COURSE OVERVIEW TE0304
AI & Technologies in Water System

Course Title
AI & Technologies in Water System

Course Date/Venue
Session 1: August 04-08, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 08-12, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
TE0304

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 AI & Technologies in Water System. It covers the artificial intelligence in water systems, historical development of water technologies and smart water networks (SWN); the AI algorithms for water demand forecasting, AI in water quality monitoring and the role of AI in water conservation; the AI for water treatment process control, predictive analytics for maintenance in water systems and automation in water distribution; the AI in flood prediction and management, machine learning for water resource management and blockchain in water systems.

Further, the course will also discuss the deep learning for water system analytics, AI and machine learning for water leak detection and natural language processing (NLP) in water system data analysis; the AI-powered water quality control systems, energy management in water systems using AI and smart cities and AI integration in water systems; the AI for stormwater management and wastewater treatment optimization; the water system security and AI and big data in water system planning; and improving water sustainability in cities, reducing the environmental impact of water systems and integrating sustainability goals into AI models.

During this interactive course, participants will learn the emerging AI technologies and their potential applications; the ethical considerations in AI for water systems and AI for climate change and water management; the collaboration between technology providers, utilities, and governments and building AI ecosystems for water system advancements; overcoming data quality and integration issues; and ensuring scalability of AI solutions across diverse systems.

Course Objectives

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

- Apply and gain a good working knowledge on AI and technologies in water system
- Discuss artificial intelligence in water systems, historical development of water technologies and smart water networks (SWN)
- Illustrate AI algorithms for water demand forecasting and AI in water quality monitoring and identify the role of AI in water conservation
- Carryout AI for water treatment process control, predictive analytics for maintenance in water systems and automation in water distribution
- Apply AI in flood prediction and management, machine learning for water resource management and blockchain in water systems
- Employ deep learning for water system analytics, AI and machine learning for water leak detection and natural language processing (NLP) in water system data analysis
- Apply AI-powered water quality control systems, energy management in water systems using AI and smart cities and AI integration in water systems
- Carryout AI for stormwater management, AI for wastewater treatment optimization, water system security and AI and AI and big data in water system planning
- Apply AI for improving water sustainability in cities, reduce the environmental impact of water systems using AI and integrate sustainability goals into AI models
- Discuss the emerging AI technologies and their potential applications including ethical considerations in AI for water systems and AI for climate change and water management
- Collaborate between technology providers, utilities, and governments and build AI ecosystems for water system advancements
- Overcome data quality and integration issues and ensure scalability of AI solutions across diverse systems

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 AI and technologies in water system for water industry professionals, technology and AI experts water engineers and other technical staff.

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.

  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.

- 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.

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 **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 Networks** Optimization, **Water Supply & Distribution** Systems Efficiency & Effectiveness, **Pipe** Materials & Fittings, **Service Reservoir** Design & Operation, **Pipes & Fittings**, **Water Network** System Design & Operation, **Supply Water Network** Rehabilitation, **Water Loss** Reduction, **Main Water** System Construction, **Main Water Line** Construction, Transmission & Distribution **Pipelines**, **Water Distribution** Design & Modelling, **Water Supply** System, Oilfield **Water Treatment**, 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.

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 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	***Overview of Artificial Intelligence in Water Systems*** *Definition of AI and its Relevance to the Water Industry • Benefits of AI Adoption in Water System • Types of AI Technologies Used in Water System • Key Challenges in Implementating AI in Water SystemS*
0930 - 0945	*Break*
0945 – 1045	***Historical Development of Water Technologies*** *Early Technologies in Water Treatment and Distribution • Evolution of Automation and Control in Water Systems • The Rise of Digitalization in Water Management • Technological Advancements Over the Past Decade*
1045 - 1145	***Smart Water Networks (SWN)*** *Definition and Components of SWN • Role of IoT in Creating Smart Water Systems • Real-Time Data Monitoring and Analytics • Benefits of Predictive Maintenance in SWN*
1145 - 1230	***AI Algorithms for Water Demand Forecasting*** *Machine Learning Techniques for Demand Forecasting • Historical Data Analysis and Trend Identification • Algorithms Used for Load Forecasting in Water Systems • Case Studies of Successful AI-Based Demand Forecasting Models*
1230 – 1245	*Break*

