JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Early Downstream Process Development and Route Selection Training Course

27 June – 1 July 2027
Istanbul

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Early Downstream Process Development and Route Selection Training Course

Ref: 2126_78387 **Date:** 27 June – 1 July 2027 **Location:** Istanbul **Fees:** 5500 GBP

Early Downstream Process Development and Route Selection is a 1-week training course for process engineers in refining and petrochemicals who frame new units, and who leave with a Process Route Selection Dossier. Feedstock shifts, energy costs and lower-carbon targets make early process choices decisive for capital and operating cost. Jupiter Prime Training offers this Early Downstream Process Development and Route Selection course.

Why Early Downstream Process Development and Route Selection Matters Now

Most of a downstream unit's lifetime cost is fixed before detailed design begins, when the route, the reactor type and the separation train are chosen. Changing crude slates, interest in bio-based and recycled feeds, and pressure to cut energy use and emissions all widen the set of candidate routes. Sponsors expect routes compared on consistent balances. Organisations that frame early phases well avoid costly recycle loops later; those that do not lock in poor yields and oversized utilities. The course rests on stage-gate front-end loading practice and established cost estimate classification.

Who Gains Most from Early Downstream Process Development and Route Selection

- Process engineers responsible for building heat and mass balances for new or revamped units
- Technology evaluation engineers responsible for screening licensed and in-house process routes
- Project development engineers responsible for preparing front-end gate submissions
- Pilot plant and research engineers responsible for generating scale-up data
- Cost and economics engineers responsible for early capital and operating estimates

A technology or project development group that sends process, pilot plant and cost engineers together gains most.

Early Downstream Process Development and Route Selection Capabilities

Participants turn a concept into a defensible route, balanced flow sheet and gate-ready estimate.

- Assess candidate process routes against yield, energy, safety and maturity criteria — the technology selection decision
- Build steady-state heat and mass balances with closure checks — sizing equipment and utilities
- Design a preliminary process flow diagram with stream tables — aligning process and project disciplines
- Specify scale-up data needs from laboratory and pilot runs — the research and licensor interface
- Calculate order-of-magnitude capital and operating cost estimates — the project sponsor's go or recycle choice
- Communicate route recommendations with stated uncertainty — the front-end gate review panel

Key Early Downstream Process Development and Route Selection Terms

- Process Route — the sequence of reaction and separation steps that converts a feedstock into the target products.
- Block Flow Diagram — a simple diagram of main process sections and connecting streams.
- Process Flow Diagram — a drawing of major equipment, streams and operating conditions, supported by a stream table.
- Heat and Mass Balance — the accounting of every stream's flow, composition and energy, closed around each unit.
- Scale-Up Factor — the ratio of commercial to test equipment size.
- Front-End Loading — staged project definition before final investment, with a gate decision after each stage.

Early Downstream Process Development and Route Selection Day by Day

Day 1: Framing the Downstream Opportunity

- Feedstock and Product Slate Definition — Setting the Basis for Route Screening
- Stage-Gate Front-End Loading Phases — Matching Effort to Decision Maturity
- Technology Readiness Assessment — Judging Licensed Versus In-House Routes
- Block Flow Diagrams for Candidate Routes — Comparing Process Architectures Quickly
- Screening Criteria Matrix — Weighing Yield, Energy, Safety and Emissions

Day 2: Heat and Mass Balances

- Reaction Stoichiometry and Conversion Basis — Fixing Yields for the Balance
- Steady-State Material Balance Closure — Detecting Missing or Inconsistent Streams
- Energy Balance and Heat Integration Targets — Estimating Minimum Utility Demand
- Recycle and Purge Loop Analysis — Controlling Impurity Build-Up
- Process Simulation Model Set-Up — Choosing Thermodynamic Methods and Components

Day 3: Preliminary Flow Sheets and Equipment

- Process Flow Diagram and Stream Table — Communicating the Design Basis
- Reactor Type Selection — Balancing Selectivity, Catalyst Life and Heat Removal
- Separation Train Sequencing — Reducing Energy Use in Distillation
- Utility Summary and Battery Limits — Defining Interfaces with Offsites
- Early Hazard Identification on Flow Sheets — Removing Inherent Process Hazards

Day 4: Scale-Up and Early Cost Estimating

- Laboratory, Pilot and Demonstration Data Planning — Closing Scale-Up Gaps
- Scale-Up Rules for Reactors and Columns — Predicting Commercial Performance
- Factored Capital Cost Estimates — Producing Order-of-Magnitude Figures
- Operating Cost Build-Up From Balances — Linking Utilities and Catalyst to Margin
- Estimate Classification and Contingency — Stating Accuracy Ranges Honestly

Day 5: Practising the Process Route Selection Dossier

- Two-Route Comparison Case for a Refinery Revamp — Applying Screening and Balances
- Petrochemical Derivative Unit Case — Applying Flow Sheet and Scale-Up Methods
- Sensitivity and Uncertainty Tornado Chart — Testing the Preferred Route
- Gate Review Rehearsal — Defending Assumptions to a Sponsor Panel
- Process Route Selection Dossier — Recording Basis, Choice and Next-Stage Actions

Applying Early Downstream Process Development and Route Selection After the Course

- Rebuild a current study's heat and mass balance with closure checks and share the gaps.
- Run a screening criteria matrix on two candidate routes for an active opportunity and present the ranking at the next gate meeting.

Early Downstream Process Development and Route Selection Questions FAQ

What is Early Downstream Process Development and Route Selection and why does it matter now?

It is the front-end work of choosing and defining a process route for a refining or petrochemical unit. It matters now because feedstocks, energy costs and emissions targets are changing, and early choices fix most lifetime cost.

Which roles gain most from Early Downstream Process Development and Route Selection?

Process, technology evaluation and project development engineers gain most, with pilot plant and cost engineers.

How does Early Downstream Process Development and Route Selection differ from a detailed process design course?

It sits before detailed design. A detailed design course sizes equipment to datasheets; this one compares routes, closes preliminary balances and prepares estimates for a front-end gate.

What do you bring back from Early Downstream Process Development and Route Selection?

You bring back a Process Route Selection Dossier with the design basis, compared routes, balances, an order-of-magnitude estimate and the actions for the next stage.

Early Downstream Process Development and Route Selection: The Way Forward

The Process Route Selection Dossier first informs whether a downstream opportunity passes its first gate and which route moves forward. Process engineers, project sponsors and licensors use it to agree the basis for the next stage. After its first use, revisit the screening weights and scale-up assumptions, because pilot results often shift priorities.