



# WE121: Advanced Water Treatment





## Training Description:

Water treatment is a process of making water suitable for its application or returning its natural state. Thus, water treatment required before and after its application. The required treatment depends on the application.

Water treatment involves science, engineering, business, and art. The treatment may include mechanical, physical, biological, and chemical methods. As with any technology, science is the foundation, and engineering makes sure that the technology works as designed. The appearance and application of water is an art.

## Training Objectives:

By the end of the training, participants will be able to gain an in-depth knowledge of:

### DESALINATION TECHNOLOGIES

- ✓ Identify technologies for desalination
- ✓ Explain and compare membrane-based and thermal-based desalination
- ✓ Tell current capacity of desalination in the world

### LOW PRESSURE MEMBRANES (UF and MF)

- ✓ Explain the basic principles of low-pressure membranes
- ✓ Identify advantages and differences in various commercial systems
- ✓ Define and explain fouling and cleaning in low pressure membranes
- ✓ Justify the use of low-pressure membranes in membrane disinfection
- ✓ Compare low pressure membranes with other technologies

### REVERSE OSMOSIS

- ✓ Explain the basic principles of reverse osmosis
- ✓ Identify and assess commercial elements and systems
- ✓ Define and classify fouling and propose mitigation activities to control fouling in RO systems
- ✓ Evaluate need for pre-treatment and for post-treatment in RO systems
- ✓ Design manually and by commercial software seawater and brackish water reverse osmosis systems

### NATURAL SYSTEMS

- ✓ Explain and design bank filtration systems
- ✓ Describe aquifer recharge and reuse systems

### ADVANCED OXIDATION PROCESSES

- ✓ Explain and identify advantages of various AOPs
- ✓ Design AOPs for removal of contaminants

### WATER REUSE

- ✓ Assess potential applications of water reuse systems
- ✓ Define water reuse and describe various case studies

## Training Designed for:

This course is intended for all engineers with training needs in effluent treatment and a need for a better understanding of the available technologies as well as those practitioners who wish to improve their





knowledge and skills in water treatment projects and communicate efficiently with vendors as an 'intelligent buyer'.

### Training Requirement:

“**Hand’s on practical sessions, equipment and software** will be applied during the course if required and as per the client’s request.” (This hands-on, highly-interactive training includes simulator, real-life case studies and exercises).

This training course is available upon request in English or Arabic. Content, location and duration can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

### Training Program:

#### FIVE DAYS:

#### ❖ **Module 01: Water Sources, Types and Quality Conventional Water Treatment**

- Water cycle
- Water resources
- Surface water
- Groundwater
- Non-conventional water
- Types of water polluters

#### ❖ **Module 02: Conventional Treatment Stages**

- Coagulation and flocculation
- Sedimentation
- Filtration
- Disinfection
- Treated water supply
- Disinfection points in the treatment plant

#### ❖ **Module 03: Micro Filtration and Ultra Filtration**

- Basic principles of membrane filtration
- Micro and ultra-filtration elements
- Systems fouling and cleaning
- Membrane disinfection

#### ❖ **Module 04: Desalination and Reverse Osmosis**

- Current status of desalination in the world
- Thermal systems versus membrane systems
- Fundamentals of desalination
- Reverse osmosis elements and systems
- Particulate and inorganic fouling
- Organic fouling and bio fouling
- Scaling, pre-and post-treatment
- Process design of RO systems
- Computer aided design of seawater reverse osmosis plants





- ❖ **Module 05: Advanced Oxidation Processes**
  - Fundamentals of AOPs
  - Combinations
  - Applications
- ❖ **Module 06: Water Softening**
  - Importance of water softening
  - By-pass flow
  - Stages of ion exchange softener
  - Interaction of chemical softening and coagulants
  - Methods of stabilizing water in chemical softening
- ❖ **Module 07: Operating of Water Treatment Plant**
  - Goals of water treatment operation
  - Monitored functions and their locations
  - Daily operating procedures
  - Importance of flow regulation
  - Basic guidelines for handling consumers complaint
- ❖ **Module 08: Maintenance and Cleaning of the Treatment Plant**
  - Preventive maintenance
  - Washing the filters
  - Periodic cleaning program
  - Handling and disposal of process wastes
  - Valves (Pressure reduces valve, air release valve, etc.)
  - Pumps and connections
  - Control system
- ❖ Course Conclusion
- ❖ POST-TEST and EVALUATION

### Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

### Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

### Training Fees:

**As per the course location** - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.





Note: The 5% VAT (Value Added Tax), will be effective starting 01<sup>st</sup> of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

### Training Timings:

#### Actual Face to Face Daily Timing:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break/Lunch)
13:30 - 14:00	Last Session

#### Virtual Online Live Training Daily Timing:

08:00 - 10:00	First Session
10:00 - 10:20	Recess
10:20 - 12:20	Second Session
12:20 - 12:40	Recess (Prayer Break)
12:40 - 14:00	Last Session

#### **For training registrations or in-house enquiries, please contact:**

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