COURSE OVERVIEW TE0300
Water Production and Transmission

Course Title
Water Production and Transmission

Course Date/Venue
Session 1: June 30-July 04, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: October 20-24, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
TE0300

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 Water Production and Transmission. It covers the significance of water production including types of water sources, water production processes and challenges in water production; the water treatment methods, water treatment plants (WTP) design, water purification techniques, water transmission and water quality standards and regulations; the types of water distribution systems, components of water distribution networks and hydraulic principles in water distribution; the criteria for pipe selection and sizing, designing of pump stations, distribution system balancing and optimization; and the network monitoring and control systems.

Further, the course will also discuss the functions and types of pumping stations pump selection and capacity determination; the energy efficiency in pumping stations, pump maintenance and troubleshooting; the types of water losses, leakage detection and repair, smart metering, data collection and reducing non-revenue water; the energy consumption in water systems, optimizing pumping operations and power supply for water infrastructure; the smart water grid systems and renewable energy integration; and sustainability in water production and transmission.

During this interactive course, participants will learn the principles of reverse osmosis (RO) technology including RO membrane types and applications, designing considerations for RO plants and maintaining and troubleshooting of RO systems; the membrane filtration technologies, desalination of seawater and chemical additives in water treatment; the wastewater reuse and resource recovery, water treatment monitoring and control and maintenance of water treatment and transmission systems; identifying and diagnosing system failures, troubleshooting pumps, valves, and piping systems, handling leaks, pressure issues and contamination and restoring and repairing procedures; the safety standards in water treatment and transmission and workforce training in water systems; the emerging technologies in water production and transmission, artificial intelligence and machine learning applications; and the robotics and automation in water facilities and blockchain technology for water data management.

Course Objectives

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

- Apply and gain an in-depth knowledge on water production and transmission
- Discuss the significance of water production including types of water sources, water production processes and challenges in water production
- Carryout water treatment methods, water treatment plants (WTP) design, water purification techniques, water transmission and water quality standards and regulations
- Identify the types of water distribution systems, components of water distribution networks and hydraulic principles in water distribution
- Determine the criteria for pipe selection and sizing, design of pump stations, distribution system balancing and optimization, network monitoring and control systems
- Discuss the functions and types of pumping stations and apply pump selection and capacity determination, energy efficiency in pumping stations, pump maintenance and troubleshooting
- Identify the types of water losses and implement leakage detection and repair, smart metering, data collection and reduce non-revenue water
- Explain energy consumption in water systems, optimize pumping operations and describe power supply for water infrastructure
- Recognize smart water grid systems and apply renewable energy integration and sustainability in water production and transmission
- Explain the principles of reverse osmosis (RO) technology including RO membrane types and applications, design considerations for RO plants and maintenance and troubleshooting of RO systems
- Describe membrane filtration technologies, desalination of seawater and chemical additives in water treatment
- Employ wastewater reuse and resource recovery, water treatment monitoring and control and maintenance of water treatment and transmission systems

- Identify and diagnose system failures, troubleshoot pumps, valves, and piping systems, handle leaks, pressure issues and contamination and restore and repair procedures
- Apply safety standards in water treatment and transmission and workforce training in water systems
- Discuss the emerging technologies in water production and transmission, artificial intelligence and machine learning applications, robotics and automation in water facilities and blockchain technology for water data management

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 water production and transmission for water utility engineers, water treatment plant supervisors, environmental and sanitary engineers, project managers and developers in water sector, consultants in water resources & infrastructure, water technicians 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.

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.

