(Solid Mechanics) Course Catalogue

2022-2023

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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Lecturer (Practical)	**Yassin Ali Ibrahim**	
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Course Book

- **Course overview:**

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.

- **Course objective:**

On completion of this unit, students should be able to:
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.

Student's obligation

- 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.

- **Forms of teaching**

During the academic year, Data Show is used for full detailing, besides that a white board is used to solute the examples, and a software copy of the lecture will be handed, finally, a home work for the coming week will be announced.

- **Assessment scheme**

ECTS Workload Calculation Form										
Activity	S	Description		Activity Type	No.	T.F. Range		Specefic T. F.	Time Factor	Workload
						Min	Max			
Course		Theory	In class	f	10				2	20
	1		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
	7	Scientific/Field Trips		f						

Site Visists and Lab Experiments	8	Practical/Lab Reports		h						
Assignment	9	Homework		h	3	1	4	2	2	6
	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		1	5
	16	Mid Term	Theory	f	1				1	1
	17		Preparation (1.5-3) * Theory Hr.	h	1	3	6		3	3
	18		Practical	f	1					
	19		Preparation (1-2) * Practical Hr.	h	1					
	20	Final	Theory	f	1				2	2
	21		Preparation (3-5) * Theory Hr.	h	1	6	10		6	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)	87
Total hours/16 week	10.1	Total hours	126
ECTS (Total hours 126 / 27) ≈ 5		Accept	**4.67**

- **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**
Not applicable		
Practical Topics (If there is any)	**Week**	**Learning Outcome**
1. Introduction: Definition of stress, stress tensor, normal and shear stresses in axially loaded members. 2. Numerical problems on stress, shear stress in axially loaded members. 3. Stress & Strain :- Stress-strain relationship, Hooke's law, Poisson's ratio, shear stress, 4. Numerical problems on Stress-strain Hooke's law, Poisson's ratio, shear stress 5. Introduction to Tensors 6. Members Subjected to Flexural Loads 7. Shear Force and Bending Moment in Beams 8. Bending Moment 9. Shear Force 10. Drawing Shear Force 11. Drawing Bending Moment 12. Beams	1 2 3 4 5 6 7 8 9 10 11 12	
19. **Examinations**: This Subject does not have exam, marks are set weekly based on continuous assignment, home work, report and project.		
▪ **Extra notes:** None		
▪ **External Evaluator**		
