COURSE OVERVIEW TE0268
Water System Operation & Optimization

Course Title
Water System Operation & Optimization

Course Date/Venue
November 25-29, 2024/Al Maya 1 Meeting Room, Grand Millenium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
TE0268

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 System Operation and Optimization. It covers the water system components including supply sources, treatment facilities, storage and distribution networks; the fundamentals of water quality, standards and parameters crucial for maintaining safe drinking water; the hydraulics and fluid dynamics, system monitoring and data acquisition and energy management in water systems; and the regulatory compliance and safety protocols for water system operations.

Further, the course will also discuss the innovative treatment technologies; the process optimization for water treatment, sludge management and disposal, chemical handling and dosage optimization; the taste and odor control in water supplies; the emerging contaminants and removal technologies; the design and layout of distribution networks; the leak detection and loss management; and the pressure management, water storage optimization, pump operation and efficiency and asset management.

During this interactive course, participants will learn the sustainable water resource management and renewable energy integration; the climate resilience in water systems, water reuse and recycling; the smart water technologies to improve water system management and optimization; the cutting-edge technologies and their potential impact on water systems; the digital twins for system monitoring, simulation and optimization; the advanced data analytics and predictive maintenance; the strategies for engaging customers in water conservation efforts; the regulatory trends and future compliance challenges; and the strategic planning for future water system challenges.

Course Objectives

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

- Apply and gain an in-depth knowledge on water system operation
- Identify water system components including supply sources, treatment facilities, storage and distribution networks
- Discuss the fundamentals of water quality, standards and parameters crucial for maintaining safe drinking water
- Explain hydraulics and fluid dynamics, system monitoring and data acquisition and energy management in water systems
- Review the regulatory compliance and safety protocols for water system operations
- Recognize innovative treatment technologies and apply process optimization for water treatment, sludge management and disposal, chemical handling and dosage optimization
- Carryout taste and odor control in water supplies and discuss the emerging contaminants and removal technologies
- Illustrate the design and layout of distribution networks and apply leak detection and loss management
- Employ pressure management, water storage optimization, pump operation and efficiency and asset management
- Apply sustainable water resource management and renewable energy integration
- Carryout climate resilience in water systems, water reuse and recycling as well as smart water technologies to improve water system management and optimization
- Explore cutting-edge technologies and their potential impact on water systems
- Utilize digital twins for system monitoring, simulation and optimization
- Apply advanced data analytics and predictive maintenance including strategies for engaging customers in water conservation efforts
- Discuss regulatory trends and future compliance challenges as well as strategic planning for future water system challenges

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 system operation and optimization for water utility managers, engineers, water treatment plant operators, consultants, environmental scientists and researchers, professionals involved in water distribution and infrastructure maintenance

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: -

- 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.

- 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.

