MODULE DESCRIPTION – ENGINEERING MECHANICS II

وصف المادة الدراسية (ميكانيك هندسي II)

Module Information			
معلومات المادة الدراسية			
Module Title	**Engineering Mechanics II**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**CIER 120**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	UGI	**Semester of Delivery**	2
Administering Department	CIER	**College**	Type College Code
Module Leader	Abdulkhalik J Abdulridha + Zuhair Al-Jaberi + Alaa Waleed Hameed	**e-mail**	Abdulkhalik.J.AbdulRidha@nahrainuniv.edu.iq Zuhair.k.alawy@nahrainuniv.edu.iq alaa.w.ibrahim@nahrainuniv.edu.iq
Module Leader's Acad. Title	Assistant Professor + Lecturer	**Module Leader's Qualification**	Ph.D. + Ph.D.
Module Tutor	Abdulkhalik J Abdulridha + Zuhair Al-Jaberi + Alaa Waleed Hameed	**e-mail**	Abdulkhalik.J.AbdulRidha@nahrainuniv.edu.iq Zuhair.k.alawy@nahrainuniv.edu.iq alaa.w.ibrahim@nahrainuniv.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Graduation of civil engineers qualified to work in their various fields of specialization: 1. Utilize mathematical, scientific, and engineering knowledge. 2. Serve on inter-professional teams. 3. Identify, formulate, and solve engineering problems. 4. Employ the techniques, abilities, and contemporary engineering instruments required for engineering practice. 5. Communicate successfully.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To understand and apply the force of friction to rigid bodies. 2. Determine the center of gravity and center of mass. 3. Remember and apply the area's centroid. 4. Determine the magnitude and moment of inertia about a specified axis. 5. Introduction to dynamics (particle kinematics and motion of particles). 6. Determine the motion, velocity, and acceleration in a straight line. 7. Determine the Kinetics of particles, forces, masses, and accelerations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **FRICTION FORCE** Explain what dry friction is and how to examine the equilibrium of rigid bodies when they encounter it. [12 hrs.] **CENTER OF MASS AND CENTROID OF AREAS** Explain the difference between the center of mass, the centroid, and the center of gravity. In addition, it illustrates how to pinpoint a body's centroid and center of gravity when dealing with complex geometries or several constituent pieces. [12 hrs.] **MOMENT OF INERTIA** Figure out how to calculate the moment of inertia of a region. [12 hrs.] **KINEMATICS OF PARTICLES** Explain where things are, how far they moved, how fast they were going, and how fast they were going. Investigate the linear velocity of particles and depict it visually. Tracking particle movement in many coordinate systems over a curved route. [12 hrs.] **KINETICS OF PARTICLES** Explain what mass and weight are and then state Newton's second law of motion. This exercise will use the equation of motion in several coordinate systems to analyze the accelerated motion of a particle. [12 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The primary strategy for delivering this module will be to encourage student participation in the tasks, while also honing and enhancing their critical thinking skills. This will be accomplished through courses and student-oriented interactive tutorials. The primary objective of studying engineering mechanics is to develop the ability to predict the effects of force and motion while performing engineering's creative design functions.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5	LO #2 and #4
	Online Assignments	2	10% (10)	3 and 6	LO # All
	Onsite Assignments	1	10% (10)	Continuous	LO # All
	Reports	1	10% (10)	9	LO # All
Summative assessment	Midterm Exam	2 hr.	10% (10)	8	LO #4 - 6
	Final Exam	3 hr.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduce the friction forces
Week 2	concept of dry friction
Week 3	Equations of Equilibrium and Friction
Week 4	Introduce the center of gravity and center of mass
Week 5	locate of the centroid for a body of arbitrary shape
Week 6	locate of the centroid for a body of composite shape
Week 7	Definition of Moments of Inertia for Areas
Week 8	Parallel-Axis Theorem for an Area
Week 9	Radius of Gyration of an Area
Week 10	Discuss location, motion, speed, and acceleration relationships
Week 11	Visualize straight-line particle movement
Week 12	Particle migration along a curved trajectory in multiple coordinate systems
Week 13	Newton's Second Law of Motion in addition to defining mass and weight
Week 14	System of Particles' Kinematic Equation
Week 15	Equations of Motion: Rectangular Coordinates
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Engineering Mechanics Statics and Dynamic, by Higdon. Engineering Mechanics Statics and Dynamic, by Meriam.	Yes
Recommended Texts	Mechanics for Engineers-Statics and Dynamic, by Ferdinand P. Beer, E. Russell.	No
Websites		

<table>
<tr><td colspan="5" align="center">Grading Scheme
مخطط الدرجات</td></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks %</td><td>Definition</td></tr>
<tr><td rowspan="5">Success Group
(50 - 100)</td><td>A - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>B - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>C - Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>D - Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>E - Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">Fail Group (0 – 49)</td><td>FX – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>F – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
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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.