

Faculty of Engineering & Technology

Mechanical Design (1)

Information :

Course Code : MAN 341

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Hassan Mohamed Shams Eldin Elsayed Eleashy	8
Lecturer	Hassan Mohamed Shams Eldin Elsayed Eleashy	8
Assistant Lecturer	Zakaria Mostafa Abdo Salim Marouf	4
Assistant Lecturer	Zakaria Mostafa Abdo Salim Marouf	4

Area Of Study :

- Know and understand design procedures
- Know and understand the factors affecting design details
- Know and understand the selection of materials, modes of loading, safety factors and allowable stresses
- Design of permanent joints: (welding, interference fitting, riveting, adhesion)
- Design of detachable joints: (threaded joints, keys and splines)
- Design of some machine elements: springs, power screws, thin pipes and pressure vessels
- Design seals of hydraulic and pneumatic cylinders

The student shall attain the above mentioned objectives efficiently under controlled guidance and supervision while gaining the experience through application and analysis of realistic system data.

Description :

Design procedures, Factors affecting design details, Selection of materials, Modes of loading, Safety factors and allowable stresses, Design of permanent joints: (welding, interference fitting, riveting, adhesion), Design of detachable joints: (threaded joints, keys and splines), Design of some machine elements: springs, power screws, Thin pipes and pressure vessels, Seals Design of hydraulic and pneumatic cylinders, Application of CAD.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Identify basic applied and engineering science.
2 -	Identify principles in the of 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 field of 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: :

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 -	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.
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.

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
Design procedures	5	2	3
Factors affecting design details	10	4	6
Selection of materials, Modes of loading, Safety factors and allowable stresses	10	4	6
Design of permanent joints: (welding, interference fitting, riveting, adhesion)	10	4	6
Design of some machine elements: springs, power screws	10	4	6
Design of thin pipes and pressure vessels	10	4	6
Seals Design of hydraulic and pneumatic cylinders	10	4	6
Application of CAD.	10	4	6

Teaching And Learning Methodologies :

Lectures
Tutorials
Presentation & Discussion
Brain storming
Lab activities (In the laboratory collective subject)

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
1 st -Mid-term examination	25.00		
2 nd -Mid-term examination	25.00		
Final examination	40.00		
Quizzes	10.00		