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. Kyle Bester is a **Senior Water Engineer** with extensive years of practical experience within the **Oil & Gas**, **Power & Water Utilities** and other **Energy** sectors. His expertise includes **Main Water** System Construction, **Main Water Line** Construction, **Service Reservoir** Design & Operation, **Pipes & Fittings**, **Water Network** System Design & Operation, **Water Networks** Optimization, Oilfield **Water Treatment**, **Reverse Osmosis, Water Reservoir**, **Water Tanks**, **Water Pumping** Station, **Water Distribution** System, **Water Network** System, **Water Pipes & Fittings**, **Water Hydraulic** Modelling, **Water Storage Reservoir**, **Reservoirs & Pumping** Stations Design & Operation, **Pumping** Systems, Interconnecting **Pipelines**, **Water Network Hydraulic** Simulation Modelling, **Water Supply** Design, **Water Balance Modelling**, **Water Distribution Network**, **Water Network** System Analysis, **Water Forecasts** Demand, **Water Pipelines** Materials & Fittings, **Water Network** System Design, Pump Houses & Booster Pumping Stations, **Potable Water Transmission**, **Water Distribution Network**, Districts Meters Areas (DMAs), **Water Supply & Desalination Plants** Rehabilitation, **Water Reservoirs & Pumping Stations**, **Water Network System** Extension, Water Network System Replacement & Upgrade, **Water Supply & Distribution** Systems Efficiency & Effectiveness, **Pipe** Materials & Fittings, **Supply Water Network** Rehabilitation, **Water Loss** Reduction, Transmission & Distribution **Pipelines**, **Water Distribution** Design & Modelling, **Water Supply** System, Best Practice in **Sewage** & Industrial **Wastewater Treatment** & Environmental Protection, **Water Distribution** Design & Modelling, **Desilting**, Treating & Handling Oily **Water**, **Water Chemistry** for **Power Plant**, **Water** Sector Orientation, Environmental Impact Assessment (**EIA**), **Potable Water**, **Reverse Osmosis** Treatment Technology and **Chlorination** System, **Well** Inventory, Monitoring & Conservation, **Qualitative Analysis** of Soil & Ground Water, **Water** Networking, **Hydraulic Modelling** Systems, **Pumping** Stations, **Centrifugal Pumps**, **Pipelines & Pumping**, **Water Reservoirs**, **Water Storage Tanks**, Extended Activated **Sludge** Treatment, **Sewage & Industrial Wastewater** Treatment & Environmental Protection, Supervising & Monitoring **Sewage Works**, **Water Desalination** Technologies, **Water Distribution & Pump** Station, Best **Water Equipment** Selection & Inspection, **Hydraulic Modelling** for Water Network Design, **Water Utility** Industry, **Water Desalination** Technologies & New Development, **Water Hydrology**, **Water Conveyors**, **Water Networks** Rehabilitation. He is currently the **Part Owner & Manager** of Extreme Water SA wherein he manages, re-designed and commissioned a water and wastewater treatment plants.

During his career life, Mr. Bester has gained his practical and field experience through his various significant positions and dedication as the **Project Manager**, **Asset Manager**, **Manager**, **Water Engineer**, **Supervisor**, **Team Leader**, **Analyst**, **Process Technician**, **Landscape Designer** and **Senior Instructor/Trainer** for various international companies, infrastructures, water and wastewater treatment plants from New Zealand, UK, Samoa, Zimbabwe and South Africa, just to name a few.

Mr. Bester holds a **Diploma** in **Wastewater Treatment** and a **National Certificate** in **Wastewater & Water Treatment**. Further, he is a **Certified Instructor/Trainer**, an **Approved Chemical Handler** and has 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: ***Monday, 25th of November 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Water Systems**: Introduction to Water System Components including Supply Sources, Treatment Facilities, Storage & Distribution Networks*
0930 – 0945	*Break*
0945 – 1030	***Water Quality Management**: Fundamentals of Water Quality, Standards & Parameters Crucial for Maintaining Safe Drinking Water*
1030 – 1130	***Hydraulics & Fluid Dynamics**: Basic Principles Affecting Water Flow in Pipes & Networks including Pressure Dynamics & Flow Rates*
1130 – 1215	***System Monitoring & Data Acquisition**: Tools & Technologies for Real-Time Monitoring of Water Quality & System Performance*
1215 – 1230	*Break*
1230 – 1330	***Energy Management in Water Systems**: Energy Usage in Water Systems & Strategies for Minimizing Consumption*
1330 – 1420	***Regulatory Compliance & Safety**: The Legal Framework & Safety Protocols for Water System Operations*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Tuesday, 26th of November 2024***

0730 – 0830	***Innovative Treatment Technologies**: Exploring Advanced Water Treatment Options such as Membrane Technologies, UV Disinfection & AOPs*
0830 – 0930	***Process Optimization for Water Treatment**: Techniques for Enhancing the Efficiency & Effectiveness of Treatment Processes*
0930 – 0945	*Break*
0945 – 1100	***Sludge Management & Disposal**: Best Practices in the Handling, Treatment & Disposal of Sludge from Water Treatment Plants*
1100 – 1215	***Chemical Handling & Dosage Optimization**: Safe Chemical Handling Practices & Optimization of Chemical Dosages for Treatment*
1215 – 1230	*Break*
1230 – 1330	***Taste & Odor Control**: Strategies for Managing Taste & Odor Issues in Water Supplies*
1330 – 1420	***Emerging Contaminants & Removal Technologies**: Addressing Challenges Posed by Pharmaceuticals, Microplastics & Other Emerging Contaminants*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Wednesday, 27th of November 2024***

