Course Specification
(Bachelor)

Course Title:	Computer Applications in Construction Engineering
Course Code:	CE 4405
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: (9, 10)					
4. Course General Description:					
This course introduces students to the application of computer-based tools and techniques in construction engineering and project management. Topics include project planning and scheduling, data management, cost control, risk assessment, and digital collaboration in construction projects. The course integrates theoretical knowledge with hands-on experience using industry-standard software.					
5. Pre-requirements for this course (if any)**:**					
Department Approval					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					

- Provide an understanding of modern computer applications in construction engineering and project management.
- Develop the ability to use industry-standard software for project planning, scheduling, cost control, and risk analysis.
- Enhance analytical and problem-solving skills in construction project management through digital tools.
- Foster efficiency, accuracy, and decision-making in construction projects using computer-based applications.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	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**	30
2.	**Laboratory/Studio**	45
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	Explain the role of computer applications in construction engineering and project management.	K1, K2	Lectures, Case Studies	Written Exams, Quizzes
1.2	Identify the capabilities of project planning, cost control, and risk assessment software.	K2	Lectures, Practical Demonstrations	Assignments, Reports

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.0	**Skills**			
2.1	Apply project scheduling and cost control software to real-world construction scenarios.	S1, S2	Lab Sessions, Group Projects	Project Reports, Presentations
2.2	Use digital collaboration tools for project coordination and communication.	S3	Hands-on Training, Case Studies	Software-Based Assignments
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate the ability to integrate multiple software tools in project workflows.	V1, V2	Interactive Discussions, Field Visits	Participation, Reports

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Computer Applications in Construction **1**	**5**
2.	Introduction to Computer Applications in Construction **2**	**5**
3.	Project Planning and Scheduling Software **1**	**5**
4.	Project Planning and Scheduling Software **2**	**5**
5	Construction Data Management and Documentation **1**	**5**
6	Construction Data Management and Documentation **2**	**5**
7	Cost Control and Budgeting in Construction **1**	**5**
8	Cost Control and Budgeting in Construction **2**	**5**
9	Risk Assessment and Decision-Making Tools 1	**5**
10	Risk Assessment and Decision-Making Tools 2	**5**
11	Digital Collaboration and Communication Platforms **1**	**5**
12	Digital Collaboration and Communication Platforms **2**	**5**
13	Case Studies and Industry Applications **1**	**5**
14	Case Studies and Industry Applications **2**	**5**
15	Discussion	**5**
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Written Exam 1	Week 5	10%
2.	Group Project	Week 8	15%
3.	Written Exam 2	Week 10	10%
4.	Software-Based Assignment	Week 12	15%
5.	Final Exam	Week 16	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	Schwalbe, K. (2015). *Information Technology Project Management.* Cengage Learning
Supportive References	Hegazy, T. (2002). *Computer-Based Construction Project Management: Pearson New International Edition.* Pearson Higher Ed. Paulson Jr, B. C. (1994). *Computer Applications in Construction.* McGraw-Hill, Inc.
Electronic Materials	Online tutorials, software manuals, research papers
Other Learning Materials	Instructor-prepared notes, case studies

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Equipped with multimedia and projection systems. High-performance computers with industry-standard software
Technology equipment (projector, smart board, software)	Smart boards, cloud computing resources
Other equipment (depending on the nature of the specialty)	VR tools for digital collaboration applications (if available)

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty, Students	Surveys, Peer Review
Effectiveness of Students assessment	Faculty	Exam Reviews, Rubric Analysis
Quality of learning resources	Faculty, Students	Feedback Forms, Resource Evaluation
The extent to which CLOs have been achieved	Program Leaders	Performance Reports
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

