Course Specification
(Bachelor)

Course Title:	Special Topics in Construction Engineering
Course Code:	CE 4406
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 explores advanced and emerging topics in construction engineering, providing students with knowledge of modern construction techniques, sustainable construction practices, digital technologies, and smart construction methods. The course will include case studies, real-world applications, and innovative construction solutions, preparing students to address contemporary industry challenges.					
5. Pre-requirements for this course (if any)**:**					
Department Approval					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
1. Identify and analyze emerging trends in construction engineering. 2. Apply modern construction technologies and digital tools in engineering projects. 3. Evaluate sustainable construction practices and their impact on the environment. 4. Assess the integration of smart construction techniques in infrastructure development. 5. Develop innovative solutions to complex construction challenges using advanced methodologies.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	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**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		45

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 key advanced construction engineering principles and best practices.	K1, K2	Lectures, Case Studies	Written Exams, Quizzes
1.2	Evaluate the role of stakeholder engagement and sustainability in construction projects.	K2	Lectures, Practical Exercises	Assignments, Reports
2.0	**Skills**			
2.1	Apply advanced techniques and digital	S1, S2	Group Projects, Simulations	Project Reports, Presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	tools in construction engineering project.			
2.2	Utilize modern construction methodologies.	S3	Problem-Based Learning	Case Study Analysis, Reports
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate ethical considerations and sustainability in construction engineering decision-making.	V1, V2	Interactive Discussions, Field Visits	Participation, Reports

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Special Topics in Construction Engineering	3
2.	Modern Construction Materials and Techniques	3
3	Construction Automation	3
4	Prefabrication and Modular Construction Methods	3
5	Sustainable Construction and Green Building Practices	3
6	Advanced Structural Systems and Smart Infrastructure	3
7	Midterm Exam and Project Discussion	3
8	Robotics and AI in Construction	3
9	Emerging Trends in Construction Safety and Risk Management	3
10	Resilient Infrastructure and Disaster-Resistant Construction	3
11	Smart Cities and Infrastructure Development	3
12	Construction in Extreme Environments	3
13	Final Project Development and Review	3
14	Final Project Presentations and Course Wrap-Up	3
15	Ethical Considerations and Decision-Making in construction engineering Projects	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Written Exam	Week 5	20%
2.	Group Project	Week 8	15%
3.	Case Study Report	Week 12	15%
4.	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	To be determined based on latest industry developments
Supportive References	PMI. (Latest Edition). *A Guide to the Project Management Body of Knowledge (PMBOK Guide).*
Electronic Materials	Online resources, BIM tools, construction simulation software, and digital modeling platforms
Other Learning Materials	Instructor-prepared notes, research papers, case studies, and industry reports

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Equipped with multimedia and projection systems. Computer lab with project management software
Technology equipment (projector, smart board, software)	Smart boards, collaboration tools
Other equipment (depending on the nature of the specialty)	Field visit kits, case study documentation

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

Assessment Areas/Issues	Assessor	Assessment Methods
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**

