

Faculty of Engineering & Technology

Mechanical Mechanisms

Information :

Course Code : MAN 311

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Associate Professor	Hassan Mohamed Shams Eldin Elsayed Eleashy	8
Teaching Assistant	Eman Mohamed Hammad Ahmed	

Area Of Study :

- Prepare student to analyze position, displacement, velocity and acceleration for planar mechanisms.
- Develop students knowledge about different types of standard cams and equivalent mechanisms.
- Train student to perform force analysis of planar mechanisms, gear trains and applications to engine balancing machines.

Description :

Kinematics Fundamentals: geometry of motion and mechanism topology, Linkage mechanisms and planar robots: position, displacement, velocity, and acceleration (Graphical, Analytical and Computers Assisted Methods), Cam-follower mechanisms: design and analysis (Graphical, Analytical and Computers Assisted Methods), Standard cams and equivalent mechanisms, Kinematics of gear trains: gears terminology, simple, compound, and planetary gear trains, Dynamics fundamentals: force analysis of mechanisms, Applications to engine balancing machines, Applications and use of Computers for Mechanism Simulation and Animation.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Define various parts involved in kinematics of machines for different applications.
2 -	Identify requirements and the design aspects of basic machine elements.
3 -	Describe different types of cams and followers.
4 -	Estimates different methods to identify velocity, acceleration and force analysis of planar mechanisms.
5 -	Define the fundamentals of the theory of kinematics and dynamics of machines

b. Intellectual Skills: :

1 -	Analyze various cam motion profiles and follower mechanism, their classification and design based on the prescribed follower motion.
2 -	Construct different types of gear trains mechanisms.
3 -	Evaluate the planar mechanisms to overcome the existing forces.

c. Professional and Practical Skills: :

1 -	Prepare a schematic drawing of a real-world mechanism.
2 -	Practice graphical methods to study the motion of a planar mechanism.

3 -	Use computer software to study the motion of a mechanism.
4 -	Demonstrate the common mechanisms used in machines and everyday life.
5 -	Apply graphical and analytical techniques for analysis of different mechanism types.

d.General and Transferable Skills :

1 -	Demonstrate efficient IT capabilities.
2 -	Efficiently manage tasks, time and resources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to kinematics Fundamentals, Geometry of motion and mechanism topology, Linkage mechanisms and planar. robots	8	4	4
Velocity and acceleration analysis of any point on linkage for a plane motion.	12	6	6
Cam-follower mechanisms: design and analysis (Graphical, Analytical and Computers Assisted Methods).	10	6	4
Analysis of some standard cams and equivalent mechanisms.	10	4	6
Kinematics of gear trains: gears terminology, simple, compound, and planetary gear trains	8	4	4
Dynamics fundamentals: force analysis of mechanisms	4	2	2
Balancing of rotating masses.	4	2	2
Project follow -up.	4	2	2

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Discussion
Project

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00		
Final Exam	40.00		
Mid- Exam 1I	15.00		
Mid- Exam I	15.00		
Participation	5.00		
Project	10.00		
Quizzes	10.00		

Course Notes :

2. Lecture notes on the E-Learning Program (MOODLE), FUE Academic Advisor System.

Recommended books :

Charles E. Wilson and J. Peter Sadler, Kinematics and Dynamics of Machinery, SI Third Edition, Prentice Hall, ISBN: 0131866419, (2003)