



## **COURSE OVERVIEW TE0266** **Sea Water Reverse Osmosis (SWRO)**

### **Course Title**

Sea Water Reverse Osmosis (SWRO)

### **Course Date/Venue**

Session 1: May 05-09, 2025/Glasshouse  
Meeting Room, Grand Millennium Al  
Wahda Hotel, Abu Dhabi, UAE

Session 2: September 08-12, 2025/Glasshouse  
Meeting Room, Grand Millennium Al  
Wahda Hotel, Abu Dhabi, UAE



### **Course Reference**

TE0266

### **Course Duration/Credits**

Five days/3.0 CEUs/30 PDHs



### **Course Description**



***This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.***

This course is designed to provide participants with a detailed and up-to-date overview of Sea Water Reverse Osmosis Technology. It covers the various desalination technologies and the scientific principles of osmosis and reverse osmosis processes; the components of an SWRO system and the process flow diagrams to understand the step-by-step operation of SWRO plants; the water chemistry, salinity and environmental impacts of SWRO operations; the pretreatment methods, membrane selection and configuration including scaling and fouling control; and the energy-efficient technologies and practices in pretreatment processes.



Further, the course will also discuss the advanced filtration techniques and design considerations for SWRO plants; the hydraulic and energy recovery devices; the operation and maintenance best practices of SWRO plants; the advanced monitoring and control systems for optimizing SWRO plant performance; diagnosing and troubleshooting common issues in SWRO operations; and the sustainability practices in SWRO operations.





During this interactive course, participants will learn the post-treatment processes, health and safety considerations and product water quality standards and testing; the strategies for blending desalinated water with conventional water sources and considerations for distribution; the emerging technologies aimed at improving efficiency and effectiveness of post-treatment processes; the regulatory frameworks and compliance; the project planning and development for SWRO plants; the economic analysis and financing of SWRO projects; the recent technological advancements and research trends in seawater reverse osmosis; and the impact of climate change on seawater desalination and strategies for adaptation

### **Course Objectives**

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a comprehensive knowledge on sea water reverse osmosis technology
- Discuss various desalination technologies and the scientific principles of osmosis and reverse osmosis processes
- Identify the components of an SWRO system and examine the process flow diagrams to understand the step-by-step operation of SWRO plants
- Explain water chemistry and salinity and the environmental impacts of SWRO operations
- Employ pretreatment methods, membrane selection and configuration including scaling and fouling control
- Explore energy-efficient technologies and practices in pretreatment processes
- Apply advanced filtration techniques and design considerations for SWRO plants
- Identify hydraulic and energy recovery devices and apply operation and maintenance best practices of SWRO plants
- Implement advanced monitoring and control systems for optimizing SWRO plant performance
- Diagnose and troubleshoot common issues in SWRO operations and discuss sustainability practices in SWRO operations
- Carryout post-treatment processes, discuss health and safety considerations and apply product water quality standards and testing
- Employ strategies for blending desalinated water with conventional water sources and considerations for distribution
- Explore emerging technologies aimed at improving efficiency and effectiveness of post-treatment processes
- Review regulatory frameworks and compliance and apply project planning and development for SWRO plants
- Carryout economic analysis and financing of SWRO projects and discuss recent technological advancements and research trends in seawater reverse osmosis
- Examine the impact of climate change on seawater desalination and strategies for adaptation

### **Exclusive Smart Training Kit - H-STK®**



*Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

### **Who Should Attend**

This course provides an overview of all significant aspects and considerations of sea water reverse osmosis technology for water engineers, mechanical engineers and other technical staff.

### **Training Methodology**

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

### **Accommodation**

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

### **Course Fee**

**US\$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.




### **Course Certificate(s)**


Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours

### **Certificate Accreditations**

Certificates are accredited by the following international accreditation organizations: -

-  British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

-  The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

### Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



**Mr. Paul Patsi, MSc, BSc, is an International Expert in Microbiology & Waste Water Treatment.** His expertise covers **Microbiological Analysis of Water & Waste Water, Waste Water Treatment Analysis, Water Chemistry, Water Biology, Water Quality, Fresh Water Environmental Chemistry, Fresh Water Microbiology, Zooplankton & Phytoplankton Analysis, Ichthyology, Microbiological Indoor Air Quality, Fluorescence Microscopy, Laboratory Assessment, Microbiological Quality Assurance and Analytical Chemistry.** Further, he is also well-versed in **HACCP, ISO 22000, ISO 17025, ISO 9001, Good Manufacturing Practice (GMP), Good Hygiene Practice (GHP) and Good Laboratory Practice (GLP).** He is currently the **Head of Microbiology & Chemical Laboratory** of PINDOS wherein he is in-charge of the waste water treatment and water/environmental legislation.

