

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 :

Review and apply the principles of static equilibrium to the analysis of structures such as pressure vessels, beams, and torsion members.

Evaluate stress and strain within various structures by applying the appropriate engineering theories.

Formulate solutions to problems requiring the application of suitable engineering theories for stress and strain.

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: :

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| 1 - | Know the characteristics of engineering materials related to discipline |
| 2 - | Know the principles of design including elements design, process and/or a system related to specific disciplines. |
| 3 - | Apply the basic theories and principles of some other engineering and mechanical engineering |
| 4 - | Understand principles of design including elements stress analysis |

b. Intellectual Skills: :

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| 1 - | Think in a creative and innovative way in stress and strain problem solving and design |
| 2 - | Analyze and interpret data, and design experiments to obtain primary data |
| 3 - | Interpret numerical data and apply analytical methods for engineering design purposes |

c. Professional and Practical Skills: :

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| 1 - | Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems. |
| 2 - | Create and/or re-design a process, component or system, and carry out specialized engineering designs. |

d.General and Transferable Skills: :

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| 1 - | Use digital libraries and/or Learning systems. |
| 2 - | Introduce ideas and solutions for many practical and engineering problems efficiently in predetermined time plan. |

Course Topic And Contents :

| Topic | No. of hours | Lecture | Tutorial / Practical |
|---|--------------|---------|----------------------|
| thin walled cylinders | 12 | 6 | 6 |
| Buckling of columns | 10 | 6 | 4 |
| Displacement and deflections | 4 | 2 | 2 |
| Transverse shear, torsion, shear center | 8 | 4 | 4 |
| Displacement and deflections | 8 | 4 | 4 |
| Stresses in elastic structures with applications. | 4 | 2 | 2 |
| Statically indeterminate structures | 4 | 2 | 2 |
| Project follow -up. | 4 | 2 | 2 |
| Midterm Exams ,Quizzes | 6 | 2 | 4 |

Teaching And Learning Methodologies :

Interactive Lecturing
 Problem solving
 Discussion
 Project

Course Assessment :

| Methods of assessment | Relative weight % | Week No | Assess What |
|---------------------------------------|-------------------|---------|--|
| Assignments, Participation, & Quizzes | 20.00 | | Reports follow up during tut. /lab work, & written exam. |
| Final Exam | 40.00 | 16 | Written Exam |
| Mid-term Exams | 30.00 | 6 | Written Exam |
| Project. | 10.00 | 12 | Practical |

Course Notes :

Lecture notes on the course moodle page, FUE website.