Course Specification
(Bachelor)

Course Title:	Computer Applications in Water Engineering
Course Code:	CE 4606
Program:	Bachelor of Science in Civil Engineering
Department:	Civil Engineering Department
College:	College of Engineering and Architecture
Institution:	Umm Al Qura University
Version:	1
Last Revision Date:	31 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☐Department	☐Track	Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (level 9 or 10/5th year)					
4. Course General Description:					
This course introduces students to specialized computer applications in water engineering. The course equips students with the skills to utilize these software tools for the analysis and design of water engineering systems, enhancing their ability to solve real-world hydraulic and hydrological challenges.					
5. Pre-requirements for this course (if any)**:**					
Water Resources Engineering					
6. Co-requisites for this course (if any)**:**					
Not Applicable					
7. Course Main Objective(s):					
The course aims to enhance students' proficiency in utilizing specialized computer software for the effective analysis and design of water engineering solutions.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	2
2.	**Laboratory/Studio**	3
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify the fundamental concepts and applications of computer software in water engineering.	K.1	• Lectures • Training tutorials	• Assignments • Quizzes
1.2	Recognize key challenges and emerging issues in water engineering.	K.2	• Lectures • Training tutorials	• Assignments • Quizzes
1.3	Describe the functionalities and applications of various specialized software tools used in water engineering analysis and design.	K.1	• Lectures • Training tutorials	• Assignments • Quizzes
2.0	**Skills**			
2.1	Effectively analyze water engineering problems using professional software tools.	S.3	• Lectures • Training tutorials • Small group work	• Assignments • Quizzes • Mid Term exam • Final Term exam • Term project

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	Evaluate and compare alternative solutions for water engineering challenges, applying appropriate computational methods and design techniques.	S.1; S.3	• Lectures • Training tutorials • Small group work	• Assignments • Quizzes • Mid Term exam • Final Term exam • Term project
3.0	**Values, autonomy, and responsibility**			
3.1	Collaborate professionally and ethically within multidisciplinary teams to formulate and solve water engineering problems.	V.1	• Lectures • Training tutorials • Small group work	• Term project
3.2	Apply official codes standards, and specifications to asses and develop solutions for complex water engineering design challenges.	V.2	• Lectures • Training tutorials Small group work	• Term project • Mid Term exam • Final Term exam

C. Course Content

No	List of Topics	Contact Hours
1.	Use computers to practice problem solving using educational and commercial software in the field of environmental engineering.	**75**
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Weekly	5%
2.	Quizzes	3 & 6 & 9,12	15%
3.	Group project	13	5%
4.	Mid-Term Exam	8	25%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
5.	Final-Term Exam	16/17	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	The manuals accomplished with the software used.
Supportive References	• Novak, P., et al. 2007. Hydraulic structures. 4th Ed. Taylor and Francis, London. • David A. Chin, "Water-Resources Engineering" 3rd Edition (2012), Prentice Hall, ISBN-10: 0132833212, ISBN-13: 9780132833219
Electronic Materials	• Institution of Civil Engineers • Institute of Hydraulic Structure and Water Environment
Other Learning Materials	The following software are helpful for applications of the subjects to engineering projects: • AutoCAD • FlowMaster • CulvertMaster • StormCAD • WaterCAD • HEC HMS • Watershed management

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	White board needs to be replaced with a bigger one with all writing and other accessories. Also, Laboratories for lectures and exams with students working on computers for 15 students during the scheduled class and laboratories hours.
Technology equipment (projector, smart board, software)	Computer with multi-media, a printer, internet connection, and data show.
Other equipment (depending on the nature of the specialty)	• 15 Desktop computers • 3 color Laser Jet Printer (size A3) • 3 Black-and-White Laser Jet Printer (size A3)

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Instructor • Program leader	• Indirect • Direct • Direct
Effectiveness of Students assessment	• Independent member teaching staff	• Direct
Quality of learning resources	• Students • Instructor	• Indirect • Indirect
The extent to which CLOs have been achieved	• Instructor • Students • Program leader	• Direct • Indirect • Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CIVIL ENGINEERING COUNCIL**
REFERENCE NO.	**THE FIFTEENTH SESSION OF THE ACADEMIC YEAR 1446**
DATE	**30 APRIL 2025**

