CONCEPT

Refinery Planning and Scheduling: Crude Selection, LP Models and Yield Optimisation

27 – 31 December 2026
Riyadh - KAFD district five-star



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Introduction:

Refinery planning and scheduling decides which crudes are bought, how conversion capacity is loaded and whether products leave on time and on grade. When the planning model is out of date, the monthly plan never reaches the tank farm intact and nobody reconciles plan against actual, margin leaks through wrong crude choices, blend giveaway and missed cargoes. This Core Concept course equips planners and schedulers to value crudes, maintain and read a refinery LP, cascade the plan into daily tank moves and close the loop with back-casting. Participants build a Refinery Monthly Plan and Schedule Reconciliation Workbook.

Course Objectives:

- Rank candidate crudes by breakeven value and marginal contribution using assay data and planning model runs
- Maintain the structure of a refinery linear programming model, including yield vectors, pooling, delta-base submodels and capacity rows
- Interpret LP solutions, shadow prices and reduced costs to decide unit loading, severity and product slate
- Convert a monthly refinery plan into weekly and daily schedules with feasible tank, blend and cargo sequences
- Reconcile plan against actual performance through back-casting and correct model yields and constraints
- Re-plan crude intake, intermediate inventory and product commitments around unit shutdowns and turnarounds

Target Audience:

- Refinery planners who run the planning model and issue the monthly operating plan
- Schedulers who sequence crude receipts, unit feeds, blends and product liftings day to day
- Economics and optimisation engineers who maintain LP model data, yields and price sets
- Crude supply and product trading support staff who evaluate cargo offers and commit volumes
- Oil movement and blending leads who execute tank transfers and certify finished batches
- Operations and technical services leads who agree unit targets with planning and report actual yields

Course Outline:

Day 1: Refinery Planning Economics and Crude Selection

- Planning Hierarchy: Annual Budget, Monthly Plan, Weekly Schedule and Daily Orders
- Crude Assay Data Sets as Planning Inputs: Cut Yields, Sulphur and Property Distribution
- Crude Valuation by Breakeven Price Against a Reference Crude Slate
- Gross Product Worth, Crack Spread Benchmarks and Variable Cost per Barrel
- Crude Slate Scorecard: Logistics, Compatibility and Processing Constraints

Day 2: Linear Programming Model Structure for Refineries

- LP Matrix Anatomy: Columns, Rows, Objective Function and Bounds
- Yield Vectors, Delta-Base Submodels and Unit Severity Modes
- Pooling and Recursion for Intermediate Stream Properties
- Blend Specification Rows: Linear Blending Indices and Nonlinear Property Handling
- Simplex Duality: Shadow Prices, Reduced Costs and Ranging for Planning Decisions

Day 3: From Monthly Plan to Daily Schedule

- Plan Handover Pack: Crude Receipts, Unit Throughputs and Product Lift Targets
- Weekly Scheduling Horizon: Cargo Windows, Pipeline Batches and Rundown Rates
- Tank and Inventory Scheduling: Heel, Ullage, Segregation and Days of Cover
- Product Blend Recipe Scheduling and Giveaway Control Against Certificate Limits
- Daily Order Issue and Shift Handover Between Scheduling and Operations

Day 4: Margin Optimisation, Back-Casting and Turnaround Planning

- Unit Yield and Margin Optimisation Using Marginal Values of Capacity and Quality
- Plan Versus Actual Variance Analysis: Volume, Yield, Price and Mix Effects
- Back-Casting Actual Operation Through the LP to Correct Model Yields
- Shutdown and Turnaround Re-Planning: Intermediate Stockbuild and Product Cover
- Planner, Scheduler and Operations Interface: Targets, Escalation and Decision Rights

Day 5: Planning and Scheduling Workbook Build

- Case Data Pack: Crude Offers, Unit Capacities, Tankage and Product Demand
- Workbook Build: Crude Ranking and Monthly LP Case with Sensitivity Runs
- Workbook Build: Two-Week Tank and Blend Schedule with Cargo Liftings
- Workbook Build: Back-Cast Reconciliation and Model Correction Log
- Refinery Monthly Plan and Schedule Reconciliation Workbook Review with a Margin Panel

Skills You Will Gain:

- Crude Breakeven Valuation
- Refinery LP Model Maintenance
- Shadow Price Interpretation
- Tank Inventory Scheduling
- Blend Recipe Planning
- Plan Versus Actual Reconciliation
- Turnaround Re-Planning
- Scheduling Handover Control

Why Attend This Course:

- Return with a Refinery Monthly Plan and Schedule Reconciliation Workbook built on a case data pack that mirrors your own refinery
- Challenge crude purchase and unit loading proposals with breakeven values and LP marginal values rather than rules of thumb
- Close the gap between the planning model and what the tank farm and units actually deliver each month
- Compare planning and scheduling practice with peers from simple and complex refineries, terminals and trading desks

Conclusion:

A refinery earns its margin only when crude choices, the planning model and the daily schedule agree with each other and with what the units deliver. The course moves from planning economics and crude valuation, through LP model structure and duality, to the cascade from monthly plan to daily tank and blend orders, and then to margin optimisation, back-casting and turnaround re-planning. The final day produces a Refinery Monthly Plan and Schedule Reconciliation Workbook ready for the next planning cycle.