Course Specification
(Bachelor)

Course Title:	Building Information Modeling for Construction
Course Code:	CE 4408
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 Building Information Modeling (BIM) and its applications in the Construction industry. The course focuses on BIM fundamentals, digital modeling, interdisciplinary collaboration, and BIM-based decision-making for construction. Topics include 3D modeling, clash detection, sustainability analysis, and digital workflow integration. Hands-on learning using industry-standard BIM software is emphasized					
5. Pre-requirements for this course (if any)**:**					
Department Approval					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					

1. Explain the fundamental principles of BIM and its role in transforming the construction industry.
2. Apply BIM tools for visualization, scheduling, and documentation of construction projects.
3. Assess the impact of BIM on sustainability and lifecycle analysis in construction.
4. Utilize cloud-based BIM collaboration platforms for project coordination

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%

No	Mode of Instruction	Contact Hours	Percentage
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 BIM in construction and industry trends.	**K1**	Lectures, and case studies.	Quizzes, and assignments,
1.2	Demonstrate proficiency in generating construction documentation from BIM models	**K2**	problem-solving exercises.	Assignments, Reports
2.0	**Skills**			
2.1	Analyze and coordinate multi-disciplinary models for clash detection and resolution.	**S1**	Lectures, and case studies.	Quizzes, and assignments,
2.2	Develop 3D parametric models using industry-standard BIM software	**S2**	Case studies, design exercises, and lectures.	Design projects, assignments, and exams
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.1	Demonstrate proficiency in generating construction documentation from BIM models	**V1, V2**	problem-solving exercises.	Assignments, Reports

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to BIM: Evolution and Key Concepts	**5**
1. 2	BIM Software Overview and Parametric Modeling Basics	**5**
3	Creating and Editing 3D Models in BIM	**5**
4	BIM for Construction Drawings and Documentation	**5**
5	Clash Detection and Coordination Using BIM	**5**
6	BIM-Based Quantity Takeoff and Material Scheduling	**5**
7	Midterm Exam and Project Proposal Discussion	**5**
8	BIM for Structural and Architectural Integration	**5**
9	BIM and Sustainability: Energy and Carbon Footprint Analysis	**5**
10	4D BIM: Construction Scheduling and Sequencing	**5**
11	BIM for Risk Management and Site Planning	**5**
12	Cloud-Based BIM Collaboration and Data Sharing	**5**
13	Final Project Development and Review	**5**
14	Final Project Presentations and Course Wrap-Up	**5**
15	Discussion	**5**
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments & Labs	2-14	20%
2.	Midterm Exam	8	20%
3.	Group Project	12	10%
4.	Final Exam	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	Zisan, Z. (2024). *Building Information Modeling: Transforming the AEC Industry: A Comprehensive Guide to the Future of Design, Construction, and Project Management.*
Supportive References	
Electronic Materials	Autodesk Revit, Navisworks, BIM 360, and other industry-standard tools
Other Learning Materials	Journal articles, case studies, and BIM industry reports

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)	

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**