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COURSE BROCHURE

Chemical Process Control for Oil and Gas Units Training Course

27 September – 1 October 2027
Dar es Salaam

Chemical Process Control for Oil and Gas Units Training Course

Ref: 1923_70753 **Date:** 27 September – 1 October 2027 **Location:** Dar es Salaam **Fees:** 7900 GBP

Chemical Process Control for Oil and Gas Units is a 1-week training course for process and control engineers who run separators, stabilisers, fired heaters and fractionators, and it ends with a Unit Control Strategy Dossier for one live unit. Feed swings, tighter product specifications and leaner shift crews make stable regulatory control a direct lever on throughput and flaring. Jupiter Prime Training delivers this chemical process control course for oil and gas units.

Why Chemical Process Control Matters Now

Three pressures shape chemical process control on hydrocarbon units today. Feed composition changes more often as fields mature, so loops tuned for one case oscillate on the next. Consoles carry more alarms, making poorly damped loops a human-factors issue. Energy and emissions targets push units towards constraints, where only sound cascade, ratio and override schemes keep margins safe. Sites that handle this well recover capacity; others pay in off-spec product and flaring.

Who Gains Most from Chemical Process Control

- Engineers responsible for separator, slug catcher and stabiliser performance
- Control specialists who configure regulatory loops
- Process engineers accountable for fractionator and heater stability and product quality
- Instrument engineers who select and diagnose final control elements on hydrocarbon service
- Technical support staff who investigate upsets

Unit teams sending a process and a control engineer together gain most.

Chemical Process Control Capabilities

The outcomes centre on loops that hold hydrocarbon units steady through feed swings, equipment limits and operator handovers.

- Identify first-order-plus-dead-time models from bump tests on level, pressure and temperature loops — tuning priorities for each unit
- Calculate PID settings with lambda and internal model rules — the trade-off between speed and robustness agreed with operations
- Design cascade, feedforward and ratio schemes for separators, heaters and columns — disturbance rejection decisions
- Diagnose stiction, deadband and sizing faults from valve signatures — repair or replacement calls for maintenance
- Assess loop health with variability, oscillation and service-factor indices — the loop improvement list for the unit
- Specify the case for multivariable control on a constrained unit — the investment discussion with plant leadership

Key Chemical Process Control Terms

- Dead time — The delay between a controller output change and the first process response, the main limit on loop speed.
- Cascade control — An outer controller sets the setpoint of a faster inner loop that rejects local disturbances early.
- Feedforward — Action calculated from a measured disturbance, such as feed rate, before it upsets the controlled variable.
- Averaging level control — Loose level tuning so a vessel absorbs flow swings instead of passing them downstream.
- Valve stiction — Static friction that makes a valve stem stick then jump, causing a sawtooth cycle.
- Override control — A selector that hands control to a constraint loop, such as a pressure limit, before it is breached.

Chemical Process Control Day by Day

Day 1: Unit Dynamics and the Control Problem

- Separator And Stabiliser Control Objectives — What Each Loop Must Protect
- Process Gain, Time Constant And Dead Time — Which Loops Can Be Fast
- Integrating Versus Self-Regulating Behaviour — Choosing The Tuning Method Per Loop
- Bump Test Planning With Operations — Safe Test Size And Timing
- Piping And Instrument Diagram Loop Walkdown — Gaps In The Existing Control Structure

Day 2: PID Tuning for Hydrocarbon Service

- PID Algorithm Forms And Units — Correct Translation Between Control System Vendors
- Lambda Tuning For Flow And Pressure Loops — Speed Against Valve Wear
- Averaging Level Tuning For Surge Drums — Smoothing Flow To Downstream Units
- Temperature Loop Tuning On Fired Heaters — Fuel Use And Tube Protection
- Derivative Action And Measurement Filtering — When Noise Outweighs Benefit

Day 3: Cascade, Feedforward and Constraint Schemes

- Cascade Design On Column Reboilers — Rejecting Steam Header Disturbances Early
- Feedforward From Feed Rate To Heater Duty — Holding Outlet Temperature Through Swings
- Ratio Control For Reflux And Fuel-Air — Product Quality And Combustion Safety
- Override And Selector Logic — Protecting Compressor And Pressure Limits
- Split-Range And Valve Position Control — Using Two Final Elements Without Fighting

Day 4: Valves, Loop Health and Advanced Control

- Control Valve Signature Analysis — Stiction, Deadband And Actuator Faults
- Installed Characteristic And Rangeability — Valve Resizing Or Trim Change
- Loop Performance Indices And Oscillation Detection — Ranking Loops For Attention
- Multivariable Predictive Control Concepts — When Regulatory Control Is No Longer Enough
- Inferential Quality Estimators — Closing Loops On Composition Between Analyser Samples

Day 5: Practising the Unit Control Strategy Dossier

- Bump Test Data From A Separation Case — Building Models For Key Loops
- Retuning A Fractionator Loop Set — Comparing Before And After Variability
- Redesigning A Heater Scheme With Feedforward — Disturbance Rejection Evidence
- Presenting Valve And Loop Findings To Operations — Agreeing Priorities With Shift Leads
- Unit Control Strategy Dossier — Loop Models, Settings, Schemes And Improvement List

Applying Chemical Process Control After the Course

- Bump test and retune the ten worst loops of one unit with lambda rules, recording variability before and after.
- Propose one cascade or feedforward change on a heater or column, with a test plan.

Chemical Process Control Questions FAQ

What is chemical process control for oil and gas units and why does it matter now?

It is the design and tuning of loops that hold separators, heaters and columns at target. Varying feeds and energy targets push units towards limits, where weak loops cost throughput.

Which roles gain most from chemical process control training?

Process, control and instrument engineers responsible for hydrocarbon units gain most, especially when a process and a control engineer from one unit attend together.

How does this chemical process control course differ from an instrumentation course?

It concentrates on control strategy and tuning for oil and gas units, not measurement devices. An instrumentation course covers transmitters and calibration; this one covers dynamics, cascade, feedforward and loop health.

What do you bring back from chemical process control training?

You bring back a control strategy dossier for one unit: loop models, tuning settings, proposed schemes, valve findings and a ranked improvement list.

Chemical Process Control: The Way Forward

The Unit Control Strategy Dossier first informs which loops to retune before the next turnaround window. Control engineers use it to schedule bump tests, process engineers to judge product quality gains and shift leads to agree changes. After its first use, revisit whether constant constraint-pushing justifies a multivariable predictive control study.