MERCURY

Industrial Wastewater Chemistry, Treatment Process, & Analysis

2 – 13 May 2027
Amman (Jordan)



Dubai - UAE: +971 4 450 5697
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Ref: 15950_999722 **Date:** 2 – 13 May 2027 **Location:** Amman (Jordan) **Fees:** 6000 Euro

Introduction to the Industrial Wastewater Chemistry, Treatment Process, and Analysis:

Understanding and managing industrial wastewater is essential for promoting environmental sustainability and safeguarding public health. The Industrial Wastewater Chemistry, Treatment Process, and Analysis course delves into the intricacies of industrial wastewater treatment, focusing on the chemical makeup and contaminants frequently present in industrial effluents.

Through this Industrial Wastewater Chemistry, Treatment Process, and Analysis training course, participants will gain insights into the industrial wastewater treatment process, including physical, chemical, and biological methods for mitigating harmful substances.

The Industrial Wastewater Chemistry, Treatment Process, and Analysis course also covers wastewater treatment analysis techniques for assessing treated wastewater quality, ensuring compliance with environmental standards, and empowering participants to design and optimize industrial wastewater solutions.

Targeted Groups for Industrial Wastewater Treatment Training:

This Industrial Wastewater Chemistry, Treatment Process, and Analysis course is designed for a range of professionals involved in industrial wastewater management. Key participants who will benefit include:

- Environmental Engineers and Technicians.
- Industrial Wastewater Treatment Plant Operators.
- Senior Water Technicians.
- Water Quality Specialists.
- Environmental Consultants.
- Chemical Engineers.
- Regulatory Compliance Officers.
- Environmental Health and Safety Managers.
- Sustainability Coordinators.
- Industrial Process Managers.
- Researchers in Environmental Science and Engineering.

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Course Objectives in Wastewater Treatment Process:

By the end of this Industrial Wastewater Chemistry, Treatment Process, and Analysis course, participants will:

- Grasp the industrial wastewater definition and understand the chemical composition of industrial wastewater.
- Identify common contaminants and pollutants in industrial effluents.
- Explore physical, chemical, and biological treatment methods for industrial wastewater treatment.
- Develop skills in selecting appropriate treatment processes for different industries.
- Learn analytical techniques for wastewater treatment analysis and quality assessment.
- Understand environmental regulations related to wastewater discharge.
- Gain the ability to design and optimize wastewater treatment systems.
- Analyze wastewater treatment performance and troubleshoot common issues.
- Appreciate the role of sustainability in wastewater management.
- Stay updated on emerging technologies and trends in wastewater treatment.

Targeted Competencies in Industrial Wastewater Solutions:

Participants in this Industrial Wastewater Chemistry, Treatment Process, and Analysis training will develop competencies in:

- Understanding industrial wastewater chemistry and contaminants.
- Proficiency in the design and optimization of wastewater treatment chemistry processes.
- Knowledge of various treatment methods for industrial wastewater treatment solutions.
- Expertise in wastewater treatment analysis and quality assessment techniques.
- Ability to interpret environmental regulations and compliance standards.
- Skill in selecting appropriate chemical treatment of industrial wastewater for specific industries.
- Proficiency in monitoring and controlling wastewater treatment systems.
- Understanding of sustainability and resource recovery in wastewater management.
- Capability to conduct risk assessments and troubleshoot treatment issues.
- Awareness of industrial wastewater treatment methods and technologies.

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What is Industrial Wastewater?

Industrial wastewater is a byproduct of industrial activities that contains various chemical compositions and contaminants. Understanding the definition of industrial wastewater is crucial to effectively managing its impact on the environment. By addressing these pollutants through informed treatment processes, industries can achieve sustainable and compliant wastewater management practices.

Course Content:

Unit 1: Introduction to Industrial Wastewater Chemistry:

- Understanding the basic composition of wastewater.
- Identifying major contaminants in industrial wastewater.
- Recognizing the impact of wastewater on the environment and human health.
- Classifying wastewater based on the type of industry e.g., manufacturing, food processing, pharmaceuticals.
- Examining the sources of chemical pollutants in industrial wastewater.
- Exploring the role of pH, dissolved oxygen, and other key parameters.

Unit 2: Physical Treatment Methods:

- Introduction to physical treatment techniques.
- Filtration and sedimentation processes.
- Screening methods for large solids removal.
- Gravity separation and flotation systems.
- Techniques for oil and grease removal.
- Evaluating the effectiveness of physical methods in wastewater treatment.

Unit 3: Chemical Treatment Methods:

- Understanding coagulation and flocculation processes.
- Chemical precipitation for heavy metals removal.
- Disinfection processes, including chlorine and ozone.
- Advanced oxidation processes AOPs for organic contaminant removal.
- pH adjustment techniques in wastewater treatment.
- Exploring the use of chemical agents for specific contaminants.

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Unit 4: Biological Treatment Methods:

- Overview of biological treatment principles.
- Aerobic vs. anaerobic treatment systems.
- Activated sludge process: design, operation, and optimization.
- Trickling filters and biofilm reactors.
- Bioreactors for nutrient removal nitrogen, phosphorus.
- Advanced biological treatment methods for complex wastewater.

Unit 5: Wastewater Treatment System Design and Optimization:

- Principles of designing wastewater treatment plants WWTP.
- Sizing of treatment units and selection of appropriate technology.
- Flow diagram creation for wastewater treatment processes.
- Factors influencing treatment plant efficiency e.g., load, temperature.
- Design considerations for energy and cost optimization.
- Troubleshooting and optimizing existing systems for better performance.

Unit 6: Analytical Techniques for Wastewater Quality Monitoring:

- Introduction to wastewater sampling and preservation.
- Chemical and physical analysis methods e.g., COD, BOD, TSS.
- Advanced analytical techniques e.g., GC-MS, HPLC.
- Real-time monitoring tools and sensors for wastewater quality.
- Quality control measures in wastewater analysis.
- Interpreting results and comparing with regulatory limits.

Unit 7: Environmental Regulations and Compliance:

- Overview of national and international wastewater discharge regulations.
- Compliance with environmental standards e.g., EPA, ISO.
- Permitting and reporting requirements for industrial discharges.
- Legal implications of non-compliance and penalties.
- Strategies for ensuring ongoing regulatory compliance.
- Role of wastewater treatment in corporate social responsibility CSR.

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Unit 8: Sustainability in Wastewater Treatment:

- Principles of sustainability in wastewater management.
- Wastewater reuse and recycling technologies.
- Resource recovery from wastewater e.g., energy, nutrients.
- Energy-efficient treatment technologies.
- The role of green chemistry and eco-friendly treatment solutions.
- Sustainability metrics for evaluating wastewater treatment plants.

Unit 9: Advanced Treatment Technologies and Innovations:

- Cutting-edge technologies in industrial wastewater treatment.
- Membrane filtration systems e.g., reverse osmosis, ultrafiltration.
- Electrochemical and photocatalytic treatments.
- Zero Liquid Discharge ZLD systems for wastewater.
- Innovations in nanotechnology for pollutant removal.
- The role of artificial intelligence AI in optimizing treatment systems.

Unit 10: Case Studies and Troubleshooting in Wastewater Treatment:

- Real-world examples of industrial wastewater treatment challenges.
- Case studies of successful wastewater treatment plant operations.
- Common operational problems and solutions in WWTPs.
- Troubleshooting issues in chemical and biological treatment processes.
- Lessons learned from global wastewater treatment practices.
- Techniques for improving wastewater treatment efficiency and reliability.