MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Strength of Materials**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐**Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**PM 203**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	**2**		**Semester of Delivery**	4	
Administering Department	PM		**College**	TEMO	
Module Leader	Hussein Mohammed Ali		**e-mail**	alabadi.hussein@ntu.edu.iq	
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	01/06/2023		**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	1) To know different types of the stresses which may subjected to the mechanical elements and their expected effects such as strain. 2) To study the shear forces and bending moment diagrams with essential stresses
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students who successfully complete this course will have demonstrated an ability to: 1. Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials. 2. Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings. 3. Calculate the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels. 4. Determine the stresses and strains in members subjected to combined loading and apply the theories of failure for static loading. 5. Determine and illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member. 6. Determine the deflections and rotations produced by the three fundamental types of loads: axial, torsional, and flexural. 7. Analyze slender, long columns subjected to axial loads. 8. Design simple bars, beams, and circular shafts for allowable stresses and loads.
Indicative Contents المحتويات الإرشادية	1. Introduction to Strength of Materials A. Definition and Importance of Strength of Materials B. Historical Background C. Applications of Strength of Materials 2. Stress and Strain A. Basic Definitions B. Types of Stresses C. Types of Strains D. Hooke's Law 3. Axial Loading A. Normal Stress and Strain B. Deformation of Axially Loaded Members C. Stress-Strain Diagrams D. Elastic and Plastic Deformation E. Factor of Safety 4. Torsion A. Torque and Torsional Shear Stress B. Polar Moment of Inertia C. Torsional Deformation D. Power Transmission in Shafts 5. Bending

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	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	(108/15)= 7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	(92/15)= 6
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**	5	10% (10)	3,6,11,13 and 15	LO #1, #3, #5, #6and #7
	Assignments	3	10% (10)	4,7 and 14	LO #2, #4 and #8
	Projects / Lab.	10	20% (20)	Continuous	All
	Report				
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Simple stress
Week 2	Shearing stress, Bearing stress
Week 3	Thin wall cylinders
Week 4	Simple strain, stress-strain diagram, Hook's law
Week 5	Thermal stress
Week 6	Welded connection
Week 7	Riveted joints
Week 8	Torsion
Week 9	Spring
Week 10	Shear and moment in Beam
Week 11	Beam deflection
Week 12	Deflection cantilever Beam
Week 13	Deflection of simply supported Beam
Week 14	Combined stresses
Week 15	Stress at a point /Mohr circle
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:Introduction to Strength of materials
Week 2	Lab 2: Brinell Hardness Test
Week 3	Lab 3: Rockwell Hardness Test
Week 4	Lab 4: Vickers Hardness Test
Week 5	Lab 5: Tensile Test
Week 6	Lab 6: Compression Test
Week 7	Lab 7: Torsion Test
Week 8	Lab 8: Creep Test
Week 9	Lab 9: Spring Stiffness
Week 10	Lab 10: Deflection in Cantilever Beam Test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Strength of Materials, Ferdinand L. Singer and Andrew Pytel.	Yes
Recommended Texts	Schaum's Outline of Strength of Materials	No
Websites	https://www.coursera.org/learn/mechanics-1	

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.

Module 1

Code	Course/Module Title	ECTS	Semester
PM 203	Strength of Materials	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	108	92
Description			
The field of strength of materials, also known as mechanics of materials, focuses on analyzing the stresses and strains experienced by structural components like beams, columns, and shafts. Engineers use different techniques to determine how these structures will respond to loads and potential failure modes. This analysis takes into consideration material properties, including yield strength, ultimate strength, Young's modulus, and Poisson's ratio. By understanding these properties, engineers can predict the behavior of a structure and design it to withstand the expected forces and stresses. Strength of materials is essential in ensuring the structural integrity and safety of engineering projects.			