



GLOBAL
INDUSTRIES
INTELLIGENCE



BEST PRACTICE

IN POTABLE WATER DISINFECTION

COURSE OUTLINES

The **Best Practice in Potable Water Disinfection** course is designed to provide water professionals with in-depth knowledge and practical skills to ensure safe drinking water through effective disinfection practices. This course covers the principles, techniques, and technologies involved in disinfecting potable water, with a focus on ensuring water safety, meeting regulatory standards, and addressing challenges in the disinfection process. Participants will explore different disinfection methods, the selection of appropriate technologies, and best practices to prevent waterborne diseases and ensure the highest quality of drinking water.

This course is typically delivered over **3 to 4 days**, with each day focusing on different aspects

DAY 1: INTRODUCTION TO POTABLE WATER DISINFECTION AND WATER QUALITY MANAGEMENT

- **Overview of Potable Water Disinfection**
 - Importance of potable water disinfection for public health
 - Global waterborne disease risks and the role of disinfection in public health protection
 - Potable water treatment processes: Pre-treatment, coagulation, filtration, and disinfection
- **Water Quality Parameters**
 - Key water quality parameters: Turbidity, pH, temperature, total dissolved solids, and microbial contamination
 - Regulatory standards for potable water quality (WHO, EPA, local regulations)
 - Understanding microbiological contaminants: Pathogenic bacteria, viruses, protozoa, and emerging pathogens

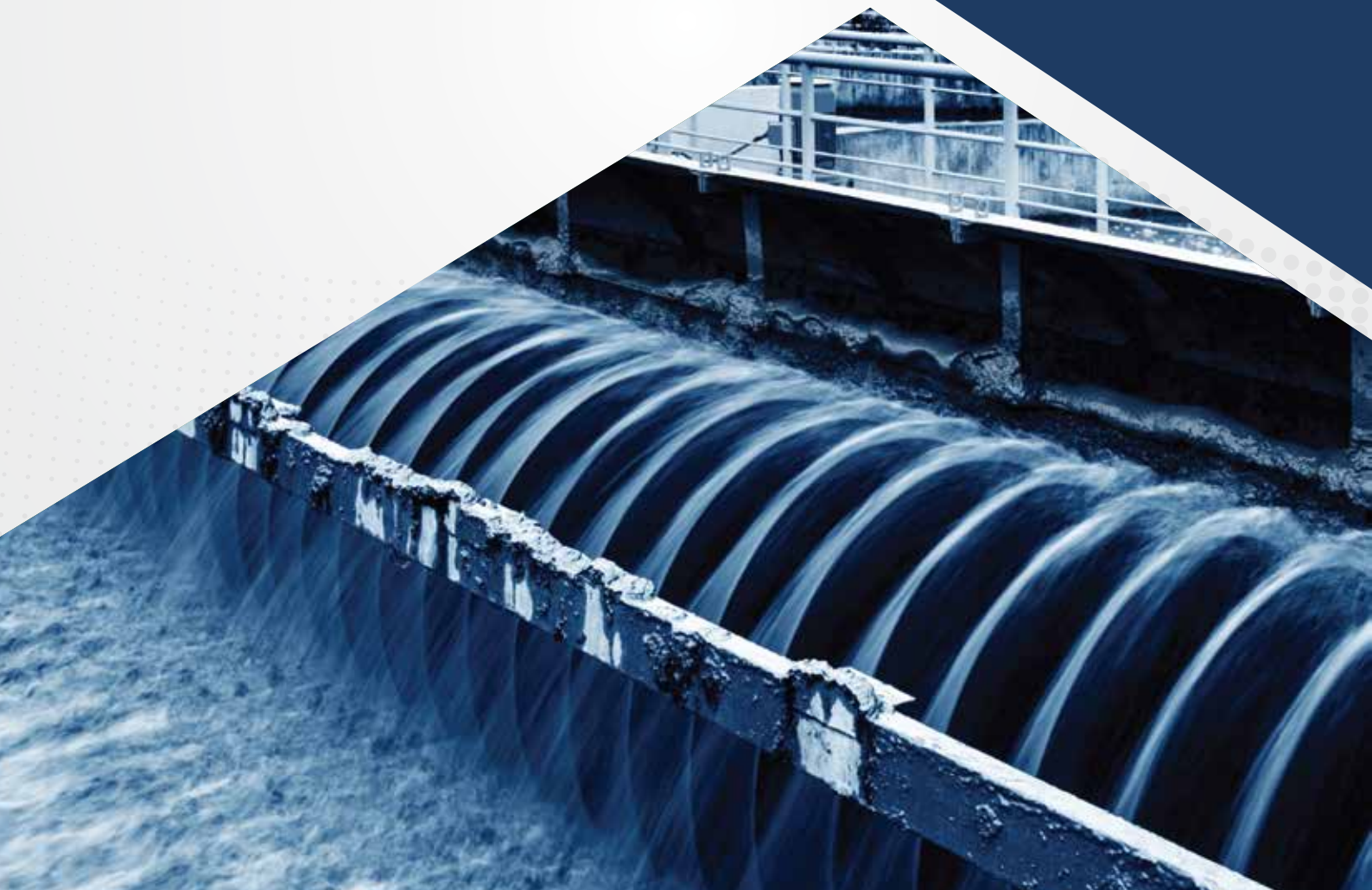
- **Disinfection Goals and Challenges**

- Primary goals of disinfection: Inactivation of pathogens, ensuring residual chlorine levels, and maintaining water quality
- Challenges in disinfection: Variability of water quality, seasonal changes, microbial resistance, and treatment plant limitations

