College of Engineering

Department of Civil Engineering

CE 501 Design of Hydraulic Structures

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required for a MSCE degree
Course Description	Design of hydraulic structures, such as canals, drains, culverts, head works, outlet works, regulators, falls, canal transitions, cross drainage works, dams , spillways, energy dissipation structures and flood control structures.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	***Related Program Outcomes***
CLO1: Explain and recognize the importance of the hydraulic structures in water resources planning and management.	**K1**
CLO2: Recognize the different types of hydraulic structures, to identify its purpose and function.	**K1**
CLO3: Develop design criteria necessary for the preparation of designs the hydraulic structures	**S1**
CLO4: Analyze different hydraulic structures; for example: dams, spillways, stilling basins, crossing structures, culverts, gates regulators	**S1**
CLO5: Design and evaluate different hydraulic structures; for example: dams, spillways, stilling basins, crossing structures, culverts, gates regulators using computer programs (e.g. HEC-RAS) on selected catchment areas.	**C2**
CLO6: Evaluate the performance of different existing hydraulic structures; for example: dams, spillways, stilling basins, crossing structures, culverts, gates regulators using computer programs (e.g. HEC-RAS) on selected real-life projects.	**C2**

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<tr><td>Student Outcomes related to this Course</td><td>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.</td></tr>
<tr><td>Topics Covered</td><td>
<table>
<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Introduction to the importance of the hydraulic structures in water resources planning and management.</td><td>CLO1</td></tr>
<tr><td>2. Understand and recognize the different types of Dams.</td><td>CLO2</td></tr>
<tr><td>3. Design criteria necessary for the preparation of designs for dams and other hydraulic structures</td><td>CLO3</td></tr>
<tr><td>4. Analyze different hydraulic structures including dams, reservoirs, spillways and outlets</td><td>CLO4</td></tr>
<tr><td>5. Designs for concrete gravity dams and applications</td><td>CLO5</td></tr>
<tr><td>6. Design of spillways, outlets and stilling basins</td><td>CLO5</td></tr>
<tr><td>7. Design of crossing structures and culverts</td><td>CLO5</td></tr>
<tr><td>8. Use of computer programs to analyze and design Culvert</td><td>CLO6</td></tr>
<tr><td>9. Use of computer programs to analyze and design concrete gravity dams</td><td>CLO6</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>• Hydraulic structures, 4th Edition: P. Novak, A.I.B. Moffat, C. Nalluri and R. Narayanan,Taylor and Francis Group, ISBN:9780415386265
• Theory and Design of Irrigation Structures Vol. II , Latest Ed, R. S. Varshney et al</td></tr>
<tr><td>Grading System</td><td>Assignments 20%
Project Work 20 %
Midterm Exam 20%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Dr. Ibrahim Elsebaie
E-mail: elsebaie@ksu.edu.sa Office 2A81</td></tr>
<tr><td>Date of Review</td><td>February, 2021</td></tr>
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