During his career life, Mr. Paul as held key positions such as the **Head of Microbiology & Chemical Laboratory, Head of Quality Control, Scientific Consultant, Biologist-Scientific Expert and Biologist** for multi-billion companies like **Help LTD, Lake Pamvotis Municipality Company, Hellenic Centre for Marine Research, Cargill and Nestle** just to name a few.

Mr. Paul has a **Master degree in Food Science and Food Technology** from the **University of Ioannina (Greece)** and a **Bachelor degree in Biology** from the **Aristotle University of Thessaloniki (Greece).** He is also a **Member** of the **Society for Applied Microbiology, Society of Biological Scientist** and the **Global Coalition for Sustained Excellence in Food & Health Protection.**

Mr. Paul has a **Master degree in Food Science and Food Technology** from the **University of Ioannina (Greece)** and a **Bachelor degree in Biology** from the **Aristotle University of Thessaloniki (Greece).** He is also a **Member** of the **Society for Applied Microbiology, Society of Biological Scientist** and the **Global Coalition for Sustained Excellence in Food & Health Protection.**

### Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

#### **Day 1**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Overview of Desalination Technologies:</b> Introduction to Various Desalination Technologies with a Focus on Reverse Osmosis & its Significance in Addressing Water Scarcity
0930 – 0945	Break
0945 – 1030	<b>Principles of Reverse Osmosis:</b> The Scientific Principles of Osmosis & Reverse Osmosis Processes, including Membrane Technology
1030 – 1130	<b>Components of an SWRO System:</b> Detailed Exploration of the Core Components of SWRO Systems, including Pretreatment, RO Membranes, Pumps & Energy Recovery Devices

1130 – 1215	<b>SWRO Process Flow Diagrams:</b> Examination of Process Flow Diagrams to Understand the Step-by-Step Operation of SWRO Plants
1215 – 1230	Break
1230 – 1330	<b>Water Chemistry &amp; Salinity:</b> Basics of Water Chemistry Relevant to Seawater Desalination, Focusing on Salinity, Scaling & Biofouling Potentials
1330 – 1420	<b>Environmental Considerations:</b> Discussing the Environmental Impacts of SWRO Operations, including Brine Disposal & Energy Consumption
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

## Day 2

0730 – 0830	<b>Pretreatment Methods:</b> In-Depth Analysis of Pretreatment Options (e.g., Coagulation, Flocculation, Filtration) to Protect RO Membranes from Fouling & Scaling
0830 – 0930	<b>Membrane Selection &amp; Configuration:</b> Criteria for Selecting RO Membranes for SWRO Plants, including Types of Membranes & their Configurations
0930 – 0945	Break
0945 – 1100	<b>Scaling &amp; Fouling Control:</b> Strategies for Managing Scaling & Fouling, including Chemical Dosing & Membrane Cleaning Techniques
1100 – 1215	<b>Energy Efficiency in Pretreatment:</b> Exploring Energy-Efficient Technologies & Practices in Pretreatment Processes
1215 – 1230	Break
1230 – 1330	<b>Advanced Filtration Techniques:</b> Examination of Advanced Filtration Techniques such as Ultrafiltration (UF) as Pretreatment to Improve SWRO Efficiency
1330 – 1420	<b>Case Studies on Pretreatment Successes &amp; Failures:</b> Analyzing Real-World Case Studies to Identify Best Practices & Lessons Learned in SWRO Pretreatment
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two

## Day 3

0730 – 0830	<b>Design Considerations for SWRO Plants:</b> Factors Influencing the Design of SWRO Plants, including Capacity, Recovery Ratio & Product Water Quality
0830 – 0930	<b>Hydraulic &amp; Energy Recovery Devices:</b> Overview of Hydraulic & Energy Recovery Devices Used in SWRO to Enhance System Efficiency
0930 – 0945	Break
0945 – 1100	<b>Operation &amp; Maintenance Best Practices:</b> Guidelines for the Operation & Maintenance of SWRO Plants to Ensure Reliability & Longevity
1100 – 1215	<b>Monitoring &amp; Control Systems:</b> Introduction to Advanced Monitoring & Control Systems for Optimizing SWRO Plant Performance
1215 – 1230	Break
1230 – 1330	<b>Troubleshooting Common Operational Issues:</b> Techniques for Diagnosing & Troubleshooting Common Issues in SWRO Operations
1330 – 1420	<b>Sustainability Practices in SWRO Operations:</b> Discussing Sustainable Practices, including Energy Optimization & Waste Minimization
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

