

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Mechanics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	PE115		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Petroleum Engineering	College	Collage of Engineering
Module Leader	Mohammed Khalaf Ulaiwi	e-mail	mohammed.khalaf@alayen.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Mohammed Khalaf Ulaiwi	e-mail	mohammed.khalaf@alayen.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	By the end of this course, students will be able to: 1. Understand fundamental principles of statics, including force systems, equilibrium, and vector operations. 2. Apply Newton's laws of motion to analyze particles and rigid bodies under various force conditions. 3. Construct and analyze free-body diagrams (FBDs) for particles and rigid bodies and solve equilibrium problems involving forces, moments, couples,



	and support reactions.		
	4. Analyze structures such as trusses, frames, and machines using appropriate methods. 5. Understand friction concepts and apply them to engineering problems. 6. Perform basic centroid and moment of inertia calculations for simple geometric shapes. 7. Apply mathematical tools (algebra, trigonometry, basic calculus) in engineering mechanics applications. 8. Understand fundamental principles of dynamics and motion. 9. Understand fundamental concepts of stress and strain, and apply Hooke's Law in structural members. 10. Analyze structural members subjected to axial load, shear, thermal, bending, torsion, and compound stresses in simple structure elements.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge	A2	A2.1: Understand the fundamental principles of engineering mechanics, including forces, moments, equilibrium, and Newton's laws. A2.2: Use appropriate mathematical tools and units consistently in engineering mechanics problems. A2.3: Analyze forces acting on particles and rigid bodies, followed by the construction of free-body diagrams for problem solving. A2.4: Apply equilibrium equations to solve statics problems involving beams, trusses, and simple frames. A2.5: Solve problems related to friction, centers of mass, and moments of inertia. A2.6: Analyze basic kinematics and kinetics of particles. A2.7: Explain the basic concepts of stress, strain, and material behavior under different types of loading. A2.8: Identify different types of loads (normal, shear, bending, torsion) and their effects on engineering components.
		B1	B1.1: Function efficiently as an individual. B1.2: Function as a member of multidisciplinary and multicultural teams.
			B2
		C1	
			C2
		Ethics	
Indicative Contents المحتويات الإرشادية		1. An overview of mechanical engineering as a foundational topic that may be connected to several other disciplines in the years to come. 2. Force and force systems, moment and couple, and finally the resultant and the equivalent force-couple system.	

	3. Drawing the free body diagram (F.B.D.) for single and multiple members. 4. Equilibrium equations for two and three-dimensional systems. 5. Friction and its types, and then calculate frictional forces. 6. The internal forces and reactions in the truss systems and frames. 7. An overview of dynamics and motion. 8. An overview of stress, strain and the compound stresses.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	• Presentation and demonstration. • Interactive learning. • Discussions and Q&A. • Problems solving. • Brain storming. • Report and assignments. • Self-learning tasks.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.47
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3 and 7	A2.1, A2.2, A2.3, A2.4 and A2.5
	Assignments	2	10% (10)	4 and 10	A1.1, A2.2, B1.1, B1.4 and B2.1
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	5	A2.2, A2.3, A2.4, B1.2 and B2.1
Summative assessment	Midterm Exam	2hr	10% (10)	9	A2.1, A2.2, A2.3, A2.4 and A2.5
	Final Exam	3hr	50% (50)	16	A2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
	Material Covered	LOs
Week 1	Basic Concepts, Scalars and Vectors, Units Conversion.	A2.1, A2.2, B1.1 and C1.1
Week 2	Force Systems-Rectangular Components.	A2.1, A2.2, A2.3, B2.1, C1.1 and C1.2
Week 3	Force Systems-Moment and Couple.	A2.1, A2.2, A2.3, B1.1, B1.2, C1.1
Week 4	Force Systems-Resultant.	A2.1, A2.2, A2.3, B2.1, C1.1 and C1.2
Week 5	Equilibrium, F.B.D., and Equilibrium Conditions.	A2.1, A2.2, A2.3, A2.4, B2.1, C1.2 and C2.1
Week 6	Friction.	A2.1, A2.2, A2.3, A2.4, A2.5, B2.1, C1.1, C1.2 and C2.1
Week 7	Structures, Plane Trusses.	A2.1, A2.2, A2.3, A2.4, A2.5, B2.1, C1.1, C1.2 and C2.1
Week 8	Centroid and moment of inertia.	A2.1, A2.2, A2.5, B2.2, C1.2 and C2.1
Week 9	Mid-term Exam.	A2.1, A2.2, A2.3, A2.4 and A2.5
Week 10	Dynamic motion	A2.2, A2.6, B2.1, C1.1, C1.2 and C2.1
Week 11	Stress and strain.	A2.2, A2.7, B2.1, C1.1, C1.2 and C2.1
Week 12	Normal stress, thermal stress, Pressure vessels and Torsion	A2.2, A2.7, A2.8, B2.1, B2.2, C1.1, C1.2, C2.1 and C2.2
Week 13	Shear force diagram.	A2.2, A2.7, A2.8, B2.1, B2.2, C1.1, C1.2, C2.1 and C2.2
Week 14	Bending moment diagram.	A2.2, A2.7, A2.8, B2.1, B2.2, C1.1, C1.2, C2.1 and C2.2
Week 15	Compound stresses.	A2.2, A2.7, A2.8, B2.1, B2.2, C1.1, C1.2, C2.1 and C2.2
Week 16	Preparatory week before the final Exam	All

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering mechanics and strength of material	Yes
Recommended Texts	1. Engineering Mechanics Statics, 7th Ed. by J. L. Meriam and L. G. Kraige, 2012. 2. Engineering Mechanics Statics, 14th Ed. R.C. Hibbeler, 2016. 3. Vector Mechanics for Engineers Dynamics, 10th Ed. by Ferdinand P. Beer, E. Russell Johnston and Ph. Cornwell, 2012. 4. Strength of Materials (Fourth Edition) Ferdinand L. Singer, Andrew Pytel.	No

Websites	https://alayen.edu.iq/entry_links
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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 (فيد المعالجة)	(45-49)	More work required but credit awarded.
	F – Fail	راسب	(0-44)	Considerable amount of work required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.