Course Specification

(Bachelor)

Course Title:	Building information modeling
Course Code:	COE4415
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:	1st
Last Revision Date:	14 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (3) (2+1)					
2. Course type					
A.	☐University	☐College	Department	☐Track	Others
B.	☐ Required		Elective		
3. Level/year at which this course is offered: (Level 9-10 / Year 5)					
4. Course General Description:					
This course provides an introduction to Building Information Modeling (BIM), a digital process used to plan, design, construct, and manage buildings and infrastructure. Students will learn how to create, visualize, and analyze 3D models, integrating data on materials, costs, and scheduling. Key topics include BIM software tools, collaboration workflows, clash detection, and the role of BIM in sustainable design and facility management. Through hands-on projects, students will gain practical skills in creating and managing intelligent 3D models that support efficient decision-making across the building lifecycle.					
5. Pre-requirements for this course (if any)**:**					
Building Construction COE3402					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The main objective is to equip students with a comprehensive understanding of BIM principles, tools, and processes for efficient planning, design, construction, and management of building projects, emphasizing collaboration, data integration, and visualization to improve project delivery, reduce errors, and enhance sustainability throughout the building lifecycle.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**3 credit hours**	**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	**Understand the fundamental concepts, principles, and history of Building Information Modelling (BIM).**	**K1**	**Interactive learning Self-directed learning**	**Midterm Exam, Final Exam**

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	Identify key BIM standards, protocols, and data exchange formats.	K2		
2.0	**Skills**			
2.1	Use BIM software tools (e.g., Autodesk Revit, Navisworks) for 3D modeling and project visualization.	S3	Interactive learning Self-directed learning	Midterm Exam, Final Exam
2.2	Perform clash detection and coordination using BIM tools.	S4		
2.3	Generate project documentation and reports from BIM models.	S4		
3.0	**Values, autonomy, and responsibility**			
3.1	Comprehend the ethicality in using BIM technologies to ensure transparency and accountability.	V1	Interactive learning Self-directed learning	Midterm Exam, Final Exam

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Building Information Modelling (BIM)	5
2.	BIM Standards and Protocols (ISO 19650, PAS 1192), and Data exchange formats (IFC, COBie).	10
3.	BIM Software Tools and Technologies (Revit, Navisworks, ArchiCAD, Tekla), and comparison of them.	8
4.	3D Modelling and Visualization	15
5.	Midterm Exam	2
6.	Collaboration and Data Management in BIM	10
7.	Clash Detection and Coordination	5
8.	BIM for Cost Estimation and Scheduling (5D & 4D BIM)	15
9.	Case Studies and Emerging Trends in BIM	5
Total		**75**

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

Essential References	Sacks, R., Lee, G., Eastman, C., Teicholz, P., Burdi, L., & Bolpagni, M. (2025). BIM handbook: A guide to building information modeling for owners, designers, engineers, contractors, and facility managers (4th ed.). Wiley.
Supportive References	Computer software manuals in the field of Construction o Revit o Navisworks o ArchiCAD o Tekla
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Classroom with minimum capacity of 30 students - computer laboratory equipped with at leaset one of (Revit, Navisworks, ArchiCAD, Tekla)
Technology equipment (projector, smart board, software)	Projector, whiteboard
Other equipment (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

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