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COURSE BROCHURE

Advanced Refinery and Petrochemical Wastewater Treatment Training Course

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Registered in the United Kingdom and Saudi Arabia

Advanced Refinery and Petrochemical Wastewater Treatment Training Course

Refinery and Petrochemical Wastewater Treatment is an advanced 2-week training course for process engineers and environmental specialists who must keep effluent treatment plants stable through changing crude slates and process upsets, and leave with an Effluent Treatment Plant Optimisation Roadmap for their site. Tighter discharge consents and growing pressure to reuse treated water now test every biological unit. Jupiter Prime Training runs this course for practitioners responsible for industrial effluent treatment.

Why Refinery and Petrochemical Wastewater Treatment Matters Now

Three forces shape refinery and petrochemical wastewater treatment today: changing crude slates and new process units that alter phenol, sulphide and ammonia loads, discharge consents that tighten limits on nitrogen and recalcitrant organics, and water scarcity that turns treated effluent into a feed for cooling towers and boilers. A site that runs its biological treatment well protects its licence and recovers water; one that suffers repeated bulking or toxic shocks risks breaches, odour complaints and throughput cuts. The course rests on activated sludge process kinetics, moving bed biofilm reactor MBBR design principles and membrane bioreactor MBR operating practice.

Who Gains Most from Refinery and Petrochemical Wastewater Treatment

- Process engineers who operate and optimise effluent treatment plants
- Environmental specialists who report effluent quality against discharge consents
- Laboratory leads who measure COD, BOD, ammonia and phenol loads
- Unit engineers whose process changes alter effluent loads and toxicity
- Utilities engineers who plan reuse of treated effluent in cooling and boiler systems

A site that sends its effluent plant engineer, environmental specialist and laboratory lead together gains most, because they can agree one load model, one shock response routine and one reuse quality target.

Refinery and Petrochemical Wastewater Treatment Capabilities

Participants move from firefighting biological upsets to running a treatment train whose loads, biomass health and polishing steps are measured and controlled.

- Assess effluent composition, toxicity and variability by source unit — engineers sizing equalisation and segregation
- Calculate sludge age, food-to-microorganism ratio and oxygen demand for biological units — operators setting control targets
- Design nitrification and denitrification stages to meet nitrogen limits — environmental specialists protecting consents
- Specify MBBR, MBR and tertiary polishing upgrades for reuse quality — utilities and capital planners
- Test responses to sludge bulking, foaming and toxic shock loads — shift teams restoring stable operation
- Communicate treatment performance and upgrade cases to site management — plant managers approving spend

Key Refinery and Petrochemical Wastewater Treatment Terms

- Equalisation — buffering flow and load variations in a tank so downstream biological units receive steady feed.
- Activated sludge — suspended microbial biomass that degrades dissolved organics in aerated tanks and settles in clarifiers.
- Sludge age SRT — the average time biomass stays in the system, controlling which organisms and processes establish.
- Moving bed biofilm reactor MBBR — a tank of free-moving plastic carriers on which biofilm grows and treats effluent.
- Nitrification — biological oxidation of ammonia to nitrate by slow-growing, toxicity-sensitive bacteria.
- Sludge bulking — poor settling of activated sludge, usually caused by filamentous organisms, leading to solids carry-over.

Refinery and Petrochemical Wastewater Treatment Day by Day

Day 1: Effluent Treatment Context

- Crude Slate and Process Unit Changes — Anticipating New Effluent Loads
- Discharge Consent Limits — Translating Permits Into Plant Targets
- Water Reuse Drivers — Linking Effluent Quality to Cooling and Boiler Supply
- Effluent Plant Performance Baseline — Benchmarking Current Removal Efficiencies
- Stakeholder Map Across Units — Assigning Responsibility for Source Loads

Day 2: Effluent Characterisation and Segregation

- Source Sampling by Process Unit — Building a Load Inventory
- Phenol, Sulphide and Ammonia Profiles — Identifying Toxicity Drivers
- Spent Caustic and Sour Water Streams — Deciding Segregation or Pretreatment
- COD, BOD and Biodegradability Ratios — Judging Biological Treatability
- Load Variability Statistics — Sizing Buffers for Peaks

Day 3: Oil Removal and Equalisation

- Gravity Separators and Plate Interceptors — Protecting Biology From Free Oil
- Dissolved Air Flotation — Removing Emulsified Oil and Solids
- Equalisation Tank Sizing and Mixing — Damping Hydraulic and Load Swings
- Storm and Off-Spec Diversion — Isolating Abnormal Flows
- pH and Nutrient Correction — Preparing Feed for Biological Units

