QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1806

Refineries and Petrochemical Industries Training Course

DOWNSTREAM OPERATIONS, REFINING, PETROCHEMICALS & INDUSTRIAL OPERATIONS
OIL & GAS

DURATION
5 Days

DELIVERY
Classroom

Course Overview

The Refineries and Petrochemical Industries Training Course is a comprehensive professional program designed to provide participants with an integrated understanding of petroleum refining, petrochemical processing, production systems, operational performance, and the industrial value chain. The course connects crude oil processing with the production of refined petroleum products, petrochemical feedstocks, intermediate chemicals, polymers, and other high-value products.

Modern refining and petrochemical complexes require a strong understanding of process integration, feedstock selection, unit operations, energy efficiency, product quality, reliability, safety, and economic performance. This course provides participants with practical knowledge of how different processing units interact and how operational decisions can influence production yield, product quality, energy consumption, profitability, and overall plant performance.

The program covers crude oil characteristics, refinery configuration, atmospheric and vacuum distillation, conversion and upgrading processes, hydrotreating, catalytic cracking, hydrocracking, reforming, gas processing, petrochemical feedstocks, olefins, aromatics, polymers, product quality, utilities, energy management, process safety, reliability, and refinery-petrochemical integration.

The course is suitable for professionals working in oil refineries, petrochemical complexes, petroleum companies, chemical industries, and downstream operations. It is particularly valuable for process engineers, refinery engineers, petrochemical engineers, production engineers, operations managers, shift supervisors, technical specialists, maintenance and reliability professionals, and professionals involved in planning and operational performance.

Objectives

- By the end of the course, participants will be able to:
- Analyze the integrated value chain of petroleum refining and petrochemical industries.
- Evaluate crude oil and feedstock characteristics and their impact on processing and production.
- Understand the operating principles of major refinery and petrochemical process units.
- Analyze distillation, conversion, upgrading, and treating processes and their influence on product yield and quality.
- Evaluate major petrochemical feedstocks and their suitability for different production processes.

- Apply principles of refinery and petrochemical integration to improve value creation.
- Analyze opportunities for improving energy efficiency and reducing process losses.
- Evaluate factors affecting product quality and compliance with specifications.
- Apply process safety and operational risk-management principles within refining and petrochemical facilities.
- Analyze production, productivity, reliability, energy, and operational performance indicators.
- Evaluate fundamental economic factors affecting refinery and petrochemical profitability.
- Develop practical improvement initiatives to strengthen operational performance, integration, efficiency, and sustainability.

Who Should Attend

This course is designed for professionals working in oil refineries, petrochemical complexes, downstream petroleum companies, and chemical processing facilities. It is particularly suitable for Process Engineers, Refinery Engineers, Petrochemical Engineers, Production Engineers, Operations Engineers, Process Technologists, Operations Managers, Shift Supervisors, and Technical Services Professionals.

The program is also valuable for Maintenance Engineers, Reliability Engineers, Inspection Professionals, Laboratory and Quality Specialists, HSE Professionals, Production Planners, Refinery Economists, and professionals involved in technical planning, performance management, and downstream business operations.

Learning Outcomes

- Upon completion of the course, participants will be able to:
- Explain the major value chain elements of petroleum refining and petrochemical industries.
- Understand the relationship between crude oil, refinery processes, and petrochemical feedstocks.
- Analyze the functions and interactions of major refinery process units.
- Understand conversion, upgrading, treating, and petroleum product production processes.
- Identify major feedstocks used in petrochemical production.
- Explain the fundamental principles of olefin, aromatic, polymer, and intermediate chemical production.

- Evaluate the influence of operating conditions on production yield and product quality.
- Identify opportunities for refinery-petrochemical integration.
- Evaluate opportunities for improving energy efficiency and reducing operational losses.
- Apply fundamental process safety and operational risk-management principles.
- Analyze operational, production, energy, reliability, and economic performance indicators.
- Evaluate key factors affecting refinery and petrochemical profitability.
- Identify opportunities for improving feedstock utilization and product value.
- Develop practical initiatives for improving integrated refining and petrochemical performance.

