

## Faculty of Engineering & Technology

### Stress Analysis

**Information :**

**Course Code :** MAN 232

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Petroleum Engineering

**Instructor Information :**

Title	Name	Office hours
Professor	Mohamed Tarek Ibrahim Mohamed Ali Elwakad	2
Teaching Assistant	Ahmed Ibrahim Sadek Mostafa Elgindy	1

**Area Of Study :**

- 1- To Understand and analyze the various loads and stresses acting on the mechanical structures.
- 2- To know the strains, deformations, slopes and deflections of the mechanical structure
- 3- To analyze the internal forces for statically indeterminate beams.

**Description :**

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 -	Understand the various loads and stresses acting on the mechanical structures.
2 -	Understand the internal forces for statically indeterminate beams
3 -	Understand the strains, deformations, slopes and deflections of the mechanical structures.

**b. Intellectual Skills: :**

1 -	Analyze the various loads and stresses acting on the mechanical structures
2 -	Analyze the internal forces for statically indeterminate beams.
3 -	Determine the strains, deformations, slopes and deflections of the mechanical structures.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Properties of areas			
Elastic behavior of simple elements under axial loading			

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Elastic behavior of simple elements under bending loading			
Elastic behavior of simple elements under twisting loading			
Combined stresses and Mohr's circle			
Principal stresses			
Beam deflection			
Statically indeterminate beams			

**Teaching And Learning Methodologies :**

Interactive Lecturing

Discussion

Problem Solving

**Course Notes :**

Handout lecture Notes (Prof. Hesham Sonbol)

**Recommended books :**

- 1- Beer, F.B. & Johnston, E.R. "Mechanics of Materials" , McGraw-Hill Book Company, 2008.
- 2- Popov, E.P., "Mechanics of Materials" , Prentice Hall Int., London, 2007.
- 3- Dobrovolsky, Machine elements, MIR Publisher Co. 2007.