0730 – 0830	***Design & Layout of Distribution Networks**: Principles Behind the Design & Optimization of Water Distribution Systems*
0830 – 0930	***Leak Detection & Loss Management**: Techniques & Technologies for Detecting Leaks & Reducing Non-Revenue Water*
0930 – 0945	*Break*
0945 – 1100	***Pressure Management**: Strategies for Optimizing Pressure to Reduce Leaks & Improve System Efficiency*

1100 – 1215	***Water Storage Optimization**: Balancing Storage Capacity with Demand to Ensure Water Quality & Availability*
1215 – 1230	*Break*
1230 – 1330	***Pump Operation & Efficiency**: Optimizing Pump Schedules & Operations for Energy Efficiency & Reliability*
1330 – 1420	***Asset Management**: Techniques for Managing Water System Assets to Maximize Lifespan & Performance*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Thursday, 28th of November 2024

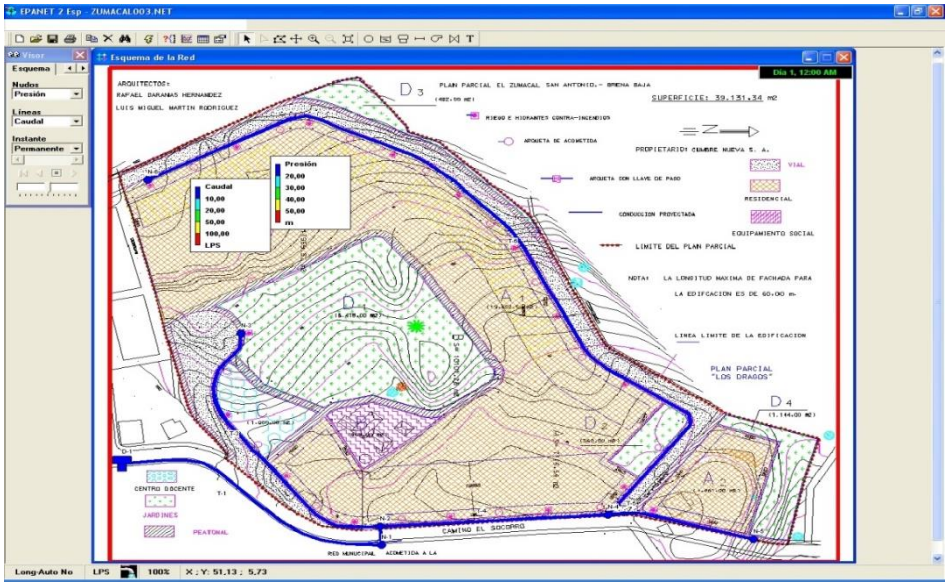
0730 – 0830	***Sustainable Water Resource Management**: Strategies for Sustainable Sourcing & Utilization of Water Resources*
0830 – 0930	***Renewable Energy Integration**: Opportunities for Incorporating Renewable Energy Sources into Water System Operations*
0930 – 0945	*Break*
0945 – 1100	***Climate Resilience in Water Systems**: Adapting Water System Operations to Withstand Climate Change Impacts*
1100 – 1215	***Water Reuse & Recycling**: Technologies & Systems for the Safe Reuse & Recycling of Wastewater*
1215 – 1230	*Break*
1230 – 1330	***Smart Water Technologies**: Implementing IoT, AI & Data Analytics for Improved Water System Management & Optimization*
1330 – 1420	***Case Studies in Operational Improvements**: Real-World Examples of Successful Water System Optimizations & Outcomes*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: Friday, 29th of November 2024