1245 – 1330	***AI in Water Quality Monitoring*** *Use of AI for Detecting Water Contamination • Sensor Networks and AI-Based Analysis • Machine Learning Models for Predicting Water Quality • Real-Time Alerting and Decision-Making Systems*
1330 - 1420	***The Role of AI in Water Conservation*** *AI-Driven Strategies for Reducing Water Waste • Optimization of Water Distribution Through AI • AI-Based Leak Detection and Repair • Water Conservation Programs Powered by AI*
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	***AI for Water Treatment Process Control*** *How AI Optimizes Water Treatment Processes • Real-Time Optimization and Decision-Making • Benefits of AI for Enhancing Process Efficiency • Key Challenges in AI Implementation in Treatment Plants*
0830 – 0930	***Predictive Analytics for Maintenance in Water Systems*** *Predictive Maintenance Using Machine Learning • Identifying Equipment Failure Patterns • Benefits of Reducing Downtime Through Predictive Analytics • Real-World Examples of Predictive Maintenance in Water Systems*
0930 - 0945	*Break*
0945 – 1130	***Automation in Water Distribution*** *Role of Automation in Modern Water Distribution Systems • AI-Driven Flow Regulation and Pressure Management • Smart Valves and Pumps for Optimized Water Distribution • Real-Time Control Systems for Water Networks*
1130 - 1230	***AI in Flood Prediction and Management*** *Machine Learning Techniques for Flood Prediction • Predictive Models for Flood Risk Assessment • AI-Based Early Warning Systems • Case Studies of Successful AI Implementations in Flood Management*
1230 - 1245	*Break*
1245 - 1330	***Machine Learning for Water Resource Management*** *Overview of Machine Learning Techniques • AI Applications for Managing Water Resources • Forecasting and Resource Allocation Using AI • Real-Time Water Resource Optimization Models*
1330 - 1420	***Blockchain in Water Systems*** *Introduction to Blockchain Technology • Use of Blockchain for Data Security and Integrity • Blockchain in Water Quality Monitoring and Billing •Future Prospects of Blockchain in Water Management*
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	***Deep Learning for Water System Analytics*** *Basics of Deep Learning in AI • Applications of Deep Learning for Water System Optimization • Image Recognition and Its Role in Monitoring Water Systems • Case Studies on the Use of Deep Learning in Water Quality Monitoring*

0830 – 0930	***AI & Machine Learning for Water Leak Detection*** *AI Techniques for Early Leak Detection • Sensor Networks and AI for Predictive Leak Detection • Machine Learning Models for Assessing Water Loss • Implementation of AI in Real-World Leak Detection Systems*
0930 - 0945	*Break*
0945 – 1130	***Natural Language Processing (NLP) in Water System Data Analysis*** *Introduction to NLP Techniques • Use of NLP for Analyzing Water System Data Reports • Text-Based Data Extraction for Decision-Making • Integration of NLP With Other AI Models in Water Systems*
1130 - 1230	***AI-Powered Water Quality Control Systems*** *Automation of Water Quality Monitoring and Control • AI-Based Decision-Making in Water Treatment Plants • Real-Time Adjustments to Chemical Dosages and Treatment Cycles • Machine Learning Algorithms for Optimizing Water Treatment*
1230 - 1245	*Break*
1245 - 1330	***Energy Management in Water Systems Using AI*** *Role of AI in Reducing Energy Consumption in Water Systems • AI-Driven Optimization of Energy Use in Water Treatment Plants • Machine Learning for Energy-Efficient Water Distribution • Impact of AI on Operational Costs and Sustainability*
1330 - 1420	***Case Studies on AI Implementation in Water Systems*** *Global Case Studies of AI in Water Utilities • Lessons Learned from Successful AI Projects • Challenges and Obstacles in Implementing AI Solutions • Future Outlook for AI in Water Management*
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	***Smart Cities & AI Integration in Water Systems*** *Definition and Components of a Smart City • AI's Role in Water Management Within Smart Cities • Smart Meters and Sensors for Water Usage Data • AI-Driven Infrastructure Management in Urban Water Systems*
0830 – 0930	***AI for Stormwater Management*** *Machine Learning Models for Stormwater Prediction • AI Applications for Managing Rainwater and Urban Runoff • Real-Time Stormwater Monitoring and Flood Prevention • Predicting and Mitigating Stormwater-Related Issues*
0930 - 0945	*Break*
0945 – 1130	***AI for Wastewater Treatment Optimization*** *Machine Learning Applications in Wastewater Treatment • Real-Time Optimization of Wastewater Processing •AI in Sludge Management and Disposal • Sustainable Practices in Wastewater Treatment Using AI*
1130 - 1230	***Water System Security & AI*** *Cybersecurity Risks in Water System Management • AI Techniques for Detecting and Preventing Cyber Threats • Protecting Sensitive Water Infrastructure Through AI • AI-Based Monitoring and Threat Detection Systems*
1230 - 1245	*Break*