Accommodation

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

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. Adel Abdallah is a **Senior Water Engineer** with almost **25 years** of extensive experience within the **Power & Water Utilities** and **other Energy** sectors. His expertise widely covers in the areas of **Municipal Wastewater Treatment** Facility Operation, **Water Network Design & Hydraulic Modelling**, **Water Utility Industry**, **Sewage & Industrial Waste Water Treatment**, **Water Reservoir**, **Water Storage Reservoir**, **Water Reservoirs & Pumping Stations**, **Water Pumping Station**, **Water Distribution Systems & Pumping Stations**, **Reservoirs & Pumping Stations** Design & Operation, **Pumping** Systems, Interconnecting Pipelines, **Pump** Houses & Booster Pumping Stations, **Water Pipes & Fittings**, **Water Hydraulic** Modelling, **Water Network Hydraulic** Simulation Modelling, **Water Balance** Modelling, **Water Pipelines** Materials & Fittings, **Water Distribution** System, **Water Distribution Network**, **Water Network** System Design, **Water Instrumentation** and Network Control, **Initiation to Water Networks** Components, **Water Network System** Analysis, **Water Network** System Extension, **Water Network** System Replacement & Upgrade, **Water Networks** Optimization, **Water Tanks**, **Water Forecasts** Demand, **Waste Water Effluent Treating** Facilities, **Effluent Treatment & Slurry Handling**, **Oily Water Treatment Technology**, **Water Equipment** Selection & Inspection, **Water Testing & Commissioning** Techniques, **Wastewater** Treatment, **Water Supply** Design, Qualitative Analysis of Soil & **Ground Water**, **Well inventory**, **Monitoring & Conservation**, **Potable Water** Transmission, Districts Meters Areas (**DMA**s), **Water Supply & Desalination** Plants Rehabilitation, **Water Supply & Distribution Systems** Efficiency & Effectiveness, **Water Instrumentations** Basics, **Water Treatment** Technology, **Reverse Osmosis**, **MSF Plants**, Extended Activated **Sludge Treatment**, **MBBR**, **Water Quality** Analysis, **Steam Boiler**, **Hydro-Treating Technology** and **Water Storage Tanks**.

During Mr. Abdallah's career life, he has handled challenging positions wherein he has acquired his wide technical and practical experience such as the **Water Engineer**, **Project Site Engineer**, **Water & Wastewater Treatment System Plant Engineer**, **Senior Water & Wastewater Plant Engineer**, **Production Supervisor**, **Process Engineer**, **Technical Engineer**, **Chemical Engineer** and **Senior Instructor/Consultant** for various companies such as the Water Authority of Jordan, Metito Overseas, Al-Hassan Industrial Estate, UIP-FCEC JV Design and Build Company, Degussa MBT, Al-Mas Resin Factory, Jordanian Tunisian Chemicals Co. and National Chlorine Company.

Mr. Abdallah has a **Bachelor's** degree in **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer** and delivered numerous courses, trainings, conferences, seminars and workshops internationally.

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	***PRE-TEST***
0830 – 0930	***Overview of Water Production*** *Definition & Significance of Water Production • Types of Water Sources (Surface Water, Groundwater) • Water Production Processes (Extraction, Filtration) • Challenges in Water Production*
0930 – 0945	*Break*
0945 – 1030	***Water Treatment Methods*** *Primary & Secondary Treatment Processes • Chemical Treatments in Water Production • Filtration Systems & Their Types • Desalination Processes for Seawater*
1030 – 1130	***Water Treatment Plants (WTP) Design*** *Components of a Water Treatment Plant • Basic Layout & Flow of a Treatment Plant • Standard Design Parameters • Key Performance Indicators in WTP Design*
1130 – 1215	***Water Purification Techniques*** *Methods of Coagulation & Flocculation • Sand Filtration vs. Membrane Filtration • UV & Ozone Disinfection • Advanced Treatment Methods (e.g., Reverse Osmosis)*
1215 – 1230	*Break*
1230 – 1330	***Basics of Water Transmission*** *Concept of Water Transmission • Key Components in Water Transmission Systems • Types of Pipelines (Steel, PVC, Cast Iron) • Overview of Pumping Stations*
1330 – 1420	***Water Quality Standards & Regulations*** *National & International Standards (e.g., WHO, EPA) • Key Water Quality Parameters (pH, Turbidity, Chlorine) • Regulatory Compliance in Water Production • Monitoring & Controlling Water Quality During Transmission*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Types of Water Distribution Systems*** *Gravity-Based Distribution Systems • Pumped Systems & Booster Stations • Pressurized Water Systems • Combined Systems*
0830 – 0930	***Components of Water Distribution Networks*** *Main Pipelines, Distribution Pipelines • Valve Stations, Hydrants, & Service Connections • Water Meters & Their Importance • Pressure & Flow Control Mechanisms*
0930 – 0945	*Break*

