

Faculty of Engineering & Technology

Properties of Materials

Information :

Course Code : MAN 231

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

| Title | Name | Office hours |
|--------------------|-------------------------------------|--------------|
| Lecturer | SAMAH ELSAYED ELMETWALLY ELKHATIB | 7 |
| Teaching Assistant | Ahmed Ibrahim Sadek Mostafa Elgindy | |

Description :

Introduction to materials, Crystal structure of solids, Construction and use of phase diagrams in materials systems, Relationship of crystal structure to properties of metallic materials and their applications, Heat treatment of steels, Types of polymers: ceramics, glasses, and semi conducting materials and their applications, Internal reactions, load-stress relations and transformation of stresses for generally loaded rods, Generalized concepts of stress, strain and material relations, Energy methods, Elastic-plastic behavior of beams, Analysis of thin walled beams, Membrane theory of axisymmetric shells, Stress concentrations.

Course outcomes :

a. Knowledge and Understanding: :

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| 1 - | Identify basic applied and engineering science. |
| 2 - | Identify principles in the design of mechanical components, different materials, and manufacturing technologies in the field of mechanical power engineering and some other engineering disciplines. |
| 3 - | Identify principles in the design of fluid flow, thermodynamics, gas dynamics, turbo-machinery, heat transfer engineering and fundamentals of thermal and fluid processes |
| 4 - | Develop conceptual and detailed design of construction projects and fluid power systems.. |

b. Intellectual Skills: :

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| 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. |

c. Professional and Practical Skills: :

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| 1 - | Use laboratory, workshop equipment 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. |

d.General and Transferable Skills: :

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| 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. |

Teaching And Learning Methodologies :

Lectures

Tutorial

Class discussions and activities

Homework and self-study

Course Assessment :

| Methods of assessment | Relative weight % | Week No | Assess What |
|-----------------------|-------------------|---------|-------------|
| 1st Midterm | 25.00 | 6 | |
| 2nd Midterm | 25.00 | 11 | |
| Assignments | 10.00 | 15 | |
| Final Exam | 40.00 | 16 | |