€TRAINING

Advanced Biological Wastewater Treatment

29 December 2024 -
9 January 2025
Online

Advanced Biological Wastewater Treatment

REF: S1663 DATE: 29 December 2024 - 9 January 2025 Venue: Online - Fee: 3375 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.