COURSE OVERVIEW TE0065-4D
Water Desalination Technologies & New Development

Course Title
Water Desalination Technologies & New Development

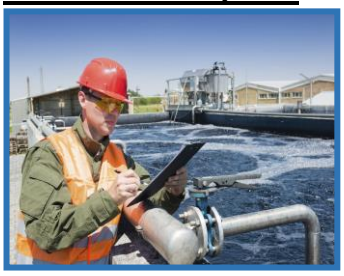
Course Reference
TE0065-4D

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

Course Date/Venue

Session(s)	Dates	Venue
1	January 29-February 01, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	March 04-07, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA
3	June 10-13, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
4	November 11-14, 2024	Cheops Meeting Room, Radisson Blu Hotel, Istanbul Sisli, Turkey

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

Water desalination technologies play a crucial role in socio-economic development in a number of countries in the world. Desalinated water is an essential and often the sole, source of fresh water in several of these countries, and rising living standards and high population growth are likely to render desalination a viable option for many areas of the world. Fresh water is rapidly becoming a scarce resource in many countries around the world. Desalination technologies, applied to seawater and brackish water, offer effective alternatives in a variety of circumstances. For some countries in the world particularly in Gulf States they are on the most arid part of the globe and characterized by some of the world's highest population growth rates, would benefit greatly from the adaptation, further development and wider dissemination of desalination technologies.

Large-scale thermal desalination technologies have been in use since the 1950s. The larger desalination plants have provided fresh water supplies for drinking municipal use and agricultural development, particularly in the Gulf States. In the past, high capital costs and heavy energy consumption generally translated into excessive desalinated water costs. However, advances in technology have helped to drastically reduce capital and running costs as well as energy requirements, rendering desalination more viable an option than ever before.

This course is essentially aimed at outlining trends in desalination technologies and highlighting the options offered by recent technological advances. The course covers available technologies, proposed design improvements and market potential in the near future. Through case studies, some of their more salient features are examined. Energy demands for both current processes and the newer innovations will be discussed. The course will cover both major processes in water desalination, the thermal and the membrane separation.

Course Objectives

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

- Apply and gain an in-depth knowledge on the operation, heat balance, performance, optimization, start-up and troubleshooting of MSF and RO water desalination plants
- Develop a good understanding of thermal and flash desalination, single and multiple effect of evaporation, fouling, scaling and the recent trends in desalination
- Describe the RO membrane desalination processes and the basic principles of MF and UF, including the fouling and cleaning of these systems
- Develop a good understanding of the basic principles and design of reverse osmosis technology (RO)
- Discuss fouling, pre-and post-treatment for RO and NF systems
- Employ the method of disposal in brackish and SWRO and compare membrane and distillation

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of water desalination technologies and new development for engineers, scientists and technologists involved in the planning, management and operation of water desalination systems and also for manufacturers, consultants, designers, researchers and water personnel. The course is also suitable for water laboratory staff including lab managers, chemists, scientists, analysts, technologists and other lab technical staff.

Training Methodology

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

30% Lectures
20% Workshops & Work Presentations
30% Case Studies & Practical Exercises
20% Software, Simulators & Videos

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

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: -

- 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 **2.4 CEUs** (Continuing Education Units) or **24 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.

- 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.

Accommodation

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

Course Instructor

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:

Dr. Tarek Samir, PhD, MSc, BSc, is a **Senior Chemical Engineer** and an **International Expert** in **Analytical Laboratory** with over **20 years** of integrated industrial experience and academic experience as a **University Professor**. His expertise widely covers in the areas of **Laboratory Practice**, **Analytical Measurement & Uncertainty**, **Uncertainty Estimation**, Statistical Process Control (**SPC**), **GC**, **GC/MS**, **HPLC**, **Validation Method**, **Laboratory Equipment**, **Laboratory Quality Management Systems** (**ISO 17025**), Lab Safety & Health, Good Laboratory Practice (**GLP**), **Water Pollution Control**, **Water Distribution** Systems, **Water Networking**, **Hydraulic** Modelling Systems, **Pumping Stations**, **Water Reservoirs**, **Water Storage Tanks**, **Water Treatment**, Extended Activated Sludge Treatment, **Water Analysis**, **Water Treatment** Technology, **MBBR**, **Hydraulic Design**, **Hydraulic Network** System, **Water Pipeline** System, **Water Distribution System**, **Water Quality** Analysis, **Steam Boiler**, **Hydro-Treating Technology**, **Water Storage Tanks**, Quantitative & Qualitative Analysis of Organic Micro-Pollutants, **Water Quality** Management, Advanced **Organic Material & Separation**, **Water Desalination**, **Oil Polluted Wastewater Treatment**, **Reverse Osmosis**, **Water Quality** Assessment, **Water Assurance & Quality Control** and **Measurement Uncertainty Estimation**.

During Dr. Tarek's career life, he has handled challenging positions wherein he has acquired his wide technical and practical experience in the field of process & chemical industry such as the **Professor**, **Associate Professor**, **Lead Auditor**, **Technical Expert**, **Technical Auditor**, **Assistant Researcher**, **Researcher** and **Senior Instructor/Lecturer** for various companies and universities such as the National Researcher Center, Van Hall Institute – Part of Wagnningen University, Science Valley Academy and Benha University.

Dr. Tarek has a **PhD**, **Master's** and **Bachelor's** degree in **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer** and published numerous technical papers, patents and journals. He has further delivered numerous trainings, courses, seminars, conferences and workshops globally.

Course Fee

Abu Dhabi	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Istanbul	**US$ 5,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course 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	***PRE-TEST***
0830 – 0930	***Thermal Desalination*** *Water Resources, Composition and Measuring Scales ● Classification, Historical Development and Market Status*
0930 – 0945	*Break*
0945 – 1100	***Thermal Desalination (cont'd)*** *Flash Desalination Processes ● MSF Flashing Stage*
1100 – 1230	***Thermal Desalination (cont'd)*** *Single Effect Evaporation ● Single Effect Mechanical Vapor Compression*
1230 – 1245	*Break*
1245 – 1420	***Thermal Desalination (cont'd)*** *Multiple Effect Evaporation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***Thermal Desalination (cont'd)*** *Multiple Effect Evaporation with Vapor Compression*
0900 – 0915	*Break*
0915 – 1100	***Thermal Desalination (cont'd)*** *Energy*
1100 – 1230	***Thermal Desalination (cont'd)*** *Fouling and Scaling*
1230 – 1245	*Break*
1245 – 1420	***Thermal Desalination (cont'd)*** *Trends in Desalination*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0900	***RO Membrane Desalination*** *Basic Principles of MF and UF ● Fouling of UF and MF Systems*
0900 – 0915	*Break*
0915 – 1100	***RO Membrane Desalination (cont'd)*** *Cleaning of MF and UF Systems ● Basic Principles of Reverse Osmosis Technology*
1100 – 1230	***RO Membrane Desalination (cont'd)*** *Design of Reverse Osmosis Systems ● Overview RO and NF Membranes*
1230 – 1245	*Break*
1245 – 1420	***RO Membrane Desalination (cont'd)*** *Fouling in RO and NF Systems ● Pretreatment for RO and NF Systems*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***RO Membrane Desalination (cont'd)*** *Post treatment for RO and NF Systems*
0930 – 0945	*Break*
0945 – 1100	***RO Membrane Desalination (cont'd)*** *Concentrate Disposal in Brackish and SWRO*
1100 – 1215	***RO Membrane Desalination (cont'd)*** *Comparison of Membrane and Distillation*
1215 – 1230	*Break*
1230 – 1345	***Summary & Open Forum***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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