# €TRAINING

## Advanced Biological Wastewater Treatment

13 - 24 May 2024
Madrid (Spain)

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REF: S1663  DATE: 13 - 24 May 2024  Venue: Madrid (Spain) -  Fee: 8775  Euro

## Introduction:

This training program provides comprehensive instruction on the theoretical foundations, practical applications, and innovative technologies in the field of biological wastewater treatment. Through a combination of theoretical learning, and case studies, participants will develop the knowledge and skills necessary to address complex challenges in wastewater treatment and contribute to sustainable environmental stewardship.

## Program Objectives:

At the end of this program, participants will be able to:

- Demonstrate a thorough understanding of the fundamental principles and advanced technologies used in biological wastewater treatment.

- Apply mathematical modelling techniques to simulate and optimize biological treatment processes.

- Design efficient and sustainable advanced biological treatment systems based on site-specific requirements and regulatory standards.

- Implement effective operational strategies to optimize the performance and reliability of biological treatment plants.

- Utilize preventive maintenance practices and troubleshooting techniques to address operational challenges and ensure the long-term efficiency of treatment facilities.

## Targeted Audience:

- Sanitary engineers.

- Environmental biotechnologists.

- Biochemists, Chemists.

- Civil engineers.

- Environmental engineers and scientists.

- Different professionals working or interested in the wastewater treatment field.

## Program Outlines:

Unit 1:

## Fundamentals of Biological Wastewater Treatment:

- Introduction to biological wastewater treatment processes.

- Microbial communities and their roles in wastewater treatment.

- Biochemical reactions involved in aerobic and anaerobic treatment.

- Factors influencing microbial activity and growth in wastewater treatment systems.

- Importance of dissolved oxygen, pH, temperature, and nutrient balance in biological treatment.

## Unit 2:

## Advanced Biological Treatment Technologies:

- Overview of advanced biological treatment technologies e.g., activated sludge, trickling filters, sequencing batch reactors.

- Design principles and operating parameters for various advanced treatment processes.

- Comparison of different biological treatment technologies in terms of efficiency, cost, and applicability.

- Case studies of successful applications of advanced biological treatment technologies.

- Emerging trends and innovations in biological wastewater treatment.

## Unit 3:

## Modelling of Biological Wastewater Treatment Processes:

- Introduction to mathematical modelling techniques for biological treatment processes.

- Development of process models to simulate biological reactions in wastewater treatment.

- Calibration and validation of biological treatment models using experimental data.

- Modelling tools to optimize and design biological treatment systems.

- Case studies demonstrating the use of modelling in the design and operation of wastewater treatment plants.

## Unit 4:

## Design Considerations for Advanced Biological Treatment Plants:

- Design parameters and criteria for sizing and configuring advanced biological treatment units.

- Factors influencing the selection of treatment technologies and process configurations.

- Integration of biological treatment units with other unit processes in wastewater treatment plants.

- Design of ancillary systems for nutrient removal, sludge handling, and odor control.

- Compliance with regulatory requirements and environmental standards in the design of biological treatment plants.

## Unit 5:

## Operation and Maintenance of Advanced Biological Treatment Systems:

- Operational strategies for optimizing the performance of biological treatment systems.

- Monitoring and control techniques for maintaining stable operation and effluent quality.

- Troubleshooting common operational issues in advanced biological treatment plants.

- Preventive maintenance practices to ensure the long-term reliability and efficiency of treatment facilities.

## Unit 6:

## Wastewater Treatment Development:

- Understanding the historical development of wastewater treatment processes.

- Exploring microbial metabolism involved in biological treatment.

- Analyzing the characteristics and composition of wastewater for effective treatment.

## Unit 7:

## Advanced Nutrient Removal:

- Removal of organic matter through advanced treatment techniques.

- Strategies for nitrogen removal, including innovative approaches.

- Techniques and processes for efficient phosphorus removal from wastewater.

## Unit 8:

## Enhancing Treatment Efficiency:

- Methods for pathogen removal to ensure water safety.

- Utilizing aeration and mixing for enhanced treatment performance.

- Addressing toxicity concerns in wastewater treatment processes.

## Unit 9:

## Advanced Treatment Technologies:

- Dealing with challenges such as bulking sludge and optimizing final settling.

- Implementation and operation of membrane bioreactors for superior treatment.

- Modeling activated sludge processes for better understanding and optimization.

## Unit 10:

## Optimization and Control:

- Implementing process control measures for efficient operation.

- Exploring anaerobic treatment methods for specific wastewater streams.

- Modeling biofilms and utilizing biofilm reactors for enhanced treatment outcomes.