspects of refining, **product blending**, and the impact of market trends and regulations on refinery profitability. By the end of this training, attendees will be able to analyze refinery flow schemes, understand the principles behind various refining technologies, and contribute effectively to improving refinery efficiency and performance.

Programme Curriculum

Training Course on Petroleum Refining

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Course Duration

10 days

Course Objectives

1. Understand the fundamentals of petroleum refining and the crude oil composition.
2. Analyze the properties and classification of crude oil, including API gravity and crude assay.
3. Master the principles of atmospheric and vacuum distillation in crude oil processing.
4. Explain the key refinery separation processes, including fractionation and deasphalting.
5. Describe the mechanisms of thermal and catalytic conversion processes like fluid catalytic cracking (FCC) and hydrocracking.
6. Gain knowledge of catalytic reforming and isomerization for gasoline production.
7. Understand hydrotreating and other refinery treating processes for product quality improvement.
8. Learn about product blending techniques to meet fuel specifications.
9. Explore refinery gas processing, sulfur recovery, and hydrogen production units.
10. Comprehend wastewater treatment and environmental regulations in refineries.
11. Analyze refinery economics, profitability, and market trends in refining.
12. Identify safety protocols and risk management in petroleum refinery operations.
13. Discuss emerging technologies in refining and sustainable refining practices.

Organizational Benefits

- Improved Operational Efficiency
- Enhanced Product Quality
- Reduced Downtime
- Increased Safety Awareness.
- Better Decision-Making.
- Environmental Compliance
- Innovation and Adaptability.
- Improved Employee Morale and Retention
- Enhanced Profitability
- Better Asset Management

Target Audience

1. Process Engineers
2. Operations Personnel.

3. Maintenance Technicians and Engineers
4. Safety Officers and Managers
5. Environmental Engineers and Specialists
6. Technical Sales and Marketing Professionals
7. Management and Leadership Personnel.
8. New Entrants to the Oil and Gas Industry.

Course Outline

Module 1: Introduction to Petroleum Refining and Crude Oil

- Overview of the global petroleum industry and its significance.
- Chemical composition and characteristics of crude oil.
- Types of crude oil and their properties (API gravity, sulfur content, etc.).
- Overview of refinery products and their applications.
- Basic refinery flow and process units.

Module 2: Crude Oil Pre-treatment and Separation

- Crude oil desalting and dehydration processes.
- Atmospheric distillation: principles and equipment.
- Vacuum distillation: principles and equipment.
- Fractionation and separation of crude oil components.
- Handling and storage of crude oil and intermediate products.

Module 3: Thermal Conversion Processes

- Introduction to thermal cracking processes (visbreaking, steam cracking).
- Chemistry and mechanisms of thermal cracking.
- Equipment and operating conditions in thermal cracking units.
- Yields and product quality from thermal cracking.
- Comparison with catalytic cracking processes.

Module 4: Catalytic Cracking Processes

- Fundamentals of catalytic cracking (FCC, hydrocracking).
- Types of catalysts used in catalytic cracking.
- Reactor design and operating variables in FCC units.
- Product distribution and quality from catalytic cracking.
- Advances in catalytic cracking technology.

Module 5: Catalytic Reforming and Isomerization

- Chemistry of catalytic reforming reactions.
- Types of reforming catalysts and processes.
- Operating conditions and product yields in catalytic reformers.
- Isomerization processes for octane enhancement.
- Integration of reforming and isomerization units.

Module 6: Hydrotreating and Hydrodesulfurization

- Principles of hydrotreating reactions.
- Catalysts used in hydrotreating processes.
- Removal of sulfur, nitrogen, and metals from refinery streams.
- Hydrotreating of naphtha, kerosene, and diesel.
- Impact of feed quality on hydrotreating performance.

Module 7: Product Blending and Formulation

- Principles of gasoline blending and octane number.
- Diesel fuel blending and cetane number.
- Blending of jet fuel, fuel oil, and lubricants.
- Use of additives to enhance product properties.
- Quality control and specifications of blended products.

Module 8: Refinery Gas Processing and Sulfur Recovery

- Composition and treatment of refinery gases.
- Separation and recovery of valuable components (LPG, natural gas).
- Sulfur recovery processes (Claus process, etc.).
- Tail gas treatment and emission control.
- Hydrogen production and utilization in refineries.

Module 9: Petrochemical Feedstock Production

- Overview of petrochemical feedstocks from refining.
- Production of olefins (ethylene, propylene) and aromatics (benzene, toluene, xylene).
- Integration of refinery and petrochemical operations.
- Emerging trends in petrochemical feedstock production.
- Quality requirements for petrochemical feedstocks.

Module 10: Refinery Utilities and Supporting Systems

- Steam generation and distribution in refineries.
- Cooling water systems and heat exchangers.
- Compressed air and nitrogen systems.
- Fuel gas systems and flare systems.
- Wastewater treatment and management.

Module 11: Refinery Economics and Planning

- Crude oil procurement and cost factors.
- Refinery operating costs and profitability analysis.
- Product pricing and market dynamics.
- Refinery planning and scheduling.
- Linear programming and optimization techniques.

Module 12: Safety and Risk Management in Refineries

- Identification of potential hazards in refinery operations.
- Risk assessment and mitigation strategies.
- Fire prevention and protection systems.
- Emergency response procedures and planning.
- Occupational health and safety regulations.

Module 13: Environmental Management in Petroleum Refining

- Sources of air and water pollution in refineries.
- Emission control technologies and regulations.
- Waste management and disposal practices.
- Environmental impact assessment.
- Sustainable refining practices and technologies.

Module 14: Advanced Refining Technologies and Processes

- Heavy oil upgrading technologies (coking, hydroconversion).
- Gas-to-liquids (GTL) and coal-to-liquids (CTL) processes.
- Biofuel integration in refineries.
- Digitalization and automation in refinery operations.
- Future trends in petroleum refining technology.

Module 15: Refinery Turnarounds, Maintenance, and Reliability

- Planning and execution of refinery turnarounds.
- Preventive and predictive maintenance strategies.
- Reliability engineering and asset integrity management.
- Inspection and testing of refinery equipment.
- Best practices in refinery maintenance and reliability.

Training Methodology

This training course will employ a blended learning approach, incorporating various methodologies to ensure effective knowledge transfer and skill development:

- **Interactive Lectures:** Engaging presentations with real-world examples and case studies.
- **Group Discussions:** Facilitated discussions to encourage peer learning and knowledge sharing.
- **Case Study Analysis:** In-depth examination of refinery scenarios and problem-solving exercises.
- **Practical Exercises:** Hands-on activities and simulations to reinforce theoretical concepts.
- **Visual Aids:** Use of diagrams, flowcharts, videos, and multimedia resources.
- **Q&A Sessions:** Dedicated time for participants to ask questions and clarify doubts.
- **Quizzes and Assessments:** To evaluate understanding and track progress.
- **Guest Speakers (Optional):** Industry experts sharing their practical experiences.
- **Plant Visits (Optional):** Opportunity to observe refinery operations firsthand.

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.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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

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