

**Faculty of Engineering & Technology**

**Structural Mechanics**

**Information :**

**Course Code :** MAN 331

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Amr Mohamed Metwally Ismaiel	6
Teaching Assistant	Amira Khaled Hasan Mohamed Elkodama	2

**Area Of Study :**

- Upon the completion of the course, students should be able to:
1. Draw and apply mohr circle to the three dimensional analysis of stress.
  2. Design of transmission shafts.
  3. Analyze stresses under combined loading
  4. Apply of superposition to statically indeterminate beams.
  5. Design columns under a centric or an Eccentric load.
  6. Design for Impact loads.

**Description :**

Displacement and deflections, Statically indeterminate structures, Energy methods applied to bar problems, Buckling of columns, Curved beams, Analysis of bars of thin walled sections in shear, Transverse shear, torsion, shear center, Analysis of axi-symmetric shells: thin walled cylinders, spheres, cones, discontinuity stresses, Introduction to structural analysis by matrix methods, Stresses in elastic structures with applications.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	~A detailed understanding of transformation of stress and strain.
2 -	~A the ability to design transmission shafts.
3 -	~A the ability to analyze statically indeterminate Beams.
4 -	~A detailed understanding of design of columns
5 -	~A detailed understanding of energy methods.

**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.
<b>c. Professional and Practical Skills :</b>	
1 -	Use laboratory, workshop e4quipment and field devices competently and safely.
2 -	Analyze the record data in the laboratory.
3 -	Prepare engineering drawings, computer graphics, and write specialized technical reports.
4 -	Write computer programs pertaining to mechanical power and energy engineering to describe the basic thermal and fluid processes mathematically, and use the computer software for their simulation and analysis.
<b>d. General and Transferable Skills :</b>	
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.

<b>Course Topic And Contents :</b>			
Topic	No. of hours	Lecture	Tutorial / Practical
Transformations of stress and strain	12	6	6
Principal stresses under a given loading	8	4	4
Deflection of beams	12	6	6
Columns	12	6	6
Energy methods	12	6	6

<b>Teaching And Learning Methodologies :</b>
Lectures
Tutorials
Presentation & Discussion
Brain storming
Lab activities (In the laboratory collective subject)

<b>Course Assessment :</b>			
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		

