

CE 324 Hydraulics – Course Syllabus

Department of Civil Engineering King Saud University

Course Description: CE324 Hydraulics (Required for a BSCE degree)	Energy equation, friction losses, minor losses, types of pipe flow & Reynolds number, series piping, parallel piping, pump's power, unsteady pipe flow, classification of free-surface flow, Froude number, uniform flow, critical flow, basics of channel design, specific energy, non-uniform rapidly varied flow (hydraulic jump), introduction to non-uniform gradually varied flow. Credit hours: 2 (2h lecture, 1h tutorial, 0)
Prerequisite	CE320 Fluid Mechanics 2 (2, 1, 0) Topics: Fluid properties, pressure at a point, pressure variation with depth, hydrostatic forces on plane surfaces, hydrostatic forces on curves surfaces, buoyant forces, stability of floating bodies, continuity equation, Euler equation, Bernoulli equation, energy equation, momentum equation.
Course Learning Objectives	The main objectives of this course are: <ol style="list-style-type: none">1. Evaluation of friction and minor losses in closed conduits.2. Analysis of flow in a single pipe and in pipes connected in series and in parallel.3. Analysis and computation of transient flow in pipes (Water Hammer).4. Learn basic elements of open channel sections and classify the flow in an open channel.5. Analysis and computation of critical and uniform flow in open channels.6. Analysis and computation of rapidly varied flow and introduction to gradually varied flow in open channels.
Topics Covered	<ol style="list-style-type: none">1. Steady Flow in Closed Conduits2. Introduction to Unsteady Flow in Closed Conduits3. Open Channel Flow
Class/ tutorial Schedule	Two lecture sessions a week (50 minutes each session) and one tutorial session every week (50 minutes)
Computer Applications	Not applicable in this course. Students are trained to use HEC-RAS and WaterCad in CE 428 and CE 429.
Contribution of Course to Meeting the Professional Component	<ol style="list-style-type: none">1. Students recognize the importance of applying acquired engineering knowledge to a practical engineering problem.

	<ol style="list-style-type: none"> 2. Students identify, formulate and solve engineering problems. 3. Students are able to evaluate and synthesize information and develop alternative solutions.
Relationship of Course to Program Outcomes	<p>This course will enhance the student's</p> <ol style="list-style-type: none"> 1. Ability to apply knowledge of mathematics, science, and engineering. 2. Ability to identify, formulate and solve engineering problems.
Textbook(s) and/or Other Required Material	<ol style="list-style-type: none"> 1. Hydrology & Hydraulic Systems by Ram S. Gupta, Published by Prentice-Hall, New Jersey, U.S.A., 1989. 2. Mechanics of Fluids by Merle C. Potter and David C. Wiggert, Published by Prentice Hall, New Jersey, U.S.A., 1997. 3. Open Channel Hydraulics by Ven Te Chow, Published by McGraw-Hill, Inc., U.S.A., 1959.
Date of Preparation	May, 2006
Grade distribution	<p>20% (Attendance, quizzes, tutorial assignments)</p> <p>40% (Two Midterm Exams)</p> <p>40% (Final Examination)</p>