MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics/ Statics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PM 100**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		1
Administering Department		**PM**	**College**	TEMO	
Module Leader	Tariq Khalid		**e-mail**	tariqaikhalidi@ntu.edu.iq	
Module Leader's Acad. Title		Assist. Professor	**Module Leader's Qualification**		MASTER
Module Tutor	Tariq Khalid		**e-mail**	E-mail	
Peer Reviewer Name		Asma Taha	**e-mail**	asmaa.taha@ntu.edu.iq	
Scientific Committee Approval Date		June /01/2023	**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	Module Objectives for Engineering Mechanics/Statics: 1. Understand the fundamental concepts and principles of Statics, including motion, forces, and acceleration. 2. Apply kinematic equations to analyze the motion of particles and rigid bodies in various scenarios. 3. Determine the relationship between forces, mass, and acceleration using Newton's laws of motion. 4. Apply the principles of work and energy to analyze and solve dynamic problems. 5. Analyze and calculate linear and angular momentum, and apply the principle of impulse and momentum to dynamic systems. 6. Understand and apply the principles of vibrations and oscillations in mechanical systems. 7. Apply principles of balancing rotating masses and vibrations to ensure smooth operation of machinery. 8. Analyze multi-degree of freedom systems and determine their natural frequencies and mode shapes. 9. Apply dynamic principles to real-world engineering problems and systems. 10. Develop critical thinking and problem-solving skills in the context of engineering Statics. 11. Communicate effectively, both orally and in writing, to present and explain the analysis, results, and solutions of dynamic problems. By achieving these module objectives, students will gain a comprehensive understanding of the principles and applications of engineering Statics. They will be able to analyze and solve problems related to motion, forces, and vibrations in mechanical systems, and apply their knowledge to real-world engineering scenarios. They will also develop skills in critical thinking, problem-solving, and effective communication, which are valuable in the field of engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply fundamental concepts of engineering mechanics/statics to analyze and solve problems related to the equilibrium of rigid bodies. 2. Demonstrate a deep understanding of vector mathematics and its application in statics, including vector addition, subtraction, dot product, and cross product. 3. Apply the principles of static equilibrium to solve problems involving forces and moments acting on rigid bodies in two and three dimensions. 4. Analyze and calculate the internal forces, such as axial forces, shear forces, and bending moments, in statically determinate structures using methods such as the method of sections and the method of joints. 5. Utilize free-body diagrams to model and analyze the forces acting on a structure or a rigid body, and determine the resultant forces and moments at specific points. 6. Analyze and calculate the centroid and moment of inertia of various two-dimensional shapes, including rectangles, triangles, and circles, and apply these concepts to determine the stability and strength of structures.

	7. Apply the concepts of friction and its effects on the equilibrium of bodies in statics, including calculating static and kinetic friction forces and determining the angle of friction. 8. Analyze and calculate the forces in trusses and frames, including the method of joints and the method of sections, and determine the stability and structural integrity of these systems. 9. Apply the principles of equilibrium to solve real-world engineering problems, such as determining the stability of structures, calculating the forces on supports and connections, and analyzing the behavior of mechanical systems. 10. Communicate effectively, both orally and in writing, to present and explain the analysis, results, and solutions of engineering mechanics/statics problems. By achieving these module learning outcomes, students will develop a strong foundation in engineering mechanics/statics and be equipped with the necessary knowledge and skills to analyze and solve a wide range of engineering problems involving static equilibrium and structural stability.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Statics • Definition and scope of statics • Fundamental concepts and principles • Importance of statics in engineering 2. Vectors and Vector Analysis • Vector representation and operations • Vector components and coordinate systems • Vector addition, subtraction, and scalar multiplication 3. Forces and Moments • Forces and their characteristics • Resultant and equilibrium of forces • Moment of a force and its properties • Couples and their effects 4. Equilibrium of Rigid Bodies • Free body diagrams and force analysis • Equations of equilibrium in two and three dimensions • Solving equilibrium problems using scalar and vector approaches • Applications to simple systems and structures 5. Truss Structures • Introduction to truss analysis • Method of joints and method of sections • Determination of member forces and support reactions

	6. Friction • Laws of friction and frictional forces • Types of friction and their characteristics • Calculation of frictional forces and moments • Applications to inclined planes, wedges, and screws 7. Center of Gravity and Centroids • Definitions and properties of center of gravity and centroids • Determination of center of gravity and centroids of simple shapes • Composite bodies and distributed loads 8. Moments of Inertia • Moment of inertia and its physical significance • Calculating moments of inertia for simple shapes • Parallel-axis and perpendicular-axis theorems • Application of moments of inertia in engineering analysis

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	15% (15)	5,7,9 and 13	LO #2 , #3 , #5 and #8
	Assignments	5	15% (15)	2,6,8,10 and 14	LO #1 ,#4 ,#6 ,#7 and #9
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Fundamental Concepts, Units Conversion, Scalar and Vector Quantities.
Week 2-4	Resultant force Resolution & Composition of Forces. Triangle & parallelogram law
Week 5	Addition of a System of Coplanar Forces: Scalar Notation, Cartesian Vector Notation
Week 6-7	Equilibrium of a Particle
Week 8	Moment of a Force, Varignon Theorem.
Week 9	Moment of a Couple
Week 10-11	Equilibrium of a Rigid Body
Week 12	Distributed loads.
Week 13	Friction
Week 14	Centroid
Week 15	Centroid of area, First moment of area.
Week 16	Area moment of inertia, Second moment of area.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mechanics/ Statics, Fourteen Edition, R.C. Hibbeler	yes
Recommended Texts	1- Engineering Mechanics , Ferdinand L. Singer 2- Engineering Mechanics, Meriam 3- Engineering Mechanics/ Statics, Arthur P. Boresi & Richard J. Schmidt	No
Websites		

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

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.

Code	Course/Module Title	ECTS	Semester
PM 100	Engineering Mechanics/ Statics	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	3	93	107

Description

Statics, is a fundamental branch of Engineering Mechanics that deals with the analysis and prediction of the behavior of objects at rest or in equilibrium. It provides the foundation for understanding the principles of forces, moments, and their effects on structures and systems. This branch of engineering mechanics is primarily concerned with the study of particles and rigid bodies under the action of forces and moments.

One of the main objectives of Engineering Mechanics/Statics is to enable engineers to calculate and predict the behavior of structures and systems under different loading conditions. This includes understanding the concepts of force vectors, moments, and couples, as well as the methods for resolving and combining these forces to determine their resultant effects.

Through theoretical study, problem-solving, and practical applications, students of Engineering Mechanics/Statics develop critical skills in analyzing and solving engineering problems. They learn to apply mathematical principles, physics, and engineering concepts to determine the forces and moments in structures and systems, and to ensure their stability and safety.