Water Distribution Network Modeling Training Course

Professional Development Training Course Outline

Category	Construction Institute	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Water Distribution Network Modeling is a critical engineering discipline that enables water utilities, municipalities, consultants, and infrastructure professionals to design, analyze, optimize, and manage complex water supply systems using advanced hydraulic simulation technologies. As urban populations grow, climate change intensifies water scarcity, and aging infrastructure increases operational risks, digital hydraulic modeling has become an essential component of smart water management. Modern software platforms such as EPANET, WaterGEMS, InfoWater Pro, and other GIS-integrated hydraulic modeling tools allow engineers to evaluate network performance, pressure management, demand forecasting, leakage reduction, fire flow analysis, pump optimization, energy efficiency, and emergency response planning. Water Distribution Network Modeling Training Course equips participants with practical knowledge and industry best practices for creating reliable, sustainable, and resilient water distribution systems through data-driven decision-making.

The course combines theoretical concepts with intensive hands-on exercises, real-world utility case studies, hydraulic simulations, GIS integration, digital twin applications, asset management strategies, and scenario-based modeling techniques. Participants will develop competencies in network calibration, water quality analysis, pressure zone design, non-revenue water reduction, resilience planning, smart water technologies, and sustainable infrastructure management. Upon completion, learners will possess the technical skills required to support digital transformation initiatives, optimize water distribution operations, improve customer service, enhance regulatory compliance, and contribute to resilient urban water infrastructure projects.

Programme Curriculum

Water Distribution Network Modeling Training Course

Introduction

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Course Duration

5 days

Course Objectives

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

1. Design efficient water distribution networks using advanced hydraulic modeling techniques.
2. Develop accurate EPANET hydraulic simulation models for real-world applications.
3. Analyze pressure management systems to improve operational performance.
4. Optimize pump scheduling and energy efficiency within water supply networks.
5. Perform comprehensive water demand forecasting and consumption analysis.
6. Conduct network calibration and model validation using field data.
7. Apply GIS integration for spatial water infrastructure management.
8. Evaluate water quality modeling including chlorine residual and water age analysis.
9. Implement leakage detection and Non-Revenue Water (NRW) reduction strategies.
10. Assess fire flow analysis for emergency preparedness.
11. Utilize digital twin technology and smart water solutions for predictive management.
12. Improve asset management and infrastructure resilience through simulation.
13. Develop sustainable climate-resilient water distribution strategies aligned with international best practices.

Target Audience

1. Water Utility Engineers
2. Civil Engineers
3. Hydraulic Engineers
4. Water Resources Engineers
5. Municipal Water Authorities

6. Infrastructure Consultants
7. GIS Specialists and Asset Managers
8. Project Managers and Utility Decision Makers

Course Modules

Module 1: Fundamentals of Water Distribution Systems

- Components of water supply networks
- Hydraulic principles and network behavior
- Water demand estimation techniques
- Pressure zones and service levels
- International design standards
- **Case Study:** Design analysis of a rapidly growing urban water distribution system.

Module 2: Hydraulic Modeling Using EPANET

- Building hydraulic models
- Creating network layouts
- Assigning demands and elevations
- Running hydraulic simulations
- Interpreting simulation outputs
- **Case Study:** Development of a complete EPANET model for a municipal water utility.

Module 3: Advanced Network Analysis

- Pressure analysis
- Velocity assessment
- Head loss evaluation
- Pump and reservoir operations
- Critical node identification
- **Case Study:** Optimization of pressure zones to reduce customer complaints.

Module 4: Water Quality Modeling

- Water age analysis
- Chlorine decay modeling
- Contaminant transport simulation
- Water quality compliance
- Source tracing techniques
- **Case Study:** Managing chlorine residual across a metropolitan water supply network.

Module 5: GIS Integration and Asset Management

- GIS data preparation
- Spatial network mapping
- Asset inventory development
- Infrastructure condition assessment
- Integration with hydraulic models
- **Case Study:** Combining GIS and hydraulic modeling for infrastructure rehabilitation planning.

Module 6: Leakage Management and Network Optimization

- Non-Revenue Water assessment
- Leakage detection strategies
- Pressure management techniques
- District Metered Area (DMA) design
- Energy optimization
- **Case Study:** Reducing water losses through pressure optimization and DMA implementation.

Module 7: Smart Water Systems and Digital Transformation

- Smart water technologies
- SCADA integration
- IoT sensors for water utilities
- Digital Twin applications
- Predictive maintenance
- **Case Study:** Implementation of a Smart Water Network for a large municipal utility.

Module 8: Resilience Planning and Future Water Networks

- Climate resilience assessment
- Emergency response modeling
- Fire flow simulation
- Infrastructure sustainability
- Future demand scenario planning
- **Case Study:** Developing a resilient water distribution network for climate adaptation.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

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