Course Outline

DAY 01

Fundamentals of Refining, Petrochemicals & the Industrial Value Chain

- Overview of the oil and gas downstream industry.
- Understanding the petroleum refining and petrochemical value chain.
- Refining versus petrochemical processing.
- The role of refineries in supplying petrochemical feedstocks.
- Crude oil characteristics and classification.
- Major refinery products and petroleum derivatives.
- Primary feedstocks used in petrochemical industries.
- Relationship between feedstock characteristics and process configuration.
- Fundamentals of integrated refinery and petrochemical complexes.
- Technical and commercial considerations in feedstock selection.
- Emerging trends in refining and petrochemical industries.

> **PRACTICAL APPLICATION**
>
> Analyze the value chain of an integrated refinery-petrochemical complex and identify key value-creation opportunities.

DAY 02

Refining Processes, Conversion & Petroleum Product Manufacturing

- Crude oil receipt, storage, blending, and preparation.
- Crude desalting and pretreatment.
- Principles of atmospheric distillation.
- Refinery distillation operations and separation efficiency.
- Vacuum distillation principles and applications.
- Refinery conversion and upgrading processes.
- Catalytic cracking fundamentals and operations.
- Hydrotreating and contaminant removal.
- Hydrocracking and product quality improvement.
- Catalytic reforming and fuel-quality enhancement.
- Gas processing and recovery.

> **PRACTICAL APPLICATION**
>
> Analyze a refinery process flow and evaluate how major processing units influence product yield, quality, and economic value.

DAY 03

Petrochemical Processes, Feedstocks & Products

- Fundamentals of the petrochemical industry.
- Petrochemical feedstocks and their sources.
- Olefin production and major applications.
- Fundamentals of steam cracking and feedstock conversion.
- Ethylene, propylene, and their major derivatives.
- Aromatics production and chemical intermediates.
- Fundamentals of polymer production.
- Polyethylene and polypropylene manufacturing principles.
- Intermediate and finished petrochemical products.

DAY 03 — CONTINUED

- Product quality and specification management.
- Relationship between operating conditions, yield, and product quality.

PRACTICAL APPLICATION

Analyze a petrochemical production pathway from feedstock to finished product and identify its critical performance factors.

DAY 04

Refinery-Petrochemical Integration, Energy, Safety & Reliability

- Principles of refinery and petrochemical integration.
- Optimizing feedstock utilization and product allocation.
- Process integration and energy recovery.
- Energy management in refineries and petrochemical plants.
- Reducing fuel and utility consumption.
- Industrial utilities and supporting systems.
- Equipment reliability and asset integrity.
- Coordination between operations, maintenance, and engineering.
- Process control and product quality management.
- Process safety principles in refining and petrochemical facilities.
- Identifying operational hazards and managing abnormal conditions.

PRACTICAL APPLICATION

Evaluate an integrated refinery-petrochemical operating scenario and identify opportunities to improve energy efficiency, reliability, safety, and operational performance.

DAY 05

Refinery & Petrochemical Economics, Performance & Optimization

- Fundamentals of refinery and petrochemical economics.
- Relationship between feedstock costs, product prices, and operating margins.

DAY 05 — CONTINUED

- Understanding yield, productivity, and value creation.
- Key performance indicators for refineries and petrochemical complexes.
- Improving throughput and unit utilization.
- Reducing product losses and improving product quality.
- Maximizing feedstock value and utilization.
- Optimizing the production mix according to market and economic conditions.
- Managing operational and economic risks.
- Sustainability, emissions reduction, and resource efficiency.
- Continuous improvement and operational excellence.
- Final practical workshop: Develop an integrated Refinery & Petrochemical Performance Improvement Plan covering feedstock management, process efficiency, production yield, product quality, energy performance, reliability, process safety, refinery-petrochemical integration, economics, sustainability, and key performance indicators.

Register or Request More Information

Course page: https://quest-training.com/courses/refineries-and-petrochemical-industries-training-course
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