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COURSE BROCHURE

# Advanced Water Treatment Process Optimisation Training Course

26 September – 7 October 2027
Dubai

# Advanced Water Treatment Process Optimisation Training Course

**Ref:** 529_19605 **Date:** 26 September – 7 October 2027 **Location:** Dubai **Fees:** 8500 GBP

Water Treatment Process Optimisation is an advanced 2-week training course for water treatment plant managers, process engineers and water quality specialists who must tune coagulation, clarification, filtration and disinfection, and leave with a Treatment Train Optimisation Plan for their works. Variable raw water and rising chemical costs now reward plants that run every stage near its best point. Jupiter Prime Training delivers this course for practitioners running potable and process water works.

## Why Water Treatment Process Optimisation Matters Now

Three forces shape water treatment process optimisation today: raw water sources that swing in turbidity, algae and organic content with seasons and storms, consumers and industrial users who expect safe, stable water with low disinfection by-products, and operating budgets squeezed by coagulant, lime and power costs. A works that optimises each stage cuts chemical use, extends filter runs and keeps quality steady; one that runs on fixed settings overdoses chemicals, suffers breakthrough and struggles with taste and odour complaints. The course rests on jar testing practice, the multiple barrier approach to drinking water safety and the contact time CT concept for disinfection.

## Who Gains Most from Water Treatment Process Optimisation

- Plant managers who balance treated water quality, chemical cost and output
- Process engineers who set coagulant doses, filter cycles and disinfection targets
- Water quality specialists who sample, test and report treated water results
- Operations supervisors who run clarifiers, filters and dosing systems by shift
- Industrial utilities engineers who supply process, boiler feed and cooling water

A utility or industrial site that sends its plant manager, process engineer and water quality specialist together gains most, because they can agree one jar testing routine, one set of stage targets and one response to raw water events.

## Water Treatment Process Optimisation Capabilities

Participants move from fixed dosing and fixed backwash timers to treatment stages tuned to raw water conditions and measured against clear quality targets.

- Test coagulant, flocculant and pH combinations through jar trials — operators setting daily doses
- Assess clarifier and dissolved air flotation performance against raw water changes — engineers choosing the clarification route
- Calculate filter loading, run length and backwash needs for rapid gravity and membrane filters — supervisors scheduling operations
- Design disinfection with CT targets while limiting by-product formation — water quality specialists protecting consumers
- Specify ion exchange and advanced oxidation stages for hardness, nitrate and trace organics — industrial users and utility planners
- Build stage-by-stage quality and cost dashboards — plant managers reporting to boards and customers

## Key Water Treatment Process Optimisation Terms

- Jar test — a bench trial that compares coagulant doses and pH in beakers to find the optimum treatment conditions.
- Coagulation — destabilising fine particles and organics with metal salts or polymers so they combine into settleable floc.
- Filter run length — the operating time between backwashes before headloss or turbidity breakthrough limits a filter.
- CT value — disinfectant concentration multiplied by contact time, used to judge pathogen inactivation.
- Disinfection by-products — compounds formed when disinfectants react with natural organic matter in water.
- Ion exchange — swapping unwanted ions such as hardness or nitrate for harmless ions on a resin bed.

## Water Treatment Process Optimisation Day by Day

## Day 1: Raw Water and Treatment Objectives

- Raw Water Source Profiling — Mapping Seasonal Turbidity, Algae and Organics
- Treated Water Quality Targets — Translating Standards Into Stage Goals
- Multiple Barrier Approach — Assigning Each Stage a Safety Role
- Plant Performance Baseline — Benchmarking Chemical Use and Output
- Process Water Requirements — Matching Quality to Boiler and Cooling Duty

## Day 2: Coagulation and Flocculation

- Jar Testing Protocols — Selecting Coagulant Type and Dose
- Enhanced Coagulation for Organics — Lowering By-Product Precursors
- Rapid Mix and Flocculation Energy — Tuning Mixing Intensity
- Streaming Current and Online Dose Control — Automating Coagulant Feed
- Polymer Selection — Improving Floc Strength and Settling

## Day 3: Clarification

- Sedimentation Basin Performance — Reading Overflow Rates and Short-Circuiting
- Lamella and High-Rate Clarifiers — Increasing Capacity on Small Footprints
- Dissolved Air Flotation — Handling Algae and Low-Density Floc
- Sludge Blanket Control — Preventing Carry-Over to Filters
- Clarifier Tracer Studies — Diagnosing Hydraulic Problems

