Course Specification
(Bachelor)

Course Title:	Mechanics of Materials
Course Code:	CE 1102
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

Table of Contents

A. General information about the course: 3

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods 4

C. Course Content 5

D. Students Assessment Activities 6

E. Learning Resources and Facilities 6

F. Assessment of Course Quality 6

G. Specification Approval 7

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 hours					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 4 / 2nd Year)					
4. Course General Description:					
This course deals with the stress and strain (normal and shear), and displacements of structural systems subjected to various applied loads. It also covers torsion stresses. Furthermore, the course encompasses beams' normal, shear forces and bending moments relations and diagrams. Combined loading, stress transformation and principal stresses are all topics considered in the course. In addition, energy method and stability of statically indeterminate axially loaded members are included in the course.					
5. Pre-requirements for this course (if any)**:**					
CE 1101: Statics					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
1. To learn the principles of mechanics applied (in terms of stresses and deformations) to different materials subjected to various types of loadings. 2. To develop problem solving skills through application of these principles to basic engineering problems.					

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		

No	Mode of Instruction	Contact Hours	Percentage
	• 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	Demonstrate knowledge of the behavior of ductile and brittle materials.	K1	class work and discussions	Class tests and quizzes
1.2	Demonstrate knowledge of normal, shear, and bending stresses and associated strains.	K1	class work and discussions	Class tests and quizzes
1.3	Demonstrate understanding of Mohr`s circle and its applications in stress transformation.	K1	class work and discussions	Class tests and quizzes
2.0	**Skills**			
2.1	Compute normal, shear, torsion, and bending stresses and strains for specific sections	S3	class work and discussions	Assignements
2.2	Detemine the internal loadings for statically determinate beams throughout the beam length.	S1	class work and discussions	Assignements

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Apply Mohr`s circle in determining principal stresses.	S1	class work and discussions	Assignements
3.0	**Values, autonomy, and responsibility**			
3.1	Emphasizing on the importance of behavior of materials and their impact on the safety of structure or human	V2	class work and discussions	-

C. Course Content

No	List of Topics	Contact Hours
1.	Behavior of materials and required experiments (Steel tension test – compression test – flexure test).	3
2.	Internal forces in statically determinate beams – axial forces and their distribution throughout the beam length.	3
3.	Normal stresses in axially loaded statically indeterminate members	3
4.	Statically indeterminate members, bearing stresses, and shear forces	3
5.	Distribution of shear forces throughout the beam length	3
6.	Bending moments and their distribution throughout the beam length.	3
7.	Shear stresses and flows.	3
8.	Normal and shear strains.	3
9.	Sketch the internal forces diagrams on structural elements	3
10.	Torsional stresses and angle of twist	3
11.	Bending stresses resulted from single bending moment about one of the section principal axes.	3
12.	Bending stresses resulted from double bending moments about the section principal axes.	3
13.	Stresses due to combined loadings (axial force and single bending moment and axial force and double bending moments)	3
14.	Stresses due to column buckling and calculation of critical loads.	3
15.	Mohr`s circle and principal stresses.	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class tests and quizzes	3, 7, 9	20%
2.	Midterm Examination	7	30%
3.	Final Exmaination	12	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	Hibbler, R.C. “Mechanics of Materials”, 11th Edition, 2023
Supportive References	Popov, E.P., “Mechanics of Materials”, 2nd Edition, 1978. Gere and Timoshenko, "Mechanics of Materials", 3rd Edition 1991.
Electronic Materials	Blackboard (www.uqu.edu.sa)
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
Technology equipment (projector, smart board, software)	Projector and blackboard
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Facuty (s)	Direct
Effectiveness of Students assessment	Facuty (s)	Direct
Quality of learning resources	Program leader	Indirect
The extent to which CLOs have been achieved		
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