Day 4: Activated Sludge Process Control

- Sludge Age and F/M Ratio Control — Setting Wasting Rates
- Aeration Demand and Dissolved Oxygen Control — Balancing Energy and Treatment
- Secondary Clarifier Performance — Managing Sludge Blanket and Return Rates
- Microscopic Biomass Examination — Reading Floc and Organism Health
- Respirometry Tests — Measuring Biomass Activity and Inhibition

Day 5: Nitrogen Removal

- Nitrification Kinetics and Inhibitors — Protecting Ammonia Oxidisers
- Pre-Denitrification Configurations — Recovering Alkalinity and Carbon
- Alkalinity and Temperature Effects — Sustaining Nitrifier Growth
- Carbon Dosing for Denitrification — Meeting Total Nitrogen Limits
- Nitrogen Mass Balance — Tracing Losses Across the Train

Day 6: Biofilm and Membrane Technologies

- MBBR Carrier Fill and Loading — Upgrading Existing Basins
- Hybrid IFAS Arrangements — Adding Biofilm to Activated Sludge
- Membrane Bioreactor Operation — Controlling Flux and Membrane Fouling
- MBR Cleaning Regimes — Recovering Permeability
- Technology Comparison Matrix — Choosing Between MBBR, IFAS and MBR

Day 7: Tertiary Polishing and Reuse

- Sand and Multimedia Filtration — Lowering Suspended Solids
- Activated Carbon Adsorption — Removing Residual Organics and Colour
- Advanced Oxidation Options — Treating Recalcitrant Compounds
- Reuse Quality Specifications — Matching Effluent to Cooling and Boiler Duty
- Reverse Osmosis on Treated Effluent — Weighing Recovery Against Brine Disposal

Day 8: Sludge Handling and Residuals

- Waste Activated Sludge Thickening — Reducing Handling Volume
- Oily Sludge Dewatering by Centrifuge and Press — Selecting Equipment
- Sludge Stabilisation and Disposal Routes — Weighing Landfill, Incineration and Reuse
- Biological Sludge Production Estimates — Planning Capacity
- Odour and Volatile Emission Control — Protecting Workers and Neighbours

Day 9: Upset Diagnosis and Recovery

- Filamentous Bulking Diagnosis — Linking Organisms to Operating Causes
- Foaming and Rising Sludge — Distinguishing Biological and Chemical Causes
- Toxic Shock Load Response — Isolating Feed and Reseeding Biomass
- Hydraulic Overload Events — Protecting Clarifiers During Storms
- Upset Root Cause Records — Feeding Lessons Back to Process Units

Day 10: Practising the Effluent Treatment Plant Optimisation Roadmap

- Applying the Load Inventory — Confirming Design Basis for a Chosen Site
- Applying Biological Control Targets — Setting SRT, DO and Wasting Rates
- Applying Upgrade Comparisons — Ranking MBBR, MBR and Polishing Options
- Applying Upset Response Routines — Assigning Triggers and Actions
- Effluent Treatment Plant Optimisation Roadmap — Presenting Targets, Upgrades and Owners

Applying Refinery and Petrochemical Wastewater Treatment After the Course

- Lead a source-by-source effluent sampling campaign and present a load inventory showing which process units drive COD, ammonia and toxicity.
- Run a biomass health review using microscopy and respirometry, and adjust sludge age and aeration targets with the operations team.

Refinery and Petrochemical Wastewater Treatment Questions FAQ

What is refinery and petrochemical wastewater treatment and why does it matter now?

Refinery and petrochemical wastewater treatment removes oil, organics, nitrogen and toxic compounds from process effluents through physical, biological and polishing stages. It matters now because tighter discharge limits and water reuse ambitions demand stable biological performance through changing process loads.

Which roles gain most from refinery and petrochemical wastewater treatment training?

Effluent plant process engineers, environmental specialists and laboratory leads gain most from refinery and petrochemical wastewater treatment training. Utilities engineers planning effluent reuse also benefit.

How does advanced refinery and petrochemical wastewater treatment differ from a municipal sewage treatment course?

Advanced refinery and petrochemical wastewater treatment deals with variable, oily and toxic industrial effluents, segregation of problem streams and shock recovery. A municipal sewage treatment course focuses on domestic wastewater, steadier loads and routine plant operation and maintenance.

What do you bring back from refinery and petrochemical wastewater treatment training?

You bring back an Effluent Treatment Plant Optimisation Roadmap for your site. It sets out load targets, biological control settings, upgrade options and upset routines with owners.

Refinery and Petrochemical Wastewater Treatment: The Way Forward

The Effluent Treatment Plant Optimisation Roadmap first informs which source streams a site segregates and which biological upgrade it funds. Process engineers, environmental specialists and utilities engineers use it to coordinate changes. After the first season of operation, revisit load inventories and upset records, at a fuel refinery or an aromatics complex alike, so targets keep pace with process changes.