

## Faculty of Engineering & Technology

### Stress Analysis

#### Information :

**Course Code :** MAN 232      **Level :** Undergraduate      **Course Hours :** 3.00- Hours

**Department :** Department of Mechanical Engineering

#### Instructor Information :

Title	Name	Office hours
Professor	Mohamed Tarek Ibrahim Mohamed Ali Elwakad	2
Lecturer	Arafa Soliman Sobh Khalil Arafa	1
Teaching Assistant	Eman Mohamed Hammad Ahmed	
Teaching Assistant	Ahmed Ibrahim Sadek Mostafa Elgindy	

#### Area Of Study :

Equilibrium, Continuity, Material mechanical behavior, Normal force, Shearing force, Bending and twisting moment diagrams, Stresses in simply loaded elastic bars: axial loading, bending and torsion, deformation, stiffness, strain Energy, Stresses in elastic and elasto-plastic bars, Residual stresses. Combined loading, Eccentric normal load, Oblique bending: combined bending and torsion, Two-dimensional stresses, Principal stresses, Maximum shear stress, Allowable stresses, Mohr's circle representation, Application to some simple frames, Thin-vessels, Springs, Load and displacement measurement.

#### Course outcomes :

##### a. Knowledge and Understanding: :

1 -	~A detailed understanding of the concept of stress.
2 -	~A thorough understanding of stress and strain
3 -	~A detailed understanding of torsion on circular shafts.
4 -	~A detailed understanding of bending and design of beams for bending.
5 -	~A the ability to determine the shearing stresses in a beam and thin-walled members.

##### b. Intellectual Skills: :

1 -	Define the mechanical power engineering problems and evaluate designs, processes, and performance and propose improvements.
2 -	Derive different solution alternatives for the engineering problems, analyze, interpret data and design experiments to obtain new data, and evaluate the power losses in the fluid transmission lines and networks
3 -	Analyze the performance of the basic types of internal combustion engines, hydraulic machines, fluid power systems, subsystems and various control valves and actuators. Analyze the solution alternatives and choose the optimum one.
4 -	Creative thinking.

##### c. Professional and Practical Skills: :

1 -	1. Analyze of different loading conditions and the resulting stresses.
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2 -	2. Determine deformations as a result of different loading conditions.
3 -	3. Draw shear and bending moment diagrams.
4 -	4. Determine shearing stresses in beams and thin-walled members

**d.General and Transferable Skills: :**

1 -	Collaborate effectively within multidisciplinary team.
2 -	Share ideas, communicate effectively and work in stressful environment and within constraints.
3 -	Lead and motivate individuals and work with others according to the rules of the professional Ethics.
4 -	Use digital libraries and/or Learning systems and demonstrate efficient IT capabilities.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Concept of Stress	8	4	4
Stress and Strain-Axial loading	8	4	4
Torsion	8	4	4
Pure Bending	12	6	6
Analysis and Design of Beams for bending	12	6	6
Shearing Stresses in beams and thin-walled members	8	4	4

**Teaching And Learning Methodologies :**

Lectures
Tutorials
Presentation & Discussion
Brain storming

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00		
Attendance and Participation	10.00		
Final Exam	40.00		
Mid-term Exams	30.00		
Quizzes	10.00		