0945 – 1100	***Hydraulic Principles in Water Distribution*** *Basic Hydraulics & Flow in Pipelines • Pressure Drop Calculation & Pipe Sizing • Bernoulli's Theorem & Its Application • Understanding Water Hammer & Surge Protection*
1100 – 1215	***Design Considerations for Water Networks*** *Criteria for Pipe Selection & Sizing • Design of Pump Stations • Distribution System Balancing & Optimization • Network Monitoring & Control Systems*
1215 – 1230	*Break*
1230 – 1330	***Pumping Stations & Water Conveyance*** *Functions & Types of Pumping Stations • Pump Selection & Capacity Determination • Energy Efficiency in Pumping Stations • Pump Maintenance & Troubleshooting*
1330 – 1420	***Water Loss Management*** *Types of Water Losses (Real vs. Apparent Losses) • Leakage Detection & Repair • Smart Metering & Data Collection • Reducing Non-Revenue Water*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Energy Consumption in Water Systems*** *Energy Costs in Water Production & Distribution • Energy-Efficient Practices in Water Treatment Plants • Pumps & Motors Energy Consumption • Role of Automation in Reducing Energy Use*
0830 – 0930	***Optimizing Pumping Operations*** *Variable Speed Drives (VSD) in Pumps • Energy-Saving Strategies in Pump Stations • Pump Performance Curves & Efficiency • Monitoring & Controlling Energy Usage in Real-Time*
0930 – 0945	*Break*
0945 – 1100	***Power Supply for Water Infrastructure*** *Electrical Systems in Water Treatment & Pumping Stations • Backup Power Systems (Generators, UPS) • Power Quality Monitoring & Management • Voltage Regulation in Water Systems*
1100 – 1215	***Smart Water Grid Systems*** *Introduction to Smart Water Grids • Benefits of IoT in Water Production & Transmission • Real-Time Monitoring & Automation • Case Studies of Smart Water Grid Implementations*
1215 – 1230	*Break*
1230 – 1330	***Renewable Energy Integration*** *Use of Solar & Wind Energy in Water Production • Designing Hybrid Power Systems for Water Stations • Feasibility Studies for Renewable Energy Applications • Cost-Benefit Analysis of Renewable Energy Adoption*
1330 – 1420	***Sustainability in Water Production & Transmission*** *Sustainable Practices in Water Treatment & Distribution • Water Reuse & Recycling in Municipal Systems • Eco-Friendly Materials for Water Infrastructure • Reducing the Carbon Footprint in Water Systems*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Reverse Osmosis (RO) Technology*** *Principles of Reverse Osmosis • RO Membrane Types & Applications • Design Considerations for RO Plants • Maintenance & Troubleshooting of RO Systems*
0830 – 0930	***Membrane Filtration Technologies*** *Microfiltration, Ultrafiltration, Nanofiltration • Applications of Membrane Filtration • Advantages & Disadvantages of Each Technology • Fouling & Cleaning of Membranes*
0930 – 0945	*Break*
0945 – 1100	***Desalination of Seawater*** *Desalination Technologies Overview • Thermal versus Membrane Desalination Processes • Environmental Impact of Desalination • Cost Analysis of Desalination Projects*
1100 – 1215	***Chemical Additives in Water Treatment*** *Types of Chemicals Used in Water Treatment (Coagulants, Flocculants, Disinfectants) • Handling & Storage of Chemicals • Chemical Dosing Systems & Calculations • Safety Procedures in Chemical Handling*
1215 – 1230	*Break*
1230 – 1330	***Wastewater Reuse & Resource Recovery*** *Wastewater Treatment for Potable Use • Advanced Treatment Methods for Reuse • Resource Recovery from Wastewater (e.g., Biogas) • Case Studies in Wastewater Reuse in Industrial Processes*
1330 – 1420	***Water Treatment Monitoring & Control*** *Real-Time Water Quality Monitoring Systems • Control Systems for Automated Water Treatment • SCADA Systems in Water Treatment & Distribution • Data Analytics in Water Treatment Optimization*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

