



# Course Specification

## (Bachelor)

Course Title: **Computer Applications in Construction Management**

Course Code: **COE4414**

Program: **Bachelor of Construction Engineering**

Department: **Civil and Environmental Engineering Department**

College: **College of Engineering and Computing in Al-Qunfudhah**

Institution: **Umm Al-Qura University**

Version: **4<sup>th</sup>**

Last Revision Date: **14 January 2025**



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## A. General information about the course:

### 1. Course Identification

<b>1. Credit hours: ( 3 ) (2+1)</b>					
<b>2. Course type</b>					
A.	<input type="checkbox"/> University	<input type="checkbox"/> College	Department	<input type="checkbox"/> Track	Others
B.	<input type="checkbox"/> Required		Elective		
<b>3. Level/year at which this course is offered: ( Level 9-10 / Year 5 )</b>					

### 4. Course General Description:

The course investigates computer applications in various aspects of the construction industry, such as planning, surveying, designing, graphics, pre-bidding, budgeting, scheduling, quality and cost control and equipment management. The course covers relevant computer concepts, operating systems, software design and programming, and computer applications. Also, the recent trends of computer applications in construction will be discussed such as artificial intelligence, machine learning, and natural language processing. Several carefully crafted hands-on activities targeting at construction problems will help students to not only learn the fundamentals, but also master their applications in construction. Students are expected to be able to create information systems to solve a problem following a systematic approach of problem definition, problem analysis, identification of possible solutions, solution selection, implementation, and evaluation.

### 5. Pre-requirements for this course (if any):

Construction Planning, Scheduling and Control COE4405

### 6. Co-requisites for this course (if any):

### 7. Course Main Objective(s):

The course aims to equip students with skills to use computer and information technology in construction management, covering industry software, hardware, project scheduling, cost management, resource management, data organization, project tracking, and effective communication for progress and billing.



## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	<b>3 credit hours</b>	<b>100%</b>
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4	Distance learning		

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	<b>30</b>
2.	Laboratory/Studio	<b>45</b>
3.	Field	
4.	Tutorial	
5.	Others (specify)	
<b>Total</b>		<b>75</b>

## 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
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Understand the role of computer and information technology in the construction management process.	K1	Interactive learning Self-directed learning	Midterm Exam, Final Exam
1.2	Know the fundamentals of computer applications in construction, available software applications.	K2		



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.3	Demonstrate advanced knowledge of analysis, software, and the use of microcomputers to practice construction project management	K3		Lab Exam
<b>2.0</b>	<b>Skills</b>			
2.1	Manage computer applications to resolve complicated construction procedures in modeling and data collection.	S1	Interactive learning Self-directed learning	Lab Exam
2.2	Develop expertise required to asses alternative solution for computer application procedure and application.	S2		Midterm Exam, Final Exam
2.3	Apply computer software in construction projects and management	S4		Lab Exam
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Apply professional expertise, leadership, and sense of responsibility	V1	Interactive learning Self-directed learning	Midterm Exam, Final Exam
3.2	Integrate professionally and ethically with multi-disciplinary teams in Computer based cases and problem solving.	V3		





## C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to construction engineering; project, Basic elements, classification of construction project	4
2.	Digital scheduling and costing and Digital construction Cost Control Software.	15
3.	Virtual construction	8
4.	Augmented reality (AR) and virtual reality (VR)	8
5.	Ground Penetration Radar (GPR)	8
6.	Midterm Exam	2
7.	The use of AI/ML in construction	10
8.	Use the Oracle Primavera P6 as a tool in planning, scheduling, cost estimate, managing and executing your project work.	10
9.	Use Microsoft Project to apply in the construction management such as Project Communication System.	10
<b>Total</b>		<b>75</b>

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	4, 12	10%
2.	Homework	3, 13	10%
3.	Laboratory	Every week	20%
4.	Midterm Exam	8	20%
5.	Final Exam	16 or 17	40%

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

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Computer software manuals in the field of Construction o MS Project o Primavera o MATLAB
<b>Supportive References</b>	<ul style="list-style-type: none"> <li>• Lecture notes are posted on Blackboard</li> <li>• Reading materials are posted on Blackboard</li> <li>• Independent readings outside class (discussion in class)</li> </ul>





Electronic Materials

Other Learning Materials

## 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<ul style="list-style-type: none"> <li>- Classroom with minimum capacity of 30 students</li> <li>- computer laboratory equipped with (MS Project, Primavera, MATLAB)</li> </ul>
<b>Technology equipment</b> (projector, smart board, software)	Projector, whiteboard
<b>Other equipment</b> (depending on the nature of the specialty)	

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Lecturer / Students	Direct / Indirect (Grades, surveys)
Effectiveness of Students assessment	Faculty	Indirect (Barriers to understand successor course)
Quality of learning resources	Lecturer	Direct (Grades)
The extent to which CLOs have been achieved	Lecturer / Faculty	Direct (Grades)
Other		

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

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	Civil and Environmental Engineering Department Council in Al-Qunfudah
<b>REFERENCE NO.</b>	The fifteenth session of the academic year 1446
<b>DATE</b>	01/05/2025

