Infrastructure Diploma
(WaterGEMS, SewerGEMS)
Course details

**Description**
Bentley’s water, wastewater, and storm water products continue to deliver excellence in hydrologic and hydraulic system analysis and design. These products are deployed across the full plan, design, operate, and maintain lifecycle of water resource infrastructure to optimize designs, manage leaks, prioritize investments, manage energy consumption, and enhance operations workflows.

- The main objective of the water supply system is to provide adequate storage capacity to supply potable water for the buildings & commercial areas with adequate quantity and pressure, and with minimum construction and operation costs, complete with necessary provisions to meet the fluctuating demands of the site.
- The main objective of wastewater collection systems is to convey the domestic wastewater from its sources to the public sewage collection, then to a location where it may be treated and ultimately reclaimed for reuse or recycling.
- The main objective of a storm drainage system is to prevent the accumulation and retention of water on paved and parking areas.

Bentley offers a streamlined utility network design and management product with Bentley Utilities Designer. This product is a comprehensive design and GIS-based management application for electric, gas, water, and wastewater networks and can be configured to integrate with a variety of GIS and WMS systems. Bentley Utilities Designer is fully integrated with WaterCAD, WaterGEMS, SewerCAD, and SewerGEMS

**OBJECTIVES:**
This course covers the design, management and drawing of infrastructure different networks:
- WaterGEMS (WaterCAD)
- SewerGEMS (SewerCAD)
- Using Autodesk Civil3D in WaterGEMS & SewerGEMS (Pressure profiles, Surface Intro., Alignment)

**Course structure:**
Infrastructure Diploma 24 class x 2.30 hours = 60 hours

**Resourcing, text books and reading material:**
We recommend the following books:
- Advanced Water Distribution Modeling and Management Walski, Tom
- Computer Applications in Hydraulic Engineering, 8th Edition Multiple Authors
- Floodplain Modeling Using HEC-RAS Dyehouse, Gary
- Heastad Methods Water Resources Modeling Collection
- Security and Emergency Management for Water Systems Doe, Steve
- Storm water Conveyance Modeling and Design Durrans, Rocky
- Wastewater Collection System Modeling and Design Walski, Tom
- Water Loss Reduction Multiple Authors
- Water Supply and Wastewater Removal Multiple Authors
PREREQUISITES:
- Basic knowledge and skills about using computers.
- Hydraulics background is recommended.

Grading
Attendance 40%
Assignments 60%
To pass the course and receive both Bentley & CAD MASTERS certificate you should:
- Attend at least 80% of course hours
- Score more than 70% as a total score + Technical evaluation by the instructor

Course Outline:
This course including the following:

1. WaterGems (waterCAD)
   - Introduction
   - Design Flows
   - Collection works
   - Treatment Process
   - Ground Reservoir
   - Elevated Tanks
   - Pump Curves
   - Water Network Design Using Method of Section
   - Water Network Design Using Method of Circle
   - Pipes Materials
   - Fire Hydrant Arrangement
   - Valves arrangement
   - Hardy Cross method
   - Introduction in WaterGems
   - Steady State Model (with default flow input)
   - EPS Model with Elevated Tank (with untraditional flow input method)
   - Training Model (SS + EPS)
   - Exporting Model to AutoCAD and finish the project
   - Application on WaterGEMS (Main Lines of Irrigation Network)

2. SewerGems (sewage)
   - Design Flows
   - Network Components
   - Different Between Combined System and Separate System
   - Pipes Materials
   - Manual Design
   - Introduction in SewerGEMS
   - Complete Sewage Model with checking Profiles
   - Advanced method to input Flows in the network
   - Training Model and Questions
   - How to present your results
   - How to export model to CAD
   - How to Use Pipe2CAD to make profiles
3. **StormCAD**

- Design Flows
- Network Components
- How to measure catch basin distance
- How to draw catchment area
- Times definition
- IDF Curve
- Introduction in Storm water Model
- Complete Storm Model (Rational)
- SCS Model
- Another system of Storm network with its model (Surface drainage)
- How to present your results
- How to export model to CAD
- How to Use Pipe2CAD to make profiles
- How to Solve clashed between water, sewage, and storm Networks using Pipe2CAD
- Training Model and Questions