Course Specification

(Bachelor)

Course Title:	Maintenance and Rehabilitation of Structures
Course Code:	COE4307
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:	4th
Last Revision Date:	14 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: (Level 10 / Year 5)					
4. Course General Description:					
This course provides the knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repair strategies of structures.					
5. Pre-requirements for this course (if any)**:**					
Building Construction COE3402					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
By the end of the course, students should understand various aspects of inspection and assessment for evaluating damaged structures, causes of deterioration, quality assurance for concrete construction and properties, special concretes, mortars, and chemicals for accelerated strength gain, repair and demolition techniques, and repairs for issues such as low member strength, deflection, cracking, chemical disruption, weathering, corrosion, wear, fire, leakage, and marine exposure.					

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	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	Recognize the various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration	K1	Interactive learning Self-directed learning	Final Exam
1.2	Estimate the future condition of a structure using mathematical principles	K2	Interactive learning Self-directed learning	Quiz
2.0	Skills			
2.1	Set quality assurance for concrete construction and concrete properties, Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain	S1	Interactive learning Self-directed learning	Assignment
2.2	Select different techniques of repair and demolition	S2		Midterm Exam
2.3	Determine repairs to overcome low member strength, deflection, cracking, chemical disruption, weathering corrosion, wear, fire,	S4		Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	leakage and marine exposure			
3.0	Values, autonomy, and responsibility			
...	N/A			

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to maintenance and rehabilitation	3
2.	Maintenance and repair strategies	6
3.	Serviceability and durability of concrete	9
4.	Strategies and techniques for repair	6
5.	Midterm Exam	3
6.	Materials for repair	6
7.	Prediction of future state of structure	3
8.	Strengthening of structures	6
9.	Techniques for demolition	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	4, 6, 12	15%
2.	Homework	3, 9, 13	15%
3.	Midterm Exam	8	30%
4.	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	Modi, P. I., & Patel, C. N. (2016). Repair and rehabilitation of concrete structures. PHI Learning Pvt. Ltd.
Supportive References	Chen, H.-P. (2018) Structural health monitoring of large civil engineering structures. 1st edn. Hoboken, NJ: Wiley-Blackwell.
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
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