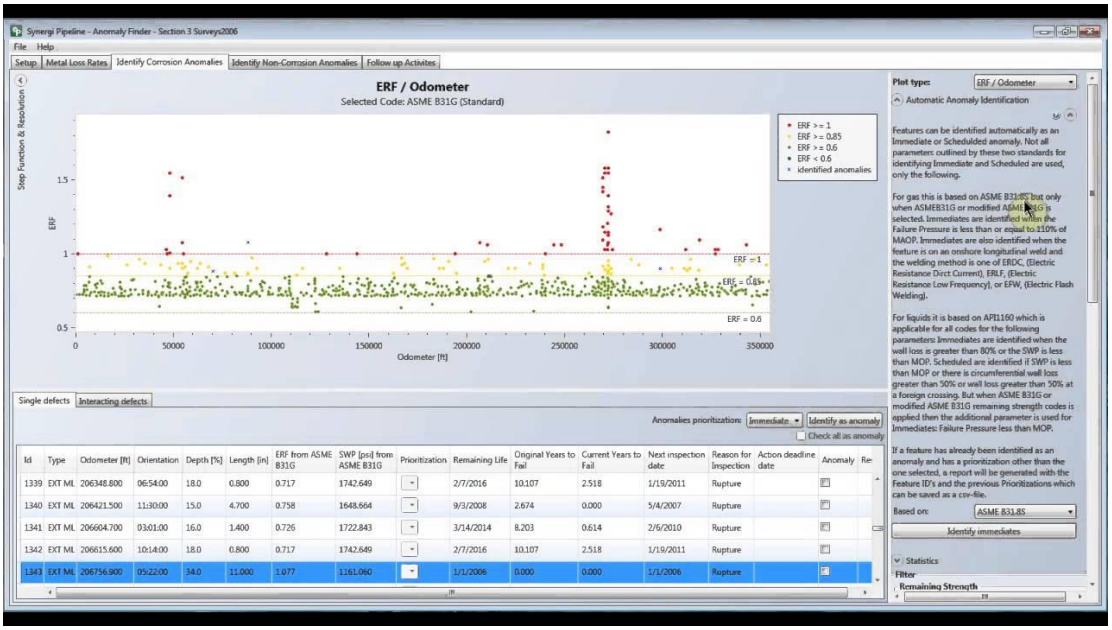
0730 – 0830	***Innovations in Water System Technologies**: Exploring Cutting-Edge Technologies & their Potential Impact on Water Systems*
0830 – 0930	***Digital Twin Technologies for Water Systems**: Utilizing Digital Twins for System Monitoring, Simulation & Optimization*
0930 – 0945	*Break*
0945 – 1100	***Advanced Data Analytics & Predictive Maintenance**: Leveraging Big Data for Predictive Maintenance & Operational Forecasting*
1100 – 1230	***Customer Engagement & Demand Management**: Strategies for Engaging Customers in Water Conservation Efforts*
1230 – 1245	*Break*
1245 – 1315	***Regulatory Trends & Future Compliance Challenges**: Upcoming Regulatory Changes & How to Prepare for Them.*
1315 - 1345	***Strategic Planning for Future Water System Challenges**: Tools & Methodologies for Strategic Planning & Resilience Building*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

