# Advanced Petroleum Refining and Process Economics Training Course

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4100 € (Per Person)

Ref: #ACE9382_296405

## Course Introduction / Overview:

The global downstream sector is a complex and dynamic environment, where technical proficiency must be paired with sharp economic acumen for success. This training course provides a comprehensive exploration of modern petroleum refining technology, from crude oil composition to the final blended products. It is meticulously designed to bridge the gap between engineering principles and financial realities, offering participants a holistic understanding of refinery operations. We will delve into the core processes, including distillation, catalytic cracking, hydrotreating, and reforming, analyzing their operational parameters and technological advancements. A significant focus is placed on process economics, exploring how factors like crude oil selection, refinery configuration, and market demand influence profitability. Drawing upon foundational concepts detailed in works like "Petroleum Refining: Technology and Economics" by James H. Gary, this program equips professionals with the tools to optimize processes, improve yields, and enhance refinery margins. BIG BEN Training Center has developed this course to empower participants to make informed decisions that drive both operational excellence and financial performance in the competitive energy market.

## Target Audience / This training course is suitable for:

- Process Engineers.
- Chemical Engineers.
- Refinery Operators and Technicians.
- Plant Managers and Supervisors.
- Petroleum Economists and Analysts.
- Technical Services Personnel.
- Research and Development Scientists.
- Project Engineers involved in refinery upgrades.
- Energy Traders and Financial Analysts.
- Corporate Planners and Strategists.

## Target Sectors and Industries:

- Oil and Gas (Downstream Operations).
- Petrochemical and Chemical Manufacturing.
- Energy Consulting and Advisory Firms.
- Engineering, Procurement, and Construction (EPC) Companies.
- Financial Institutions and Investment Banks.
- Technology and Catalyst Suppliers.
- Governmental bodies and energy regulatory agencies.
- Logistics and Supply Chain Management for petroleum products.

## Target Organizations Departments:

- Refinery Operations.
- Process Engineering and Technical Services.
- Planning and Economics.
- Research and Development (R&D).
- Maintenance and Reliability.
- Health, Safety, and Environment (HSE).
- Supply Chain and Logistics.
- Business Development and Strategy.
- Project Management.

## Course Offerings:

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

- Analyze the composition of various crude oils and their impact on refinery processing.
- Explain the principles and operations of atmospheric and vacuum distillation units.
- Evaluate the function and performance of major conversion processes like FCC, hydrocracking, and coking.
- Describe the key treating processes for removing impurities such as sulfur and nitrogen.
- Master the fundamentals of gasoline, diesel, and jet fuel blending to meet market specifications.
- Calculate and interpret key economic indicators, including refinery margins and process unit profitability.
- Apply optimization techniques to improve refinery yield and energy efficiency.
- Understand the impact of environmental regulations on refinery operations and investment decisions.
- Assess the economic feasibility of refinery upgrade and expansion projects.
- Analyze future trends, including digitalization and integration with petrochemicals.

## Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a deep and practical understanding of petroleum refining and economics. This course moves beyond traditional lectures to create an immersive and interactive learning environment. We utilize a blended approach that combines expert-led presentations with real-world case studies drawn from the global refining industry. Participants will engage in collaborative group workshops and problem-solving sessions, allowing them to apply theoretical concepts to practical operational and economic challenges. Interactive discussions are a cornerstone of the program, encouraging the exchange of ideas and experiences among peers and with the instructor. The curriculum incorporates process simulation examples and economic modeling exercises to provide hands-on experience in decision-making. Continuous feedback and guided Q&A sessions ensure that all concepts are thoroughly understood. This dynamic and participant-centered approach guarantees that attendees will leave with not only new knowledge but also the confidence to apply it effectively in their professional roles.

## Course Agenda (Course Units):

### Unit One: Fundamentals of Petroleum Refining and Crude Oil Characterization

- Introduction to the Downstream Oil and Gas Sector.
- Crude Oil Composition, Assay, and Evaluation.
- Properties of Petroleum Products and Specifications.
- Overview of a Modern Refinery Configuration.
- The Role of Atmospheric and Vacuum Distillation.
- Refinery Process Flow Diagrams and P&IDs.
- Basic Heat Transfer and Fluid Flow Principles in a Refinery.

### Unit Two: Key Conversion Processes and Technologies

- Fluid Catalytic Cracking (FCC) for Gasoline Production.
- Hydrocracking for High-Quality Distillate Fuels.
- Delayed Coking and Visbreaking for Heavy Oil Upgrading.
- Catalytic Reforming for High-Octane Gasoline Components.
- Alkylation and Isomerization Processes.
- Understanding Process Catalysts and their Lifecycles.
- Process Control and Instrumentation in Conversion Units.

### Unit Three: Product Treating, Blending, and Quality Control

- Hydrotreating for Sulfur, Nitrogen, and Metals Removal.
- Sulfur Recovery Units (SRU) and Tail Gas Treatment.
- Gasoline Blending Components and Octane Enhancement.
- Diesel and Jet Fuel Blending for Specification Compliance.
- LPG and Fuel Gas Processing and Treatment.
- Lubricant Base Oil Manufacturing Processes.
- Laboratory Analysis and Quality Assurance in Refining.

## Unit Four: Refinery Process Economics and Optimization

- Introduction to Refinery Economics and Margin Calculation.
- Linear Programming (LP) for Refinery Planning and Optimization.
- Crude Oil Selection and Feedstock Economics.
- Process Unit Profitability and Performance Monitoring.
- Energy Management and Efficiency Improvement in Refineries.
- Refinery Utility Systems and their Economic Impact.
- Capital Investment Analysis for Refinery Projects.

## Unit Five: Environmental, Safety, and Future Trends in Refining

- Health, Safety, and Environment (HSE) Management Systems.
- Key Environmental Regulations and Compliance Strategies.
- Refinery Turnaround and Maintenance Management.
- Digitalization, AI, and Advanced Process Control in Refining.
- Integration of Refineries with Petrochemical Complexes.
- The Role of Biofuels and Renewable Feedstocks.
- The Future of Petroleum Refining in the Energy Transition.

# FAQ:

## Qualifications required for registering to this course?

There are no requirements.

## How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

## Something to think about:

Considering the global energy transition, how can traditional petroleum refineries strategically adapt their process configurations and economic models to remain profitable and relevant in a low-carbon future?

## What unique qualities does this course offer compared to other courses?

This course distinguishes itself by seamlessly integrating the two critical pillars of the downstream industry: advanced process technology and rigorous process economics. Unlike programs that focus on either engineering or finance in isolation, this curriculum is built on the principle that operational decisions and financial outcomes are inextricably linked. We move beyond theoretical knowledge by immersing participants in practical, real-world scenarios and case studies that mirror the complex challenges faced by modern refineries. The content is structured to build a holistic perspective, enabling an engineer to understand the economic impact of a process change and an analyst to grasp the technical constraints of a refinery. The emphasis is on developing analytical and decision-making skills, teaching participants not just what the processes are, but how to evaluate their performance, optimize their output, and justify investments. This dual-focus approach provides a unique and powerful competency, empowering professionals to drive profitability and operational excellence in a competitive and evolving energy landscape.