## Day 4: Rapid Gravity Filtration

- Filter Media Design and Condition — Inspecting Depth and Grading
- Headloss and Turbidity Monitoring — Ending Runs Before Breakthrough
- Backwash Optimisation — Balancing Cleaning Against Water Loss
- Filter Ripening and Slow Start — Protecting Quality After Backwash
- Filter Audits — Spotting Mudballs, Cracking and Air Binding

## Day 5: Membrane Filtration

- Microfiltration and Ultrafiltration Configurations — Choosing Pressure or Submerged Systems
- Transmembrane Pressure and Flux Management — Setting Sustainable Operation
- Membrane Integrity Testing — Verifying Pathogen Removal
- Chemically Enhanced Backwash and Cleaning — Recovering Permeability
- Nanofiltration for Softening and Organics — Weighing Recovery and Concentrate

## Day 6: Disinfection and By-Product Control

- Chlorine, Chloramine and Ozone Options — Choosing Disinfectant Strategy
- CT Calculations and Contact Tank Baffling — Confirming Inactivation
- Ultraviolet Disinfection — Sizing Dose for Protozoa Control
- By-Product Formation Monitoring — Tracking Trihalomethanes and Bromate
- Residual Management in Distribution — Maintaining Protection to Consumers

## Day 7: Ion Exchange and Specialist Removal

- Softening and Dealkalisation Resins — Preparing Boiler and Process Water
- Nitrate and Perchlorate Selective Resins — Removing Targeted Contaminants
- Regeneration and Brine Management — Controlling Salt Use and Waste
- Iron, Manganese and Arsenic Removal — Selecting Oxidation and Adsorption Media
- Demineralisation Trains — Producing High-Purity Industrial Water

## Day 8: Advanced Oxidation and Taste Control

- Ozone and Hydrogen Peroxide Processes — Destroying Trace Organic Micropollutants
- UV-Based Advanced Oxidation — Treating Pesticides and Pharmaceuticals
- Granular and Powdered Activated Carbon — Controlling Taste and Odour
- Algal Toxin Response — Adjusting Treatment During Blooms
- Biological Filtration After Ozone — Reducing Assimilable Carbon

## Day 9: Process Control and Performance Management

- SCADA Trends and Alarm Setpoints — Supporting Shift Decisions
- Online Analysers and Calibration — Trusting Turbidity, Chlorine and pH Readings
- Chemical Consumption Benchmarks — Cutting Coagulant and Lime Spend
- Water Safety Plan Reviews — Linking Hazards to Control Measures
- Raw Water Event Playbooks — Responding to Storms and Spills

## Day 10: Practising the Treatment Train Optimisation Plan

- Applying Jar Test Results — Setting Seasonal Dose Curves
- Applying Filter and Clarifier Diagnostics — Ranking Hydraulic and Media Fixes
- Applying Disinfection Design — Confirming CT and By-Product Targets
- Applying Specialist Removal Options — Selecting Upgrades for Industrial Users
- Treatment Train Optimisation Plan — Presenting Stage Targets, Upgrades and Owners

## Applying Water Treatment Process Optimisation After the Course

- Lead a seasonal jar testing campaign and present dose curves that link raw water turbidity and organics to coagulant and pH settings.
- Run a filter audit across all rapid gravity filters and present backwash and media actions ranked by water quality risk.

## Water Treatment Process Optimisation Questions FAQ

### What is water treatment process optimisation and why does it matter now?

Water treatment process optimisation is the tuning of coagulation, clarification, filtration and disinfection so each stage meets quality targets at the lowest chemical and energy cost. It matters now because variable raw water and stricter by-product expectations punish plants that run on fixed settings.

### Which roles gain most from water treatment process optimisation training?

Plant managers, process engineers and water quality specialists gain most from water treatment process optimisation training. Industrial utilities engineers supplying process water also benefit.

### How does advanced water treatment process optimisation differ from a reverse osmosis troubleshooting course?

Advanced water treatment process optimisation covers the whole conventional and membrane treatment train for potable and process water. A reverse osmosis troubleshooting course focuses only on desalination membranes, their normalised data, fouling and cleaning.

## What do you bring back from water treatment process optimisation training?

You bring back a Treatment Train Optimisation Plan for your works. It sets out stage targets, dose curves, filter actions, disinfection settings and upgrade options with owners.

## Water Treatment Process Optimisation: The Way Forward

The Treatment Train Optimisation Plan first informs how a works adjusts coagulant dosing and filter cycles for the coming season. Plant managers, process engineers and water quality specialists use it to coordinate changes and report results. After the first seasonal change in raw water, revisit dose curves and by-product trends, at a municipal works or an industrial demineralisation plant alike.