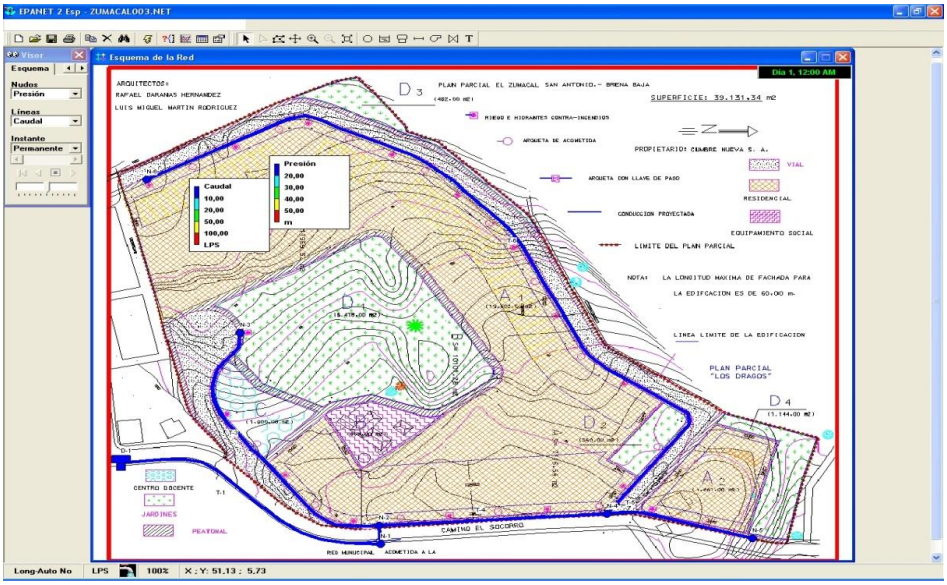
1245 - 1330	***AI & Big Data in Water System Planning*** *Role of Big Data in Water System Planning and Management • Integrating AI and Big Data for Future Water System Design • Data Analytics for Forecasting and Infrastructure Development • Real-World Examples of AI and Big Data Usage in Water Projects*
1330 - 1420	***Sustainability & AI in Water Systems*** *AI for Improving Water Sustainability in Cities • Reducing the Environmental Impact of Water Systems Using AI • Integrating Sustainability Goals into AI Models • Future Trends in AI-Driven Water Sustainability*
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	***The Future of AI in Water Systems*** *Emerging AI Technologies and Their Potential Applications • The Role of AI in Addressing Global Water Scarcity • AI's Impact on the Future of Water Infrastructure • Research and Development Trends in AI and Water Systems*
0830 – 0930	***Ethical Considerations in AI for Water Systems*** *Ethical Challenges in Implementing AI in Water Systems • Privacy and Data Security Concerns in Water System AI • Responsible Use of AI in Water Resource Management • Regulatory Frameworks for AI in Water Systems*
0930 - 0945	*Break*
0945 – 1100	***AI for Climate Change & Water Management*** *How AI Can Address the Impacts of Climate Change on Water Resources • Predicting and Managing Water Shortages Using AI • Role of AI in Climate Adaptation for Water Systems • Case Studies of AI in Climate Change Mitigation Strategies*
1100 – 1200	***Collaboration & Partnerships in AI-Driven Water Systems*** *Collaboration Between Technology Providers, Utilities, and Governments • Public-Private Partnerships for AI-Driven Water Management •Role of Academia and Research Institutions in AI Innovations •Building AI Ecosystems for Water System Advancements*
1200 - 1215	*Break*
1215 – 1230	***Challenges in Scaling AI Solutions in Water Systems*** *Technological, Financial, and Organizational Barriers • Overcoming Data Quality and Integration Issues • Ensuring Scalability of AI Solutions Across Diverse Systems • Case Studies of Overcoming AI Implementation Challenges*
1230 - 1345	***Opportunities for Future AI Innovations in Water Systems*** *Identifying Untapped Areas for AI Applications in Water Systems • Opportunities for Innovation in AI-Powered Water Technologies • The Role of AI in Enhancing Customer Experience in Water Utilities • Potential Benefits of AI for Long-Term Water Sustainability*
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

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