Course Specification
(Bachelor)

Course Title:	Theory of Structures
Course Code:	CE 2103
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 7/ 4th year)					
4. Course General Description:					
The course presents concept of loads, reactions and internal loadings in structure elements. It covers calculations for axial force, shear force and bending moments for beams and frames. The fundamentals for assessing structure stability and determinacy are also introduced in this course. Determination of slope and elastic deflection for beams and frames using geometric and energy methods is also outlined in the course. In addition, introduction to indeterminate structures is covered					
5. Pre-requirements for this course (if any)**:**					
Mechanics of Materials CE 1102					
6. Co-requisites for this course (if any)**:**					
Nil					
7. Course Main Objective(s):					
To enable the students to acquire the essential skills required to analyze simple structures using various analysis procedures and techniques.					

2. Teaching mode (mark all that apply)

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

No	Mode of Instruction	Contact Hours	Percentage
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	Demonstrate knowledge of loads types, structure stability, and determinacy.	K1	Lectures and training tutorials,	Monthly exams Home Work Final exam
1.2	Demonstrate understanding of geometric and energy methods and their applications in slope and deflection calculations.	K2	Lectures and training tutorials,	Monthly exams Home Work Final exam
2.0	**Skills**			
2.1	Calculate the reactions for different types of loadings and structures.	S1	Lectures and training tutorials	Monthly exams Home Work Final exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	Compute and Sketch normal force, shear force and bending moment for a specific section in beams and frames.	S2	Lectures and training tutorials	Monthly exams Home Work Final exam
2.3	Justify the appropriate procedure for assessing the slope and deflection for beams and frames.	S4	Lectures and training tutorials	Monthly exams Home Work Final exam
3.0	**Values, autonomy, and responsibility**			
3.1	Use official codes to evaluate the safety deflection to avoid serviceability problems	V1	Team work project.	Team work project report
3.2	Integrate and communicate with group students for solving a particular problem.	V2	Team work project.	Team work project report

C. Course Content

No	List of Topics	Contact Hours
1.	**Types of supports & equilibrium equations**	**3**
2.	**Calculation of the reactions**	**3**
3.	**Stability and determinacy for beams, frames and trusses**	**3**
4.	**Relationships between load, shear force and bending moment**	**3**
5.	**Axial and shear forces in statically determinate frames**	**3**
6.	**Bending moments in statically determinate frames**	**3**
7.	**Calculation of the slope and deflection using the double integration method**	**3**
8.	**Calculation of the slope and deflection using the moment area theorem**	**3**
9.	**Calculation of the slope and deflection using the conjugate beam**	**3**

	method	
10	Calculation of the slope and deflection using Castigliano` theorem	3
11.	Calculation of the slope using the virtual work method	3
12	Calculation of the deflection using the virtual work method	3
13.	Consistent deformation method for analysis of indeterminate beams	3
14	Shear and bending moment for indeterminate beams	3
15	Beam analysis under moving load using the method of influence line	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Exam 1	4	20%
2.	Exam 2	8	20%
3.	HW and Class Room Participation	1-13	10%
4.	Final Eama	13-15	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	Hibbeler, R.C., “Structural Analysis”, Pearsons, 10th Edition, 2016.
Supportive References	Chajes, A., “Structural Analysis”, Prentice - Hall, 2nd Edition,1990. J.L Meriam, L.G. Kraige, "Engineering Mechanics", Volume One, 5th Edition, John, Wiley& Sons, Inc. 2002 Hsieh, Y., “Elementary Theory of Structures”, Prentice-Hall, 1970. Tartaglione, L.C., “Structural Analysis”, McGraw-Hill, 1991.
Electronic Materials	http://www.sciencedirect.com http://ocw.mit.edu/
Other Learning Materials	Tartaglione, L.C., “Structural Analysis”, McGraw-Hill, 1991.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Class room** **White board**
Technology equipment (projector, smart board, software)	• **Printers** • **laptop** • **Engineering Software** • **Projector**
Other equipment (depending on the nature of the specialty)	**International journal membership**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	• Students questioners at the end of the semester. • Analysis of students feedback
Effectiveness of Students assessment	Civil engineering Course coordinator	The faculty member would submit a course folder containing detailed information about the course, students achievements and feedback.
Quality of learning resources	The specialized committee in each civil engineering division.	• C.E program Assessment Committee analyzes the data collected through various sources, e.g., student feedback surveys, assignments grades, etc. • Periodical workshop may be conducted to improve quality.
The extent to which CLOs have been achieved	Done by the Assessment Committee during the Faculty Council meeting.	The results are discussed with the faculty (by The Assessment Committee) during the Faculty Council

Assessment Areas/Issues	Assessor	Assessment Methods
		meeting. The recommendation are documented. An action plan would be made for improvement after the approval of the Department Faculty Council and to be sent to The College Council for approval and implementation.
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

