College of Engineering

Department of Civil Engineering

CE 429 Computer Applications in Water Engineering

Credit and Contact hours	3 / 3 (Lectures), 1 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective for a BSCE degree
Course Description	The course is designed to introduce students to water engineering software in the fields of hydraulics and hydrology. Students learn about modeling open channel and closed conduit flows, as well as surface and groundwater hydrology problems. Students are introduced to setting boundary conditions and calibrating models. Example computer application programs that they may use include: HEC-RAS, WaterCad, HEC-HMS, HYDROMED and MODFLOW.
Prerequisites or Co-requisites	CE324 (Hydraulics), and CE 424 (Hydrology)

Course Learning Outcomes

Students completing this course successfully will be able to

Course Learning Outcomes	Related Student Outcomes (SO)
CLO1: Apply the computer programs to model sample projects with real life constraints in the field of open channel flow, closed conduit systems, surface and groundwater hydrology.	**SO1**
CLO2: Identify the importance of model calibration using boundary conditions; before the model can be used to predict results	**SO1**
CLO3: Develop all analysis using the commercial software.	**SO1**
CLO4: Present the work in a professional way to the students and the faculty.	**SO3**

Student Outcomes related to this Course

SO 1. an ability to **identify**, **formulate**, and **solve complex engineering** problems by applying principles of engineering, science, and mathematics, and using **modern engineering tools.** [ABET 1]

SO 3. an ability to communicate effectively with a **range of audiences**. [ABET 3]

Topics Covered	List of Topics	Related CLOs
	1. General introduction to modelling, boundary conditions, calibration and verification.	CLO1
	2. General introduction to technical writing and reporting.	CLO4
	3. Introduction to HEC-RAS for modelling open channel flow problems.	CLO2, CLO3 and CLO4
	4. Introduction to HYDROMED for modelling surface water hydology problems..	CLO2, CLO3 and CLO4
	5. Introduction to WaterCAD/HAMMER for modelling closed conduit flow problems.	CLO2, CLO3 and CLO4
	6. Introduction to MODFLOW for modelling groundwater flow problems.	CLO2, CLO3 and CLO4

Textbook(s) and Other Required Material	1. Mays, L. W. (2012). Ground and surface water hydrology. Wiley. 2. Streeter, V. L., Wylie, E. B., & Bedford, K. W. (2002). Fluid Mechanics McGraw-Hill. New York. 3. Te Chow, V., Maidment, D. R., & Mays, L. W. (1962). Applied hydrology. Journal of Engineering Education, 308, 1959.

Grading System	Lecture attendance and interaction	10%
	Project work (4 project assignments)	40%
	Tutorial attendance and interaction	10%
	Final Examination	40%

Instructors	Dr. Ibrahim Elsebaie (2A81), email; elsbaie@ksu.edu.sa

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