

**Faculty of Engineering & Technology**

**Mechanical Design (2)**

**Information :**

**Course Code :** MAN 441

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mohamed Fathy Abdel Rahman Badran	22
Lecturer	Mohamed Fathy Abdel Rahman Badran	22
Teaching Assistant	Raouf Mahmoud Mourad Naguib	
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**Area Of Study :**

Know and understand the design concepts

Know and understand the constructional details as affected by manufacturing, assembly, and strength considerations

Know and understand the design for steady and cyclic loading, and for rigidity and stability

Design of Bolts, Rivets and Welds

Design of shafts, springs and couplings

Use of interactive computer programs for problem solving is illustrated and encouraged

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 :**

Introduction to design concepts, Constructional details as affected by manufacturing, assembly, and strength considerations, Engineering materials, Design for steady and cyclic loading, and for rigidity and stability, Rigid and elastic connections, Bolts, rivets and welds, Design of shafts, springs and couplings, Use of interactive computer programs for problem solving is illustrated and encouraged, Design projects.

**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.
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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
Introduction to design concepts	5	2	3
Constructional details as affected by manufacturing, assembly, and strength considerations	10	4	6
Engineering materials,	10	4	6
Design for steady and cyclic loading, and for rigidity and stability	10	4	6
Rigid and elastic connections, Bolts, Rivets and Welds	15	6	9
Design of shafts, springs and couplings	15	6	9
Use of interactive computer programs for problem solving is illustrated and encouraged	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		

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2 nd -Mid-term examination	25.00		
Final examination	40.00		
Quizzes	10.00		