	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiya College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Strength of Materials	**Module Delivery**	
Module Type	CORE	**Theory** **Lab** **Tutorial**	
Module Code	AIE242		
ECTS Credits	6		
SWL (hr/sem)	150		

Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Ghanim Kadhim Abdulsada	**e-mail**	Ghanim.sada@uowa.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	26/9/2025	**Version Number**	2025

Relation With Other Modules

Prerequisite module	**	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To assist students to understand the fundamental principles of all kind of Stresses. 2. To develop problem solving skills and understanding of principles of Tensile test through the description of material behavior during the test. 3. To develop problem solving skills and understanding of thermal stresses through the application of techniques. 4. To understand how analysis of torsional shear stress and shear strain. 5. To comprehend how clarification of beam, and loading types. Draw the Shear force and Bending Moment diagrams in beams. 6. Analyze the stresses on beam: bending stress, transverse shear stress, combine stress with drawing Mohr's circle. 7. To develop problem solving skills and understanding of Beam Deflection. 8. Study the stress induced in relatively long Columns (Euler's Column Equation).
Module Learning Outcomes	1. Enable the student to learn and understand the simple stress and simple strain 2. The student should understand and be able to apply Hook's Laws. 3. Enable the student to learn and solve the Statically Indeterminate Problems: 4. The student should Know the thermal stress and thermal deformation connecting with simple stress. 5. The student should Know the analysis of Circular shaft which is suffered from torsional shear stress. 6. The student should Know how can find the Stresses and deformations in pressure vessels. 7. The student should Know the beams and loading types on them. Draw the Shear force and Bending Moment diagrams in beams. 8. The student should study the Study the stress induced in beams due to lateral loads and shear stress due to bending induced in beams. 9. The student should understand and be able to apply Equation of elastic curve using double integration method and using Macaulay's Method. 10. Enable the student to learn and understand Stresses at a Point and Complex Stresses and Graphical representation of stress at a point using Mohr's circle 11. Enable the student to learn and understand stress induced in

	relatively long Columns (Euler's Column Equation).
Indicative Contents	Indicative content includes the following. Part A - Introduction to Simple Stresses, Strains: Study of simple stresses and strains. To know where the Hooke's law apply. And solved Statically Indeterminate Problems: [9 hrs]. Thermal Strain and Stress: Study the strain and stress induced due to temperature changes. Solve statically indeterminate problems due to temperature changes [5 hrs]. Part B - Torsion of Circular Shaft: Study the pure torsion for solid and hollow circular shafts. Study the stress induced due to torsion. Study the angular deformation induced due to torsion. [10 hrs]. Part C- Pressure Vessels: Stresses and deformations in pressure vessels. [5 hrs]. Part D- Beams: Introduction to beams and loading types. Draw the Shear force and Bending Moment diagrams in beams. [9 hrs]. Bending Stresses in Beams: Study the stress induced in beams due to lateral loads. Calculating the second moment of area. [5 hrs]. Shear Stress due to Bending in Beams: Study the shear stress due to bending induced in beams. [5 hrs]. Deflection in Beams: Equation of elastic curve using double integration method. Finding the elastic curve for complex loading using Macaulay's Method. [9 hrs]. Stresses at a Point and Complex Stresses: Study the stresses at a point. Basic principles for calculating the combined stresses at a point. [5 hrs]. Mohr's Circle: Graphical representation of stress at a point using Mohr's circle. Systematic procedure of graphical representation of stresses at a point using Mohr's circle. [5 hrs]. Part E - Buckling of Columns:

	Study the stress induced in relatively long Columns (Euler's Column Equation). Buckling for medium columns using Rankine method. [5 hrs].

Learning and Teaching Strategies

Strategies	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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	72	**Unstructured SWL (h/w)**	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	20% (20)	3,6 ,9,11	All
	Assignments	2	10% (10)	5, 8	All
	Projects / Lab.	Lab. 4	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**Stresses, Strains, Hooke's Law:** Study of simple stresses and strains, to know where the Hooke's law apply
Week 2	**Statically Indeterminate Problems:**

	Basic principles for solving statically indeterminate Problems.
Week 3	**Thermal Strain and Stress:** Study the strain and stress induced due to temperature changes. Solve statically indeterminate problems due to temperature changes
Week 4	**Torsion of Circular Shaft:** Study the angular deformation induced due to torsion.
Week 5	**Torsion of Circular Shaft:** Study the angular deformation induced due to torsion.
Week 6	**Pressure Vessels:** Stresses and deformations in pressure vessels.
Week 7	**Beams: S.F. and B.M. Diagrams:** Introduction to beams and loading types.
Week 8	**Beams: S.F. and B.M. Diagrams:** Draw the Shear force and Bending Moment diagrams in beams.
Week 9	**Bending Stresses in Beams:** Study the stress induced in beams due to lateral loads. Calculating the second moment of area.
Week 10	**Shear Stress due to Bending in Beams:** Study the shear stress due to bending induced in beams.
Week 11	**Deflection in Beams:** Equation of elastic curve using double integration method.
Week 12	**Deflection in Beams:** Finding the elastic curve for complex loading using Macaulay's Method.
Week 13	**Stresses at a Point and Complex Stresses:** Study the stresses at a point. Basic principles for calculating the combined stresses at a point.
Week 14	**Mohr's Circle:** Graphical representation of stress at a point using Mohr's circle. Systematic procedure of graphical representation of stresses at a point using Mohr's circle.
Week 15	**Buckling of Columns:** Study the stress induced in relatively long Columns (Euler's Column Equation). Buckling for medium columns using Rankine method.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Exp. 1: Tensile test
Week 2	Exp. 2: Torsion test

Week 3	Exp. 3: Thick pressure vessel
Week 4	Exp. 4: Bending test
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Hibbeler R.C., "*Mechanics of Materials*", Prentice Hall, Eighth Edition, 2011.	Yes
Recommended Texts	Hearn E.J., "*Mechanics of Materials*", Butterworth, Third Edition, 1997.	Yes
Websites		

APPENDIX:

GRADING SCHEME				
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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.

UNIVERSITY OF WARITH AL-ANBIYAA
COLLEGE OF ENGINEERING
وارث الانبياء
جامعة
2017 أسست
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