Water Supply Engineering

Course Code: 093137

Credit: 3 hours

prerequisite: 0901361

Course description: Principles of aqueous and inorganic chemistry, chemical equilibrium. Drinking water engineering: water consumption rate, design period, population estimation, sources of water, physical, chemical, and biological quality of water. Drinking water treatment: coagulation, flocculation, sedimentation, filtration, disinfection, and softening. Removal of taste and odor, water distribution networks.

Instructor: Ghada Kassab, PhD

Office hours: 10-11 am; Sunday, Tuesday and Thursday

Text book: Mackenzie L. Davis. (2011). Water and Wastewater Engineering, Design Principals and Practice. McGraw Hill.

References: Viessman, W; Hammer, M; Perez, E; Chadik, P. (2009). Water Supply and Pollution Control. Pearson- Prentice Hall.

Davis, M. and Masten, S. (2009). Principles of Environmental Engineering and Science. McGraw Hill.

Hammer, M. and Hammer, M. (2011). Water and Wastewater Technology. Pearson-Prentice Hall.

Tom D. Reynolds and Paul Richards (1995). Unit Operations and Processes in Environmental Engineering, Cengage Learning .

David Hendricks. (2010). Fundamentals of Water Treatment Unit Processes. IWA publication.

Mark Benjamin and Desmond Lawler. (2013). Water Quality Engineering: Physical/Chemical Treatment Processes. Wiley

Course learning outcomes:

as an outcome of completing this course; students:

I. will be able to recognize the configuration of drinking water supply system, including water treatment and distribution.

II. will be able to identify water quality criteria and standards and their relation to public health and environment.

III. will be able to identify the physical, chemical and biological characteristics of drinking water.

IV. will be able to estimate water supply demand, design population and design flow.

V. will be able to design drinking water treatment processes and distribution system.

Students outcomes:

Upon completion of this course, students will acquire:

- Ability to design system component or process to meet desired needs (outcome **C** according to ABET criteria).
- An ability to identify, formulate and solve engineering problems (outcome **E** according to ABET criteria).
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (outcome **H** according to ABET criteria)

Topics covered:

- Physical, chemical and biological characteristics of drinking water.
- The governing regulations and standards.
- Estimation of water demand
- Design of different unit process in water treatment. More specifically, the:
  - Coagulation-flocculation process
  - Sedimentation
  - Filtration
  - Water softening
  - Disinfection
  - Adsorption and ion exchange
  - Distribution networks

Student Assessment:

First exam: 20%
Second exam: 30%
Final exam: 50%

Examination policy:

Any type of communication is not permitted during the examinations, nor copying from others, or collaborating in any way. **Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.**