

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 :

- Analyze position, displacement, velocity and acceleration for planar mechanisms.
- Define and design different types of standard cams and equivalent mechanisms.
- Explain the kinematics of gear train and force analysis of planar mechanisms 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 -	Understand various parts involved in kinematics of machines for different applications.
2 -	Identify requirements and the design aspects of basic machine elements.
3 -	Develop an ability to design a system, component, or process to meet desired needs within realistic constraints.
4 -	Develop an ability to identify, formulate, and solve engineering problems.
5 -	Understand the fundamentals of the theory of kinematics and dynamics of machines

b. Intellectual Skills: :

1 -	Understand various cam motion profiles and follower mechanism, their classification and design based on the prescribed follower motion.
2 -	Understand importance gear trains and their practical applications.
3 -	Analyze the available inputs to attain the required outputs.

c. Professional and Practical Skills: :

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

3 -	Use computer software to study the motion of a mechanism.
4 -	Utilize 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 -	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
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.	4	2	2
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
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
1 st -Mid-term examination	15.00	6	Written Exam
2 nd -Mid-term examination	15.00	11	Written Exam
Assignments, Participation, & Quizzes	20.00	16	Reports follow up during tut. /lab work, & written exam.
Final examination	40.00		Written Exam
Project.	10.00	12	Practical

Course Notes :

Lecture notes on the course moodle page, FUE website

Recommended books :

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