DAY 2: DISINFECTION TECHNOLOGIES AND METHODS

- **Chlorine-Based Disinfection**

- Chlorine gas, sodium hypochlorite, and calcium hypochlorite as disinfectants
- Dosage calculation and chlorine contact time (CT)
- Benefits and challenges of chlorine disinfection: Cost, effectiveness, residual chlorine, and formation of disinfection by-products (DBPs)
- Monitoring and maintaining chlorine residuals in the distribution system



- **Alternative Disinfection Technologies**

- Ozonation: Principles, advantages, and challenges of ozone as a disinfectant
- Ultraviolet (UV) Radiation: How UV disinfection works, applications, and effectiveness for inactivating pathogens
- Advanced Oxidation Processes (AOPs): Overview of AOPs and their applications in water treatment
- Chlorine Dioxide: Benefits and use cases in potable water disinfection

- **Hybrid Systems and Innovations in Disinfection**

- Combining disinfection methods: Chlorine with UV or Ozone for improved pathogen removal
- Emerging disinfection technologies: Electrochemical disinfection, photocatalysis, and UV with peroxide systems
- Innovations for improving disinfection efficiency and minimizing DBP formation

DAY 3: DAY 3: BEST PRACTICES IN DISINFECTION AND REGULATORY COMPLIANCE

- **Designing Disinfection Systems**

- Selection criteria for disinfection technologies: Water source quality, treatment capacity, environmental conditions, and regulatory requirements
- Designing and optimizing disinfection systems for maximum efficiency and compliance
- Ensuring adequate contact time, proper mixing, and uniform disinfection throughout the treatment process

- **Monitoring and Control of Disinfection Processes**

- Online monitoring and control systems for disinfection effectiveness (chlorine residual, turbidity, UV dose)
- Quality assurance and quality control (QA/QC) in disinfection processes
- Data logging, real-time reporting, and remote monitoring for improved performance

- **Regulatory Requirements and Best Practices**

- Regulatory standards for potable water disinfection: WHO Guidelines, EPA standards, and local regulations
- Sampling protocols and analysis techniques for assessing disinfection efficacy
- Record-keeping and documentation required for regulatory compliance
- Strategies for meeting water quality standards in diverse settings (urban, rural, and remote areas)

DAY 4: CASE STUDIES, TROUBLESHOOTING, AND FUTURE TRENDS

- **Case Studies, Troubleshooting, and Future Trends**

- Real-world examples of successful disinfection programs in different regions and settings
- Lessons learned from past challenges and failures in water disinfection
- Case studies on the impact of improved disinfection systems on public health outcomes

- **Troubleshooting Common Disinfection Problems**

- Addressing issues like poor disinfection efficacy, inadequate chlorine residual, microbial contamination, and DBPs
- Solutions for optimizing disinfection processes in the face of changing water quality or source water contamination
- Addressing seasonal challenges such as algae blooms, high organic loads, and turbidity spikes



- **Emerging Trends and Innovations in Water Disinfection**

- Advances in disinfection technologies: AI, IoT, and automation in water treatment plants
- The role of sustainability and energy efficiency in disinfection systems
- Trends in decentralized water treatment and on-site disinfection systems for remote and off-grid communities
- Future challenges and opportunities in global water disinfection, including climate change impacts and increasing water scarcity

- **Target Audience:**

- Water treatment professionals, engineers, and operators involved in the disinfection of potable water
- Public health officials and environmental health professionals responsible for water safety
- Water quality managers, researchers, and regulatory compliance officers
- Consultants and contractors in the water and wastewater treatment industry

- **Learning Methodology:**

- The course combines theoretical lectures with practical demonstrations, case studies, group discussions, and hands-on exercises. Participants will engage in activities like calculating chlorine dosage, designing disinfection systems, and troubleshooting disinfection problems. Additionally, real-world examples will be used to highlight the application of disinfection best

- **Learning Objectives:**

- **By the end of this course, participants will be able to:**

1. Understand the importance of potable water disinfection in safeguarding public health.
2. Evaluate and select appropriate disinfection technologies for different water sources.
3. Design, implement, and optimize disinfection systems based on best practices.
4. Ensure compliance with local and international water quality standards and regulations.
5. Troubleshoot and solve common disinfection challenges.
6. Stay updated with emerging trends and innovations in potable water disinfection.