

College of Engineering

Department of Civil Engineering

جامعة  
الملك سعود  
King Saud University



## CE 528 Water Resources Systems Analysis

**Credit and Contact hours**

3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)

**Required, or Elective**

Required for a MSCE degree

**Course Description**

Introduction to system engineering optimization by calculus, linear and nonlinear programming, dynamic programming, simulated annealing, chance constraints modeling, and decision analysis. Applications to water resources problems.

**Prerequisites or Co-requisites**

None

**Course Learning Outcomes**

Students completing this course successfully will be able to

Course Learning Outcomes	Related Program Outcomes
<b>CLO1:</b> Recognize and explain the main concepts of water resources systems.	<b>K1</b>
<b>CLO2:</b> Recognize the different types of methodologies to solve water resources problems.	<b>K1</b>
<b>CLO3:</b> Select and apply appropriate methods and techniques for analyzing water resources systems problems	<b>S1</b>
<b>CLO4:</b> Evaluate the performance of existing water resources systems in real-life projects.	<b>C2</b>

**Student Outcomes related to this Course**

**K1.** Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.

**S1.** 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.

**C2.** Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.

<b>Topics Covered</b>	<b>List of Topics</b>		<b>Related CLOs</b>
	1. Introduction to water resources systems analysis.		<b>CLO1</b>
	2. Water Distribution Operation Modeling.		<b>CLO2</b>
	3. Groundwater Management Modeling.		<b>CLO2</b>
	4. Storm Sewer Design Modeling.		<b>CLO2</b>
	5. Detention/Retention Basin Design.		<b>CLO3</b>
	6. Chance-Constrained Models.		<b>CLO3</b>
	7. Water Quality Management Models for Rivers and Estuaries.		<b>CLO3</b>
	8. Infiltration Basin Design.		<b>CLO3</b>
	9. Water Reuse Planning Models.		<b>CLO3</b>
	10. Reservoir Operation Modeling.		<b>CLO3</b>
	11. Soil Aquifer Treatment (SAT) Systems.		<b>CLO4</b>
	12. Regional Water Supply Planning Models.		<b>CLO4</b>
13. Case study: Saudi Arabia ,and project presentation.		<b>CLO4</b>	
<b>Textbook(s) and Other Required Material</b>	<ul style="list-style-type: none"> <li>• Mays L.W. and Y.K. Tung, Hydrosystems Engineering and Management, McGraw-Hill, 1992.</li> </ul>		
<b>Grading System</b>	Assignments	5%	
	Project Work	35 %	
	Midterm Exam	20%	
	Final Exam	40%	
<b>Instructors</b>	Dr. Faisal Mohammed A Alfaisal/ Dr. Ali O. Al-alnahit E-mail: falfaisal@ksu.edu.sa Office 2A93		
<b>Date of Review</b>	February, 2021		