Course Specification
(Bachelor)

Course Title:	Computer Applications in Structural Engineering
Course Code:	CE 4504
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:					
The course is designed to prepare students for structural engineering computer-aided software that has been commonly used in the engineering industry. The design and analysis of structural elements are of main interest in this course. Computer software such as SAP 2000 and RAM are utilized to achieve the course outcome					
5. Pre-requirements for this course (if any)**:**					
Structural Analysis					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The course aims to enhance students' proficiency in utilizing specialized computer software for the effective analysis and design of structural engineering solutions.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	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**	3
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 different softwares in the structural engineering.	K1	• Lectures • Training tutorials	• Assignments • Quizzes
1.2	Recognize problems and issues related to structural engineering.	K2	• Lectures • Training tutorials	• Assignments • Quizzes
2.0	**Skills**			
2.1	professionally analyze the structural engineering problems using the professional software's.	S1	• Lectures • Training tutorials • Small group work	• Assignments • Quizzes • Mid Term exam • Final Term exam • Term project
2.2	Assess and compare the appropriate alternative solutions of the structural problems.	S3	• Lectures • Training tutorials • Small group work	• Assignments • Quizzes • Mid Term exam • Final Term exam • Term project
3.0	**Values, autonomy, and responsibility**			

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

C. Course Content

No	List of Topics	Contact Hours
1	Use computers to practice problem-solving	3
2	Use educational and commercial software in the field of structural engineering.	3
3	Analysis of statically determinate beams via SAP 2000	3
4	Analysis of statically determinate trusses via SAP 2000	3
5	Analysis of statically determinate frames via SAP 2000	3
6	Analysis of statically indeterminate beams via SAP 2000	3
7	Analysis of statically indeterminate trusses via SAP 2000	3
8	Analysis of statically indeterminate frames via SAP 2000	3
9	Design of structural members such as beam, column, slab utilizing SAP 2000	3
10	Define the wind lateral loads in SAP 2000	3
11	Define the seismic lateral loads in SAP 2000	3
12	Design of multistory reinforced concrete building via SAP 2000 software	3
13	Design of steel structures via SAP 2000/ RAM software	3
14	Ensuring design procedures are within the code and LRFD design requirements	3
15	Preparing final technical report from SAP 2000 software	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 manuals accomplished with the software used. SAP 2000 software RAM software
Supportive References	
Electronic Materials	
Other Learning Materials	

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)	Computer with multi-media, a printer, internet connection, and data show.
Other equipment (depending on the nature of the specialty)	• 15 Desktop computers • 3 color Laser Jet Printer (size A3) • 3 Black-and-White Laser Jet Printer (size A3)

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Instructor • Program leader	• Indirect • Direct • Direct

Assessment Areas/Issues	Assessor	Assessment Methods
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**

