

€ TRAINING

Mastering Petroleum Refinery Operations





Mastering Petroleum Refinery Operations

Introduction:

Petroleum refinery operations involve a series of processes that convert crude oil into valuable products such as fuels, lubricants, and petrochemicals. These operations include distillation, cracking, treating, and blending to ensure the production of high-quality end products. This training program provides comprehensive instruction on the intricacies of refining operations, focusing on planning, scheduling, and yield optimization. It equips professionals with the skills and knowledge necessary to enhance refinery efficiency, reduce quality giveaways, and optimize production yields.

Program Objectives:

At the end of this program, the participants will be able to:

- Explore production planning and scheduling tools for crude and product deliveries.
- Apply scheduling optimization principles for efficient refinery operations.
- Optimize crude selection to enhance profitability.
- Develop blending techniques using Excel for improved product quality.
- Minimize quality giveaways through practical Excel spreadsheets and optimize refinery efficiency.

Targeted Audience:

- Refining professionals, including technologists and operations engineers.
- Professionals involved in production, planning, and scheduling.
- Process engineers and technologists engaged in refinery activities.
- Operations personnel, including shift supervisors.
- Marketers, refinery planners, and blending professionals.

Program Outline:

Unit 1:

Refinery Configuration and Planning:

- Understand hydro skimming refinery processes.

- Explore refineries with secondary conversion processes.
- Analyze integrated refinery systems.
- Evaluate existing and new refinery configurations.
- Assess crude oil selection and scheduling for optimal operations.

Unit 2:

Product Movements and Tankages Management:

- Gather necessary information for product movement planning.
- Analyze crude assay and intermediate feed characteristics.
- Manage yields and properties across different process units.
- Optimize product blending considering specifications and environmental issues.
- Evaluate utilities to improve product movement and tankage release.

Unit 3:

Problem Formulation and Solution Approaches:

- Understand refinery flow-sheets and material balance.
- Formulate problem statements and demand equations for optimization.
- Implement product inventory and quality control strategies.
- Explore capacity control and feedstock availability.
- Apply mathematical approaches like linear programming and graphic methods.

Unit 4:

Crude Oil Yields and Refinery Technology:

- Understand crude oil origins, assays, and characteristics.
- Analyze crude oil products and product specifications.
- Explore refinery complexity and interrelationships of processes.
- Evaluate production of gasoline, kerosene, jet fuel, and diesel.
- Assess refinery economics and petrochemical feedstocks for yield optimization.

Unit 5:

Petroleum Refinery Processes:

- Overview of crude processing and desalting methods.
- Understand atmospheric and vacuum distillation processes.
- Analyze heavy oil processing methods like coking and thermal processes.
- Explore delayed coking, fluid coking, flexicoking, and visbreaking.
- Assess the impact of refining processes on product yields and quality.

Unit 6:

Process for Motor Fuel Production:

- Explore fluid catalytic cracking, hydrocracking, and cat cracking.
- Understand isomerization, alkylation, and hydrotreating for motor fuels.
- Assess catalytic reforming for motor fuel production.
- Manage blending for product specifications and hydrogen production.
- Evaluate refinery gas plants, acid gas treating, and sulfur recovery plants.

Unit 7:

Refinery Economics and Optimization:

- Develop residue reduction strategies for improved yield and profitability.
- Process asphalt and residual fuel for value-added products.
- Learn cost estimation methods and economic evaluation techniques.
- Analyze economic factors impacting refinery operations.
- Explore optimization strategies to enhance refinery performance.

Unit 8:

Supporting Operations and Environmental Considerations:

- Apply blending techniques for environmental compliance and product quality.

- Understand hydrogen production methods and environmental impacts.
- Manage refinery gas plants to control emissions.
- Apply acid gas treating techniques for sulfur removal and protection.
- Evaluate sulfur recovery plants for regulatory compliance and sustainability.

Unit 9:

Recent Developments and Future Trends:

- Explore emerging technologies in refinery configuration and planning.
- Learn about innovations in product movements and tankage management.
- Discover advancements in problem formulation and solution approaches.
- Stay updated with trends in crude oil yields and refinery technology.
- Understand the future directions of petroleum refinery processes and motor fuel production.

Unit 10:

Future Technologies in Refining and Sustainability:

- Explore the latest advancements in refining technologies and automation.
- Analyze the role of digitalization and AI in optimizing refinery operations.
- Understand sustainable practices in refining, including carbon capture and renewable energy integration.
- Evaluate innovations in reducing emissions and improving energy efficiency in refineries.
- Discuss the future of refining in the context of global energy transition and sustainability goals.