#### Day 4

0730 – 0830	<b>Post-Treatment Processes:</b> Overview of Post-Treatment Processes Required to Stabilize & Enhance the Quality of Desalinated Water
0830 – 0930	<b>Health &amp; Safety Considerations:</b> The Health & Safety Aspects Related to SWRO Plants, including Handling Chemicals & Product Water Quality Standards
0930 – 0945	Break
0945 – 1100	<b>Product Water Quality Standards &amp; Testing:</b> Detailed Discussion on Water Quality Standards for Potable Use & the Importance of Rigorous Testing
1100 – 1215	<b>Blending &amp; Distribution:</b> Strategies for Blending Desalinated Water with Conventional Water Sources & Considerations for Distribution
1215 – 1230	Break
1230 – 1330	<b>Emerging Technologies in Post-treatment:</b> Exploration of Emerging Technologies Aimed at Improving Efficiency & Effectiveness of Post-Treatment Processes
1330 – 1420	<b>Regulatory Frameworks &amp; Compliance:</b> Navigating Regulatory Frameworks & Ensuring Compliance with Local & International Standards for Desalinated Water
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Four

#### Day 5

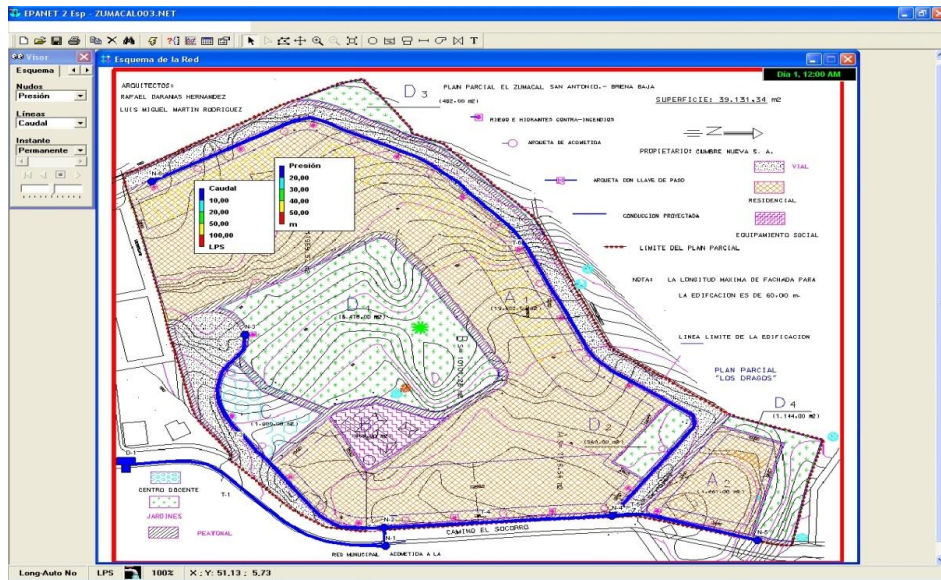
0730 – 0830	<b>Project Planning &amp; Development for SWRO Plants:</b> Key Stages in the Development of SWRO Projects, from Feasibility Studies to Commissioning
0830 – 0930	<b>Economic Analysis &amp; Financing of SWRO Projects:</b> The Economic Considerations, Cost Analysis & Financing Models for SWRO Projects
0930 – 0945	Break
0945 – 1100	<b>Innovations in SWRO Technology:</b> Discussing Recent Technological Advancements & Research Trends in Seawater Reverse Osmosis
1100 – 1230	<b>Impact of Climate Change on SWRO:</b> Examining the Impact of Climate Change on Seawater Desalination & Strategies for Adaptation
1230 – 1245	Break
1245 – 1345	<b>Case Studies of Successful SWRO Projects:</b> Reviewing Case Studies of Successful SWRO Projects with a Focus on Innovative Solutions & Management Practices
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course





### **Simulator (Hands-on Practical Sessions)**

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the latest revision of “EPANET” simulators.



**EPANET Simulator**

### **Course Coordinator**

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)