

**PROGREEN DIPLOMA – WATER SPECIALIZATION**  
**PRGR 667 Water Treatment and Water Desalination**

**Catalog description:**

**PRGR 667 Water Treatment and Water Desalination (2 credit hours)**

Physical, chemical and biological water quality parameters determinations and standards; water treatment units: screens; sedimentation, coagulation/flocculation processes, filtration, and disinfection. This course will also survey the commonly used thermal and membrane based desalination technologies. Environmental, sustainability and economic factors which may influence the performance, affordability and more wide-spread use of desalination systems for fresh water production and reuse will be highlighted.

**Textbooks:**

1. Water and Wastewater Technology, by Mark J. Hammer fifth edition, Prentice Hall.
2. Theory and Practice of Water and Wastewater Treatment, by R.L. Droste, John Wiley and sons.
3. Desalination: Water from Water, by Jane Kucera first edition, Wiley-Scrivener.

**Coordinator:** Dr. Ahmed Shafik El-Gendy

**Educational Objectives/Learning Outcomes:**

The aim of this course is to enable students to develop an understanding of water quality and water treatment plants. By the end of this course, each student will be able to do the following:

1. Explain the water quality aspects, major water pollutants and standards.
2. Estimate the future population of a community.
3. Estimate the design flow rates for a water treatment plant to serve a community.
4. Apply basic design criteria for each water treatment process and design each component: sedimentation; coagulation/flocculation processes; basin design; filtration; and disinfection.
5. Gain an understanding of the different desalination processes and the key factors affecting the processes performance.
6. Calculate the membrane flux rates and Design membrane arrays.
7. Generate process drawings.

**Topics covered:**

The following topics will be covered (not necessarily in the same order) contingent upon the student progress:

- **Quantity of Water:** relation between quantity and population; population estimation; water use factors; fire demand; and design periods and flows.
- **Quality of Water Supply:** water and impurities; contaminants and pollutants; standards; and physical, chemical, and biological water quality parameters.

- **Water Treatment Processes:** purpose; sedimentation; coagulation/flocculation processes; settling basin design; filtration; disinfection.
- **Water Desalination Processes:** Types; Thermal processes; Membrane processes; Membrane configurations, Membrane fouling and cleaning; Membrane design parameters; Calculation of membrane flux rate, Array Design.

**Assessment and grades:**

Project:	45%
Assignments:	40%
Activities:	15%