College of Engineering

Department of Civil Engineering

CE 543 Planning and Design of Water and Wastewater Networks

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective
Course Description	Development of design skills in water distribution and wastewater collection networks: Estimation of flows; systems layout and planning; selection and setting of design criteria; computer network analysis and design. Preparation of design reports for selected local projects.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to:

Course Learning Outcomes (CLOs)	*Related Student Outcomes (SO)*
CLO1. Recognize and identify the most critical issues and challenges in planning, designing, and operating water distribution and wastewater collection systems. K1	**SO1**
CLO2. Develop design criteria (e.g., mass and flow inputs; performance requirements; general bulk/aggregate parameters) necessary for the preparation of designs for water and wastewater systems. S1	**SO2**
CLO3. Analyze sanitary sewer collection systems and water distribution systems using computer programs (e.g., Watercad®, EPANET, Sewercad). S1	**SO2**
CLO4. Design and evaluate water distribution systems using computer programs (e.g., Watercad®, EPANET) on selected real-life projects. S4	**SO5**
CLO5. Design and evaluate wastewater collection systems using computer programs (e.g., Sewercad) on selected real-life projects. S4	**SO5**
CLO6. Display a commitment to professional engineering standards and ethical values, upholding high academic integrity in all assigned assignments and work. V1	**SO6**

Student Outcomes related to this Course

SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems.

SO 2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors.

SO 5 Design novel advanced Civil Engineering systems and evaluate their performance, sustainability, and effectiveness for engineering practice and their impact in global, economic, environmental, and societal contexts

SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.

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<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Water demands and types of water consumptions and water and wastewater network components</td><td>CLO 1,2</td></tr>
<tr><td>2. Issues and challenges in planning, designing, and operating water distribution and wastewater collection systems</td><td>CLO 3</td></tr>
<tr><td>3. Design criteria necessary for the preparation of designs for water and wastewater systems</td><td>CLO 1,2</td></tr>
<tr><td>4. Methods of water and wastewater networks analyses</td><td>CLO 3,4,5</td></tr>
<tr><td>5. Use of computer programs to analyze and design water networks</td><td>CLO 3,4</td></tr>
<tr><td>6. Use of computer programs to analyze and design wastewater networks</td><td>CLO 3,5</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>• Water and Wastewater Systems Analysis, Volume 34, 1st Edition.
• Students are encouraged to read different journal papers concerning planning and design of water and wastewater networks.</td></tr>
<tr><td>Grading System</td><td>Assignments 20%
Lecture Attendance --
Project work 20%
Mid-term exams 20 %
Final Exam 40 %</td></tr>
<tr><td>Instructors</td><td>Dr. Abdulrhman Fahmi Al-Ali / Dr. Mohab Amin Amin</td></tr>
<tr><td>Date of Review</td><td>November, 2024</td></tr>
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