

Water Distribution Networks

1. **Course number and name:** 020DEAGS3 Water Distribution Networks
2. **Credits and contact hours:** 4 ECTS credits, 2x1.25 hours
3. **Name(s) of instructor(s) or course coordinator(s):** Antoine HREICHE
4. **Instructional Materials:**
 - Environmental Engineering, by Peavy, Rowe, Tchobanoglos, McGraw-Hill International Editions
 - Water Supply and Sewerage, by Terence J. McGhee sixth edition, McGrawHill International Editions.
5. **Specific course information**
 - a. **Catalog description:** This course aims at providing the student with a clear and thorough presentation of the theory and applications for the design of water distribution systems and related appurtenances, methods of distribution and criteria, system maintenance, protection of water quality, quantity of water, population estimation; water use factors; fire demand; design periods, pumps and pumping stations; aqueducts and water pipes; The following topics will, hopefully, be covered and contingent upon the student progress:
 - Hydraulic Designs: flow in pipes and flow regimes; governing equations; equivalent lengths; flow measurements; open channel flow, and controls.
 - Quantity of Water: relation between quantity and population; population estimation; water use factors; fire demand; and design periods and flows.
 - Aqueducts and Pipes: conveyance and distribution, stresses in pipes, pipe material, valves, corrosion, effect on water quality, and other appurtenances
 - Collection and Distribution of Water: intakes, methods of distribution, storage, flow estimation, pressures, design of networks, system maintenance, and protection of water quality in systems.
 - Pumps and pumping Stations: types, characteristic curves, system curves, and optimal operation
 - Financial Considerations: cost estimates, optimization of water supply systems, and financing a water supply system.
 - b. **Prerequisites or co-requisites:** None
 - c. **Required:** Required major course for Water and Environment Specialty students.
6. **Educational objectives for the course**
 - a. **Specific outcomes of instruction:**

At the conclusion of this course, each student will be able to do the following:

 - Understand the theory and applications for the design of water distribution systems and related appurtenances.

- Understand methods of distribution and design criteria,
- Understand the physical, chemical and biological water quality properties and standards;
- Determine the quantity of water, population estimation; water use factors; fire demand; design periods,
- Learn basic design criteria for each water treatment process as well as to understand how to design each component.
- Understand professional and ethical responsibility

b. PI addressed by the course:

PI	1.1	1.4	2.3	3.1
Covered	yes	yes	yes	yes
Assessed				

7. Brief list of topics to be covered:

- Introduction (2h30)
- Population Estimation (2h30)
- Quantity of Water (2h30)
- Fire Demand (2h30)
- Intakes (2h30)
- Storage (2h30)
- Collection and distribution of water (2h30)
- Pumps (2h30)
- Pipes (2h30)
- WaterCad (5h00)
- Projects (7h30)