Course Specification
(Bachelor)

Course Title:	Special Topics in Structural Engineering
Course Code:	CE4112
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: (level 9 or 10/5th year)					
4. Course General Description:					
This course covers advanced selected topics in structural engineering in accordance with the needs of the student and the guidance of the supervisor. The need would be according to the graduation project scope of the students. Advanced Topics would focues on advanced topics in structural engineering such as lightweight structures, pre-cast concrete technology, FRP-reinforced concrete structures, and corrosion, strengthening and repair of buildings.					
5. Pre-requirements for this course (if any)**:**					
Department approval					
6. Co-requisites for this course (if any)**:**					
Not Applicable					
7. Course Main Objective(s):					
To give the student the opportunity to attend one of the special structural engineering topics that he might encounter during his studying. The topic should take into consideration the student's background, interests, and the requirements for his research / graduation project. Also, to prepare students to have skills of assessment and design of advanced topics in buildings.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• 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	Identify the basics and describe the applications of advanced methods in structural engineering.	K1	Lectures Training tutorials	Assignments Quizzes
1.2	Recognize problems and issues related to complex and advanced structural engineering.	K2	Lectures Training tutorials	Assignments Quizzes
2.0	**Skills**			
2.1	professionally analyze the special structural engineering problems using the professional techniques and advanced tools.	S1	Lectures Training tutorials Small workgroups	Assignments Quizzes Mid Term exam Final Term exam Term project
2.2	Assess and compare the appropriate alternative	S3	Lectures Training tutorials	Assignments Quizzes

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	solutions of special structural problems.		Small workgroups	Mid Term exam Final Term exam Term project
3.0	**Values, autonomy, and responsibility**			
3.1	Collaborate professionally and ethically within multidisciplinary teams to formulate and solve structural engineering problems.	V3	Lectures Training tutorials Small workgroups	Term project
3.2	Apply official codes standards, and specifications to asses and develop solutions for complex structural engineering design challenges.	V3	Lectures Training tutorials Small workgroups	Term project Mid Term exam Final Term exam

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to be specified according the instructor and students based on their shared interest which is influenced by the graduation project proposal.	**3**
2	Introduction about lightweight structures	**3**
3	Analysis and design of lightweight structures	**3**
4	Introduction of pre-cast concrete structures	**3**
5	Analysis and design of connections of pre-cast concrete elements	**3**
6	Detailing of pre-cast concrete elements and connections	**3**
7	Introduction of FRP-reinforcement types	**3**
8	Analysis and design of FRP-reinforced members	**3**
9	Corrosion impact on reinforced concrete elements	**3**
10	Rehelibitation of concrete structures	**3**
11	Field tests and measurments required to evaluate damage in buildings	**3**
12	Strengthening of buildings using CFRP, GFRP, concret jacketing, and steel plated	**3**
13	Application of post-tensioning in strengthening of elements	**3**
14	Detailing of repair and strengthening of structural elements	**3**

15	Review for finals	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Weekly	5%
2.	Quizzes	3 & 6 & 9,12	15%
3.	Group project	13	5%
4.	Mid-Term Exam	8	25%
5.	Final-Term Exam	16/17	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	The Manual for SAP 2000 SOFTWARE
Supportive References	• ACI Code requirements • AISC code
Electronic Materials	• To be specified by the supervisor and depends about the topic.
Other Learning Materials	• To be specified by the supervisor and depends about the topic.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	White board needs to be replaced with a bigger one with all writing and other accessories. Also, Laboratories for lectures and exams with students working on computers for 15 students during the scheduled class and laboratories hours.
Technology equipment (projector, smart board, software)	To be specified by the supervisor and depends about the topic. However, there is need for SAP 2000 or RAM software
Other equipment (depending on the nature of the specialty)	• To be specified by the supervisor and depends about the topic.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Instructor • Program leader	• Indirect • Direct • Direct
Effectiveness of Students assessment	• Independent member teaching staff	• Direct
Quality of learning resources	• Students • Instructor	• Indirect • Indirect
The extent to which CLOs have been achieved	• Instructor • Students • Program leader	• Direct • Indirect • Direct
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**

