

(Solid Mechanics) Course Catalogue 2023-2024

College	Erbil Technology College	
Department	Construction and Materials Technology Engineering	
Module Name	Solid Mechanics	
Module Code	SOM235	
Semester	3	
Credit	5	
Module type	Theoretical & Tutorial	
Weekly hours	6	
Weekly hours (Theory)	(3)hr Class	(135) hr Workload
Weekly hours (Practical)	()hr Class	() hr Workload
Lecturer (Theory)	Yassin Ali Ibrahim	
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Course Book

<p>▪ Course overview:</p> <p>This basic course in Solid Mechanics aims to provide an introduction to analysis of stress and strain in solid materials under elastic deformation. Focus is on investigating a number of fundamental structural elements such as bars, shafts and beams under different loading conditions. Within the analysis, both one-dimensional and three-dimensional methods are employed. While plastic deformation is not being covered, realistic dimensioning problems in order to avoid it is included.</p>										
<p>▪ Course objective:</p> <p>On completion of this unit, students should be able to:</p> <ol style="list-style-type: none"> 1. Apply appropriate methods to calculate internal stresses and strains in basic structures 2. Demonstrate a basic understanding of the bending behaviour of compression and tensions members 3. Demonstrate the ability to analyse a beam structure and understand its internal behaviour under bending. 										
<p>Student's obligation</p> <ul style="list-style-type: none"> ▪ Students should be informed that the method of teaching the material is evaluated daily. ▪ After each lecture and tutorial work, homework must be prepared. ▪ At the end of each theoretical lecture, a tutorial should be followed. ▪ There will be an essay and an assignment during the semester. 										
<p>▪ Forms of teaching</p> <p>During the academic year, Data Show is used for full detailing, besides that a white board is used to solve the examples, and a software copy of the lecture will be handed, finally, a home work for the coming week will be announced.</p>										
<p>▪ Assessment scheme</p>										
ECTS Workload Calculation Form										
Activity	S	Description	Activity Type	No.	T.F. Range		Specific T. F.	Time Factor	Workload	
					Min	Max				
Course		In class	f	10				2	20	
	1	Theory	Online	f	2			2	4	
	2	Preparation (1-2) * Theory Hr.		h	12	2	4	4	4	48
	3	Practical		f	12					
	4	Preparation (1-1.5) * Practical Hr.		h	12					
	5	Tutorial		f	12	1	1		1	12
	6	Preparation (0.5-1.5) * Tutorial Hr.		h	12	0.5	1.5	0.5	6	
Site Visits and Lab Experiments	7	Scientific/Field Trips		f						
	8	Practical/Lab Reports		h						
Assignment	9	Homework		h	3	1	4	3.34	3.34	10.02
	10	Report		h	2	1	4	4	4	8
	11	Seminar		h						
	12	Paper		h						
	13	Essay		h	1	1	6	5	5	5

	14	Project/Poster		h						
Assessment	15	Quiz		h	5	1	2	2	2	10
	16	Mid Term	Theory	f	1				<u>1</u>	1
	17		Preparation (1.5-3) * Theory Hr.	h	1	3	6		<u>3</u>	3
	18		Practical	f	1					
	19		Preparation (1-2) * Practical Hr.	h	1					
	20	Final	Theory	f	1				<u>2</u>	2
	21		Preparation (3-5) * Theory Hr.	h	1	6	10		<u>6</u>	6
	22		Practical	f	1					
	23		Preparation (2-4) * Practical Hr.	h	1					
Face to face hours (f)/12 week		4.4		Face to face hours (f)					39	
Home hours (h)/16 week		6.8		Home hours (h)					96.02	
Total hours/16 week		10.1		Total hours					135.02	
ECTS (Total hours 135.02 / 27) \approx 5								Accept		5

▪ **Specific learning outcome:**

- Explain the one-dimensional as well as three-dimensional concepts of stress and strain to quantify the internal forces and deformation,
- Explain and apply one-dimensional as well as three-dimensional material models including elasticity.
- Interpret and draw symbolic representations of different one-dimensional structures under mechanical loading,
- Determine internal forces and deformations in bars and beams
- Calculate relevant criteria in realistic dimensioning problems to avoid failure by plastic deformation and elastic instability.

- **Course Reading List and References:**

- Key references:
- Useful references: Solid Mechanics
- Magazines and review (internet): Engineering Magazines

▪ **Course topics (Theory)**

	Week	Learning Outcome
1. Members Subjected to Flexural Loads	1	
2. Shear Force and Bending Moment in Beams	2	
3. Bending Moment	3	
4. Shear Force	4	
5. Drawing Shear Force	5	

6. Drawing Bending Moment	6	
7. Beams	7	
8. Introduction: Definition of stress, stress tensor, normal and shear stresses in axially loaded members.	8	
9. Numerical problems on stress, shear stress in axially loaded members.	9	
10. Stress & Strain :- Stress-strain relationship, Hooke's law, Poisson's ratio, shear stress,	10	
11. Numerical problems on Stress-strain Hooke's law, Poisson's ratio, shear stress	11	
12. Introduction to Tensors	12	
Practical Topics (If there is any)	Week	Learning Outcome
Not Applicable		
19. Examinations:		
-Mid Term Exam	7	
-Final Exam	14	
<ul style="list-style-type: none"> ▪ Extra notes: None		
<ul style="list-style-type: none"> ▪ External Evaluator 		