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COURSE BROCHURE

AI Calibration Interval Optimisation and Loop Tuning Training Course

25 – 29 April 2027
Manama

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Registered in the United Kingdom and Saudi Arabia

AI Calibration Interval Optimisation and Loop Tuning Training Course

Ref: 1020_38567 **Date:** 25 – 29 April 2027 **Location:** Manama **Fees:** 5500 GBP

AI Calibration Interval Optimisation and Loop Tuning is a 1-week training course for instrument engineers, control technicians and reliability engineers who will build a Calibration and Loop Priority Schedule. Fixed calibration calendars and untuned controllers still consume technician hours where little risk exists. Jupiter Prime Training presents AI Calibration Interval Optimisation and Loop Tuning as a route to spending instrument effort where the process data shows it is needed.

Why AI Calibration Interval Optimisation and Loop Tuning Matters Now

Three pressures meet in instrument sections today. Smart transmitters report diagnostic and as-found history that rarely informs the calibration calendar. Experienced control technicians are retiring, taking loop tuning judgement with them. Operations leaders want fewer manual interventions and steadier product quality without more headcount. A site that sets intervals from evidence reduces unnecessary field trips and spots degrading devices sooner; one that does not over-calibrates healthy instruments while sluggish loops quietly waste energy. The course uses the ISO/IEC 42001 AI management system standard and the NIST AI Risk Management Framework AI RMF to frame oversight of the models involved.

Who Gains Most from AI Calibration Interval Optimisation and Loop Tuning

- Engineers who set calibration frequencies and approve instrument maintenance strategies
- Technicians who perform as-found and as-left checks and retune controllers in the field
- Reliability specialists who rank instrument failures and assign repair priorities
- Control engineers who monitor loop performance across distributed control systems

An instrument and control section gains most when its field technicians and its control engineers attend together, because interval decisions and tuning decisions draw on the same process history.

AI Calibration Interval Optimisation and Loop Tuning Capabilities

Participants learn to treat each transmitter and controller as a record of evidence, scored for risk and degradation rather than serviced by habit.

- Calculate evidence-based calibration intervals from as-found error history — maintenance planners
- Build a soft sensor that cross-checks a critical transmitter — process engineers
- Assess smart transmitter diagnostics for early sensor degradation — instrument supervisors
- Test loop performance indices to rank controllers for retuning — control engineers
- Specify oversight checks for models that shorten or extend intervals — reliability leads
- Communicate a ranked instrument work list — operations and maintenance managers

Key AI Calibration Interval Optimisation and Loop Tuning Terms

- As-found error — the deviation an instrument shows when tested before any adjustment.
- Calibration interval — the time allowed between scheduled checks of an instrument against a reference.
- Soft sensor — a model that estimates a process variable from other measurements, used to back up or verify a physical transmitter.
- Loop performance index — a score of how well a control loop holds its setpoint, covering variability, oscillation and valve travel.
- Sensor degradation — a gradual loss of accuracy from fouling, ageing or electronics wear that diagnostics can reveal early.
- Valve stiction — static friction in a control valve that causes sticking and limit cycling in the loop.

AI Calibration Interval Optimisation and Loop Tuning Day by Day

Day 1: Instrument Evidence and Risk

- Instrument Criticality Ranking — Linking Devices To Safety And Product Risk
- As-Found And As-Left Records — Measuring Real Calibration Need
- Smart Transmitter Diagnostic Data — Early Signs Of Sensor Degradation
- Control Loop Inventory And Historian Tags — Scoping The Tuning Effort
- Asset Management System Exports — Preparing Inputs For Models

Day 2: Modelling Calibration Need

- Survival And Reliability Models Of As-Found Error — Interval Setting
- Classification Of Pass And Fail Checks — Predicting Out-Of-Tolerance Devices
- Redundant Transmitter Comparison — Detecting Sensor Deviation Without Field Visits
- Soft Sensor Regression Models — Verifying Critical Measurements Continuously
- Interval Extension And Reduction Rules — Balancing Risk And Workload

Day 3: Control Loop Performance Analytics

- Loop Performance Indices And Variability Measures — Ranking Controllers
- Oscillation And Stiction Detection Algorithms — Valve Versus Tuning Faults
- Machine Learning Assisted PID Tuning — Proposing Gain Changes Safely
- Model Predictive Control Health Checks — Spotting Degraded Constraints
- Energy And Quality Impact Estimates — Justifying Loop Interventions

Day 4: Prioritising Instrument Work

- Combined Instrument Health Scores — Ordering Calibration And Repair Jobs
- Work Order Scheduling Around Production Windows — Technician Allocation
- Model Oversight Under ISO/IEC 42001 And NIST AI RMF — Interval Changes
- Management Of Change For Tuning Updates — Operator Acceptance
- Performance Dashboards For Instrument Sections — Tracking Avoided Field Trips

Day 5: Practising the Calibration and Loop Priority Schedule

- Applying Interval Models To A Refinery Pressure Transmitter Fleet — Frequency Choice
- Applying Loop Indices To A Water Treatment Dosing Case — Retuning Order
- Applying Soft Sensors To A Critical Analyser Case — Backup Decision
- Escalation Rules For Model Recommendations — Engineer Sign-Off
- Calibration And Loop Priority Schedule — Ranked Devices, Intervals And Actions

Applying AI Calibration Interval Optimisation and Loop Tuning After the Course

- Analyse as-found history for one class of transmitters and propose revised calibration intervals.
- Rank the twenty worst-performing control loops in one unit using loop performance indices.

AI Calibration Interval Optimisation and Loop Tuning Questions FAQ

What is AI calibration interval optimisation and loop tuning and why does it matter now?

It is the use of machine learning on calibration records, transmitter diagnostics and loop data to decide when instruments need attention and which controllers need retuning. It matters now because skilled technicians are scarce and fixed calendars waste effort.

Which roles gain most from AI calibration interval optimisation and loop tuning?

Instrument engineers, control technicians and reliability engineers gain most. Control engineers and planners also benefit.

How does AI calibration interval optimisation and loop tuning differ from a process instrumentation course?

A process instrumentation course covers measurement principles, device selection and control theory. This subject builds on that and uses models to set intervals, score device health and rank loops for tuning.

What do you bring back from AI calibration interval optimisation and loop tuning?

You bring back a ranked list of devices and loops with evidence-based intervals and actions, tested on refinery and water treatment cases.

AI Calibration Interval Optimisation and Loop Tuning: The Way Forward

The Calibration and Loop Priority Schedule ranks each instrument and control loop with its proposed interval, health score and next action. Its first use is deciding which transmitter class moves to a longer or shorter calibration frequency. Instrument supervisors and planners own it. After one maintenance cycle, compare actual as-found results with the model to confirm the intervals.