Water, Sanitation, and Rainwater Drainage Networks

25 July – 5 August 2027
Cairo (Egypt)



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Introduction

Water and sanitation infrastructure is a cornerstone of public health, environmental protection, and sustainable urban development. This comprehensive training course provides participants with the technical, regulatory, and operational knowledge required to effectively plan, design, construct, and manage water supply systems, sewerage networks, and rainwater drainage systems.

The program emphasizes sustainability, climate resilience, and the application of digital tools such as GIS and hydraulic modeling e.g., EPANET, SWMM for enhanced project management. Participants will gain practical skills in rainwater drainage solutions, sanitation services, and water infrastructure management to support sustainable urban and rural development.

Course Objectives

By the end of this course, participants will be able to:

- Understand the technical principles of water supply, sanitation, and drainage systems.
- Design and evaluate integrated water and wastewater infrastructure networks, including rainwater drainage systems.
- Plan and supervise construction projects related to water, sanitation, and rainwater drainage.
- Apply national and international standards for sustainable and climate-resilient systems.
- Assess and mitigate environmental and public health risks associated with water and sanitation projects.
- Implement effective rainwater drainage solutions to reduce rainwater drainage problems.

Course Outlines

Day 1: Introduction to Water and Sanitation Infrastructure

- Importance of Water, Sanitation, and Hygiene WASH.
- Overview of urban and rural water supply systems.
- Introduction to sanitation and sewerage networks.
- The role of rainwater drainage systems in urban planning.
- Key stakeholders and institutional frameworks in sanitation services.



Day 2: Water Sources and Treatment Processes

- Types of water sources: surface water and groundwater.
- Water quality standards and testing parameters.
- Water treatment methods: physical, chemical, and biological processes.
- Comparison of small-scale and large-scale treatment systems.
- Case studies of successful potable water projects.

Day 3: Water Distribution Network Design

- Hydraulic principles and pressure zone management in water supply systems.
- Selection of pipeline materials, layouts, and jointing techniques.
- Design of pumping stations and distribution reservoirs.
- Functions of elevated tanks and system storage.
- Leak detection systems and water loss control to maintain infrastructure integrity.

Day 4: Sanitation Systems and Sewerage

- On-site sanitation options: septic tanks, pit latrines.
- Centralized sewerage systems for urban areas.
- Gravity-based and pressure-based sewer designs.
- Characteristics of wastewater and its treatment requirements.
- Sludge handling, transport, and safe disposal.

Day 5: Drainage and Stormwater Management

- Types of drainage systems: surface drainage, subsurface drainage, and combined systems.
- Rainfall-runoff estimation and hydrology principles.
- Design principles for urban stormwater networks and rainwater drainage solutions.
- Implementation of Sustainable Urban Drainage Systems SuDS.
- Flood risk assessment and mitigation strategies to prevent rainwater drainage problems.

Day 6: Integrated System Planning and GIS Applications

- Concepts of integrated planning for water and sanitation infrastructure.
- GIS-based mapping and spatial data management for efficient design.
- Digital modeling using EPANET, SWMM, or similar tools.
- Infrastructure surveys and data collection techniques.
- Decision-making tools for project planning and expansion.



Day 7: Construction Supervision and Quality Control

- Project implementation steps: excavation, pipe laying, and backfilling.
- Material testing protocols and quality assurance plans.
- Health and safety procedures for construction sites.
- Effective supervision and contractor oversight.
- Field challenges and troubleshooting techniques for real-world solutions.

Day 8: Environmental and Public Health Considerations

- Conducting Environmental Impact Assessments EIA.
- Building infrastructure resilience in the context of climate change.
- Preventing contamination and controlling vector breeding.
- Promoting community health and sanitation behavior.
- Integrating infrastructure planning with public health initiatives.

Day 9: Operation, Maintenance, and Asset Management

- Preventive maintenance for water and sewer systems.
- Inspection, cleaning, and repair techniques.
- Monitoring system performance and water quality.
- Using asset management systems for planning and optimization.
- Tariff design and financial sustainability models for sanitation services.

Day 10: Governance, Policy, and Sustainability

- Understanding standards and benchmarks: WHO, ISO, and SDGs.
- Legal and institutional responsibilities in water and sanitation services.
- Infrastructure financing and Public-Private Partnerships PPP.
- Community participation and demand-side management.
- Final project presentations, course evaluation, and certification ceremony.

Why Attend This Course: Wins & Losses!

- Master Water and Sanitation Infrastructure Design: Learn the technical aspects of water supply, sewerage, and rainwater drainage systems.
- Sustainable and Climate-Resilient Planning: Understand how to design infrastructure that withstands environmental challenges.
- Improve Project Supervision Skills: Gain practical knowledge in construction management, quality control, and site safety.
- Apply Digital Tools: Learn to use GIS, EPANET, and hydraulic modeling for efficient infrastructure management.
- Align with International Standards: Gain confidence in applying WHO, ISO, and SDG guidelines for sustainable urban development.



Conclusion

By the end of this course, participants will have the expertise to design, implement, and manage water and sanitation infrastructure projects that are technically sound, environmentally sustainable, and socially inclusive.
They will be equipped with the skills to enhance public health, improve rainwater drainage solutions, and ensure sanitation services meet global standards.

Join this course to become a leader in water and sanitation infrastructure, delivering sustainable solutions that enhance urban resilience and protect community health.