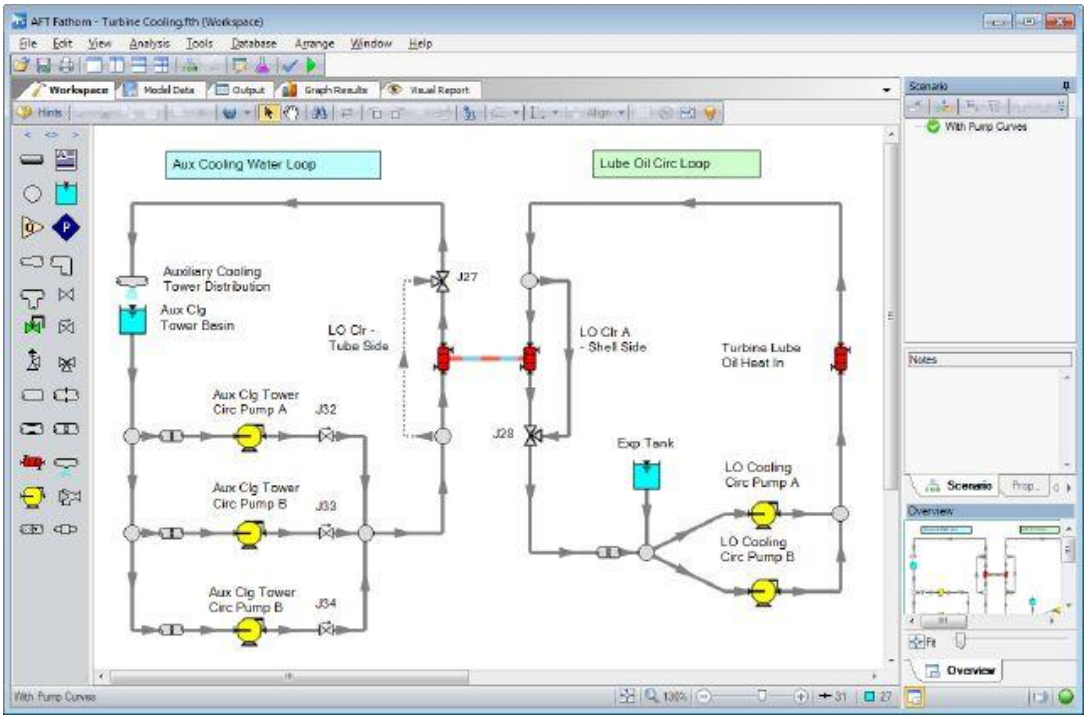
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the latest revision of “EPANET”, “Synergi Pipeline”, “AFT Fathom” and “WaterGEMS” simulators.



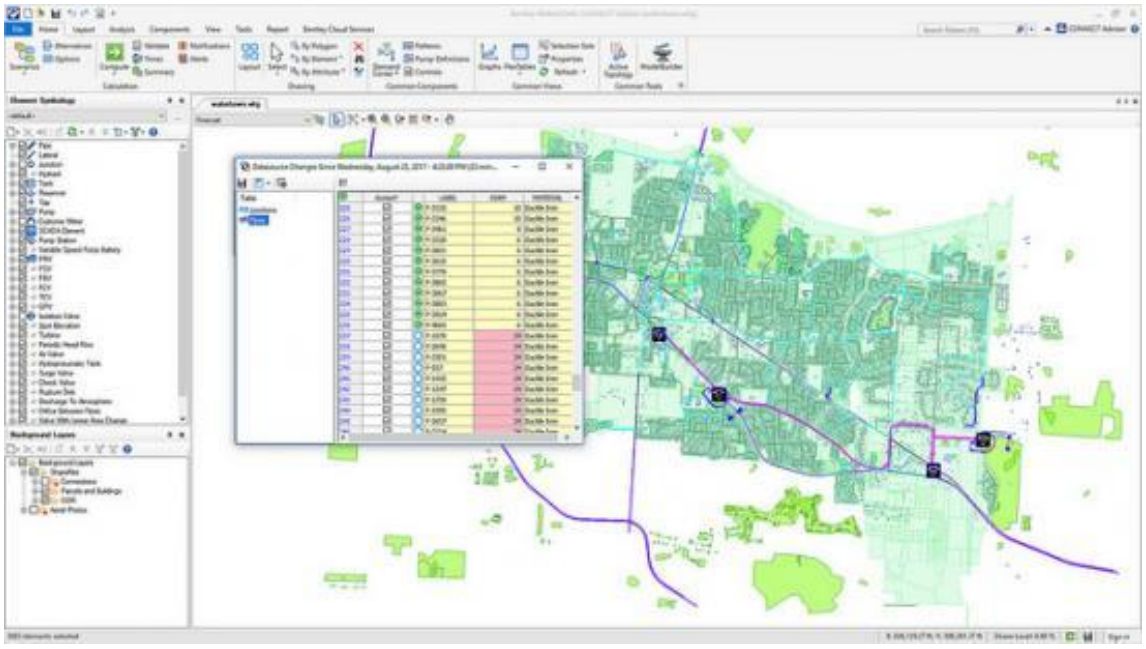
EPANET Simulator



Synergi Pipeline



AFT Fathom



WaterGEMS

Course Coordinator

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