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COURSE BROCHURE

Process Simulation and Flowsheet Validation Training Course

29 March – 2 April 2027
Dar es Salaam

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Registered in the United Kingdom and Saudi Arabia

Process Simulation and Flowsheet Validation Training Course

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Process Simulation and Flowsheet Validation is a 1-week training course for process and facilities engineers who build steady-state models of separation, compression and gas treatment trains and must show those models match the plant, producing a validated flowsheet model note. Debottlenecking, feed changes and energy targets now rest on simulation results that managers act on without opening the model. Jupiter Prime Training places the subject within everyday facilities engineering decisions.

Why Process Simulation and Flowsheet Validation Matters Now

Three pressures shape the subject today. Feed compositions shift as fields mature and new wells tie in, so a model tuned years ago may no longer describe the separators or compressors it represents. Facilities teams are smaller, and one engineer's flowsheet often becomes the basis for capital and operating choices across the asset. Energy and flaring reduction targets demand trustworthy heat and material balances. A model that converges is not the same as a model that is right; organisations that check results against plant measurements avoid oversized equipment, missed bottlenecks and design cases built on a wrong property method.

Who Gains Most from Process Simulation and Flowsheet Validation

- Engineers who build and maintain steady-state models of production and gas plants
- Specialists who size separators, compressors and treating units from simulation output
- Engineers responsible for debottlenecking studies and feed change assessments
- Staff who reconcile plant measurements with heat and material balances
- Engineers who review design cases produced by contractors

A facilities engineering group gains most when its modellers and its plant support engineers attend together.

Process Simulation and Flowsheet Validation Capabilities

Participants move from getting a flowsheet to solve towards proving that its answers can carry an engineering decision.

- Specify a property method suited to the fluid and the equipment in question — model basis approval
- Build a separation and compression flowsheet that converges reliably — study schedules
- Design recycle and tear stream strategies for stable solutions — model robustness
- Test model results against plant temperatures, pressures and flows — operations engineers
- Calculate case study sensitivities for feed and throughput changes — debottlenecking choices
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Communicate model limits and confidence to decision makers — capital and operating reviews

Key Process Simulation and Flowsheet Validation Terms

- Property package — the set of thermodynamic and transport property methods a simulator uses to predict fluid behaviour.
- Flowsheet — the connected model of streams and unit operations representing a process train.
- Tear stream — a stream the solver guesses and updates repeatedly to close a recycle loop.
- Convergence tolerance — the allowed difference between successive solver iterations before a solution is accepted.
- Model validation — comparing simulated values with measured plant data to judge whether a model is fit for use.
- Case study — a set of runs varying one or more inputs to show how outputs respond.

Process Simulation and Flowsheet Validation Day by Day

Day 1: Setting the Model Basis

- Study Purpose and Required Accuracy Statement — What the Model Must Answer
- Feed Characterisation and Heavy End Lumping — Representing Real Well Fluids
- Property Method Selection for Hydrocarbon Systems — Phase Behaviour Confidence
- Water, Acid Gas and Glycol Property Choices — Treating Unit Accuracy
- Units, Components and Naming Conventions — Model Handover and Reuse

Day 2: Building Separation and Compression Trains

- Inlet Separation and Stabilisation Stages — Flash Pressure Selection
- Compressor Stages, Intercoolers and Scrubbers — Power and Discharge Temperature
- Heat Exchanger and Air Cooler Representation — Duty and Approach Checks
- Control Valve and Pressure Drop Allowances — Realistic Hydraulic Profiles
- Specification Blocks and Adjust Functions — Meeting Product Targets

Day 3: Recycles, Convergence and Gas Treatment

- Recycle Loop and Tear Stream Placement — Stable Solver Behaviour
- Convergence Tolerance and Iteration Settings — Speed Versus Accuracy
- Amine Sweetening Column Modelling — Acid Gas Removal Prediction
- Glycol Dehydration Contactor Modelling — Water Dew Point Targets
- Diagnosing Non-Converging Flowsheets — Finding the Root of Failure

Day 4: Checking the Model Against the Plant

- Plant Measurement Selection and Quality Screening — Trusted Comparison Points
- Mass and Energy Balance Reconciliation — Exposing Meter and Model Errors
- Deviation Tables for Key Temperatures and Pressures — Fitness for Use
- Equipment Efficiency and Fouling Factor Tuning — Matching Observed Performance
- Case Studies for Feed and Throughput Changes — Debottlenecking Evidence

Day 5: Practising the Validated Flowsheet Model Note

- Applying Property Method Selection to a Live Asset — Documented Model Basis
- Applying Convergence Strategy to a Full Train — Robust Base Case
- Applying Plant Data Comparison to the Base Case — Accepted Deviations
- Model Limits and Known Gaps Statement — Safe Use by Others
- Validated Flowsheet Model Note for One Process Train — Completed Output

Applying Process Simulation and Flowsheet Validation After the Course

- Compare an existing site model with one week of plant measurements and publish a deviation table for the key streams.
- Re-examine the property method in one treating or compression model and record whether a change alters design margins.

Process Simulation and Flowsheet Validation Questions FAQ

What is process simulation and flowsheet validation and why does it matter now?

It is building steady-state models of process trains and proving their results match the plant. Shifting feeds and smaller engineering teams mean more decisions rest on models few people check.

Which roles gain most from process simulation and flowsheet validation?

Process and facilities engineers who build, use or review models of separation, compression and gas treatment units gain most, including those supporting debottlenecking studies.

How does process simulation and flowsheet validation differ from a dynamic simulation or software operation course?

It concentrates on steady-state model basis, convergence and checking against plant data rather than transient behaviour or the menus of one software package. You learn to judge a model, not only to run it.

What do you bring back from process simulation and flowsheet validation?

You bring back a checked base case for one process train, a deviation table against plant data and a written note stating the model basis and its limits.

Process Simulation and Flowsheet Validation: The Way Forward

The validated flowsheet model note records the property basis, convergence approach, plant comparison and limits of one model. Its first use is deciding whether the model may support a debottlenecking or feed change study. Facilities engineers and reviewers rely on it, and after the first study it is worth revisiting which deviations were accepted and why.