

College of Engineering

Department of Civil Engineering

جامعة  
الملك سعود  
King Saud University



## CE 520 Advanced Hydraulics

<b>Credit and Contact hours</b>	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)								
<b>Required, or Elective</b>	Required for a MSCE degree								
<b>Course Description</b>	Steady pipe flow theory and computations. Design and analyses of sewer network system. Design and analysis of transmission lines. Design and analysis of distribution networks. Unsteady flow; Gradually varied unsteady flow and Rapidly varied unsteady flow, Transient flow equations and methods of solution.								
<b>Prerequisites or Co-requisites</b>	None								
<b>Course Learning Outcomes</b>	<table border="1"><thead><tr><th>Course Learning Outcomes</th><th>Related Program Outcomes</th></tr></thead><tbody><tr><td><b>CLO1:</b> Explain and recognize characteristics of pipe flow in pipelines, water distribution system, and sewer networks</td><td><b>K1</b></td></tr><tr><td><b>CLO2:</b> Use math and software to analyze and design hydraulics systems with Civil Engineering applications.</td><td><b>S1</b></td></tr><tr><td><b>CLO3:</b> Compare, evaluate and discuss appropriate qualitative and quantitative methods commonly used in the literature of hydraulics (e.g. branching system, analytical solutions for water hammering, numerical models of water distribution, analytical solutions for pipelines).</td><td><b>C1</b></td></tr></tbody></table>	Course Learning Outcomes	Related Program Outcomes	<b>CLO1:</b> Explain and recognize characteristics of pipe flow in pipelines, water distribution system, and sewer networks	<b>K1</b>	<b>CLO2:</b> Use math and software to analyze and design hydraulics systems with Civil Engineering applications.	<b>S1</b>	<b>CLO3:</b> Compare, evaluate and discuss appropriate qualitative and quantitative methods commonly used in the literature of hydraulics (e.g. branching system, analytical solutions for water hammering, numerical models of water distribution, analytical solutions for pipelines).	<b>C1</b>
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<b>Student Outcomes related to this Course</b>	<p><b>K1.</b> Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.</p> <p><b>S1.</b> Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.</p>								

	<b>C1.</b> Criticize and discuss scientific research reports /papers related to Civil Engineering issues with high level of ethics and proficiency, independently, or as a team work.	
<b>Topics Covered</b>	<b>List of Topics</b>	<b>Related CLOs</b>
	1. Introduction	<b>CLO1</b>
	2. Sewer network system	<b>CLO1</b>
	3. Water distribution system	<b>CLO1</b>
	4. Analyze hydraulics systems	<b>CLO2</b>
	5. Design hydraulics systems with Civil Engineering applications	<b>CLO2</b>
	6. Branching flow in pipes	<b>CLO3</b>
	7. Water hammering in pipes	<b>CLO3</b>
	8. Pipeline transmission system	<b>CLO3</b>
<b>Textbook(s) and Other Required Material</b>	<ul style="list-style-type: none"> <li>• Mays, L. W.. Water Resources Engineering (2nd ed.). Wiley. Todd D.K., Ground Water Hydrology, John Wiley and Sons, 2000.</li> <li>• Haestad Methods, Donald V. Chase, Dragan A. Savic, Thomas M. Walski., Water Distribution Modeling, Haestad; 1st edition (April 1, 2001).</li> <li>• Nazih K. Shamma, Water Supply and Wastewater Removal, Wiley., Third edition, 2011.</li> </ul>	
<b>Grading System</b>	Assignments	20%
	Project Work	20 %
	Midterm Exam	20%
	Final Exam	40%
<b>Instructors</b>	Dr. Osama Saad A Al Gahtani /Dr. Faisal AlFaisal E-mail: oalgahtani@ksu.edu.sa Office 2A61	
<b>Date of Review</b>	February, 2021	