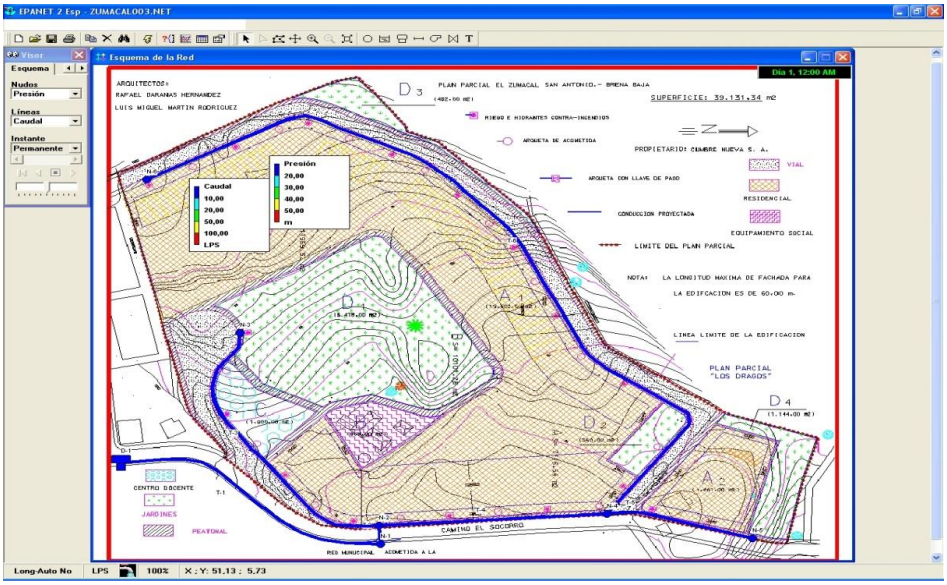
Day 5

0730 – 0830	***Maintenance of Water Treatment & Transmission Systems*** *Preventive & Predictive Maintenance • Key Performance Indicators for Maintenance • Common Issues in Water Treatment & Transmission • Maintenance Schedules & Documentation*
0830 – 0930	***Troubleshooting Water System Failures*** *Identifying & Diagnosing System Failures • Troubleshooting Pumps, Valves, & Piping Systems • Handling Leaks, Pressure Issues, & Contamination • System Restoration & Repair Procedures*
0930 – 0945	*Break*
0945 – 1100	***Safety Standards in Water Treatment & Transmission*** *Safety Protocols for Water Treatment Plants • Personal Protective Equipment (PPE) Requirements • Emergency Response Plans for Water Facilities • Hazardous Materials Handling & Storage*
1100 – 1230	***Workforce Training in Water Systems*** *Skills Required for Operation & Maintenance Personnel • Training Programs for Water System Operators • Certification & Accreditation in the Water Sector • Ongoing Education & Development*
1230 – 1245	*Break*

1245 – 1300	***Innovations in Water Technology*** *Emerging Technologies in Water Production & Transmission • Artificial Intelligence & Machine Learning Applications • Robotics & Automation in Water Facilities • Blockchain Technology for Water Data Management*
1300 - 1345	***Future Trends & Challenges in Water Production*** *Impact of Climate Change on Water Resources • Role of Desalination & Water Recycling in the Future • Global Water Scarcity & Sustainable Solutions • Evolving Regulations & Standards in Water Management*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
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