

MODULE DESCRIPTION FORM

MODULE INFORMATION			
Module Title	Engineering Materials I		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MDER311		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	1
Administering Department	Biomedical Eng.	College	College of Engineering
Module Leader	Duaa Mohammed Abd al omur	e-mail	Duaamohammed001@gmail.com
Module Leader's Acad. Title	Assistant lecture.	Module Leader's Qualification	Ms.c
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	Hasnaa.Mohammad@alaya.n.edu.iq
Scientific Committee Approval Date		Version Number	1.0

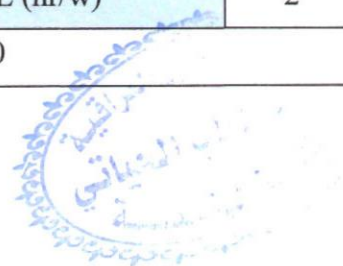
RELATION WITH OTHER MODULES		
Prerequisite module	MDER211	Semester 3
Co-requisites module	None	Semester

Module Aims, Learning Outcomes and Indicative Contents	
MODULE OBJECTIVES	1. Problem-solving with basic principles of engineering, science, and mathematics. 2. Engineering standards and simple measurement methods used for materials (Tensile test , Ductile test). 3. The main types of materials in engineering and their basic physical and mechanical properties. 4. The basic analysis skills to find stress, strain, and deformation in



	simple structures. 5. Theoretical knowledge to solve practical problems for beams, shafts, and combined members.	
MODULE LEARNING OUTCOMES	KNOWLEDGE	A2-1 Define the basic concepts of stress, strain, shear stress the mechanical properties of materials, elastic materials - Hooke's law and modulus of elasticity-young's modulus A2-2 Explain the relationships between external loads, internal forces, stresses, and deformations in structural members subjected to axial, torsional, and flexural loadings. A2-2 Express the behavior of materials under combined loading conditions and identify possible modes of failure. A2-3 Apply the principles of equilibrium, compatibility, Hooke's law and young's modulus under different loading types. A2-3 Sketch shear force and bending moment diagrams, and the internal stress distributions in beams and shafts. A2-4 Calculate stresses, strains, angles of twist, deflections, and other mechanical responses of members under applied loads. A2-5 Design simple structural components based on strength and deformation criteria, ensuring safety and efficiency in engineering practice.
	SKILLS	B.1.1 Function efficiently as an individual B.1.2 Function as a member of multidisciplinary and multicultural teams.
	ETHICS	C.2.1 Plan engineering projects, taking into consideration other trades requirements. C.2.2 Supervise and monitor engineering projects, taking into consideration other trades requirements.

INDICATIVE CONTENTS	<u>Indicative Course Content</u>			
	<u>Part I – Fundamental Concepts and Axial Loading (25hr)</u>			
	1. The basic concepts of stress, strain, and mechanical properties of materials.			
	2. Axial loading analysis in members and determination of deformation and elongation.			
	3. Compound bars study and the distribution of stresses and strains in composite members.			
	<u>Part II – Beams and Bending Behavior (25 hr)</u>			
	1. To construction shear force and bending moment diagrams for different loading conditions.			
	2. Bending stresses and shear stresses evaluation in beams.			
	3. Slope and deflection Calculation in beams using standard analytical methods.			
	<u>Part III – Torsion and Combined Loading Applications (10hr)</u>			
	1. Analysis of torsion in circular shafts, including shear stress and angle of twist.			
	2. Study of combined loading effects on structural members and resulting stress distributions.			
	3. Application of the learned concepts to practical engineering problems involving design and safety evaluation.			
LEARNING AND TEACHING STRATEGIES				
STRATEGIES	• Tutorial and graphics • Problem solving • Brain storming • Research and reporting			
Student Workload (SWL)				
Structured SWL (hr/sem)	80	Structured SWL (hr/w)	2	
Unstructured SWL (hr/sem)	16	Unstructured SWL (hr/w)	2	
Total SWL (hr/sem)	100			



DELIVERY PLAN (WEEKLY LAB. SYLLABUS)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	N.A	
DELIVERY PLAN (WEEKLY SYLLABUS)		
المنهاج الاسبوعي النظري		
	MATERIAL COVERED	LOs
Week 1	Simple Stress and Strain	A2-1
Week 2	Simple Stress and Strain	A2-2,A2-3
Week 3	Compound Bars	A2-1
Week 4	Compound Bars	A2-2,A2-3
Week 5	Beams Bending Moments and Shear Force Diagrams	A2-1
Week 6	Beams Bending Moments and Shear Force Diagrams	A2-2,A2-3
Week 7	Bending Stresses in Beams	A2-1
Week 8	Bending Stresses in Beams	A2-2,A2-3
Week 9	MID-TERM EXAM 1	-----
Week 10	Slope and Deflection of Beams	A2-1
Week 11	Slope and Deflection of Beams	A2-2,A2-3
Week 12	Shearing Stresses and Beams	A2-1
Week 13	Shearing Stresses and Beams	A2-2,A2-3
Week 14	Torsion of Circular Shafts	A2-1, A2-2,A2-3
Week 15	MID EXAM 2	-----
Week 16	Preparatory week before the final Exam	-----

LEARNING AND TEACHING RESOURCES (مصادر التعلم والتدريس)		
	Text	Available in the Library?
Required Texts	Mechanics of Materials, Hearn, 2nd edition, Perjamon press, 1985	Yes

Recommended Texts	Khurmi, R.S. and Gupta, J.K., 2005. A textbook of machine design. S. Chand publishing.	No
Websites		

MODULE EVALUATION (تقييم المادة العلمية)					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	10% (10)	During the Semester	A2-1 ,A2-2 ,A2-3
	Assignments	10	10% (10)	During the Semester	A2-2 ,A2-3
	Student Attendance	10	10% (10)	During the Semester	B1-1,B1-2
	Projects / Lab.	0	10% (10)	0	-----
	Report	1	10% (10)	During Weeks # 12,13,14	A2-1 ,A2-2 ,A2-3
Summative assessment	Midterm Exam	2hr	10% (10)	Week #9	-----
	Final Exam	3hr	50% (50)	Week #17	-----
Total assessment			100% (100)		

GRADING SCHEME (مخطط الدرجات)				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

