

Economic Framework of Refining

5.00 days

EAV/EFR

Overview

AUDIENCE

Technical, operating and engineering personnel working in the refining industry, trading and commercial specialists, independent consultants, process licensors, catalyst manufacturers and refining subcontractors.

PURPOSE

This course provides a complete view of all the fundamental aspects and challenges of the economic framework in which the refining industry is evolving.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- calculate product marginal value, refinery margins and process unit margins,
- identify cost savings in order to improve margins,
- simulate refinery operations and product blending,
- simulate and optimize refinery operations, crude oil selection and product manufacturing,
- analyze the result of a linear programming model optimization,
- evaluate project profitability.

PREREQUISITE

Basic notions of Microsoft Excel.

WAYS AND MEANS

Case studies and exercises derived from present refinery situations.
Economic optimization using Excel.
Quiz.

Agenda

TECHNICAL OVERVIEW

Brief technical presentation of the main refining units: distillation, conversion, blending, etc.
Refinery scheme evolution.

0.25 d

OIL MARKETS & TRADING

Oil supply and demand fundamentals and evolution.
Petroleum physical trading (spot, forward).
Crude oil and petroleum product pricing: benchmark, quality differential, etc.
Financial trading (futures) and hedging strategies for a refiner.

0.25 d

REFINING CONTEXT

World petroleum product demand.
Refining supply: overcapacity, types and quantity.
Main challenges: deep conversion, new product specifications, petrochemical integration, environment, etc.
Projects and perspectives.

0.50 d

REFINING MARGINS & COSTS

1.00 d

Refinery margins and costs: definitions and evolution worldwide.

Unit margins and intermediate product valuation.

Case studies: crude oil arbitrage, Fluid Catalytic Cracking (FCC) unit margin.

REFINERY BLENDING SIMULATION

0.50 d

Case study: managing the blending operation of a refinery taking into account the economic and technical (product specifications, capacities, etc.) constraints.

OPTIMIZATION OF REFINING OPERATIONS - LINEAR PROGRAMMING

1.00 d

Linear programming (LP) principles: linear equation, objective function, profit maximization or cost minimization, Simplex method, graphic interpretation, etc.

Analysis of the LP results: optimum properties, marginal costs, domain of validity of the results, etc.

Case study on Excel: explanation of a refinery model matrix (material balances, product specifications, utilities consumption, objective function, etc.); team work on the optimization of a cracking refinery and on the result analysis.

OPTIMIZATION OF REFINERY OPERATIONS - SCHEDULING

0.50 d

Principles of refining management: constraints, operational organization.

Monthly program to daily operations.

Optimization of margins from different process units.

Case study: management of typical sequential constraints (delays, processing problems, etc.).

INVESTMENT PROFITABILITY STUDIES

1.00 d

Value creation and capital cost, cash flows, discounting principle and inflation impact.

Standard global profitability analysis: cash flow schedule, economic criteria (net present value, internal rate of return, etc.).

Introduction to risk analysis.

Exercises on various investment profitability studies for refineries and petrochemical plants.