INNOVATIVE EXPERIENTIAL LEARNING IN KINEMATICS OF MACHINERY

(*A SHOWCASE OF STUDENT CREATIVITY AND APPLICATION)*

INTRODUCTION

The Department of Mechanical Engineering adopts an innovative and application-driven pedagogy to bridge the gap between theory and practical implementation. As part of the course 23ME36C – Kinematics of Machinery for Third Semester B.E. Mechanical Engineering, the experiential component was executed through student-designed working models based on real-world engineering applications.

This initiative aimed to reinforce classroom learning by encouraging students to design, analyze, fabricate, and validate mechanisms using kinematic principles. Working in teams, students transformed theoretical concepts—such as cams, gear trains, linkages, and motion transmission mechanisms—into functional prototypes.

The activity nurtured creativity, problem-solving, communication, and teamwork while ensuring strong alignment with the Outcome-Based Education (OBE) framework. The successful completion of these projects evidences the attainment of experiential Course Outcomes (CO6–CO9), demonstrating both technical proficiency and practical engineering competence among the students.

COURSE OUTCOMES

Upon the successful completion of the course, the student will be able to

Theory Component

CO1: Discuss the fundamental concepts of the simple mechanisms.

CO2: Determine velocity and acceleration of any point on a link in simple mechanisms.

CO3: Draw the cam profile for different types of follower and motion requirements.

CO4: Apply gear and gear train fundamentals to select suitable components for specific applications.

CO5: Apply friction concepts to design clutches and brakes.

Experiential Component

CO6: Design a mechanism for a specific engineering application.

CO7: Analyse and Validate the mechanisms through kinematic principles.

CO8: Implement theoretical designs into tangible prototypes.

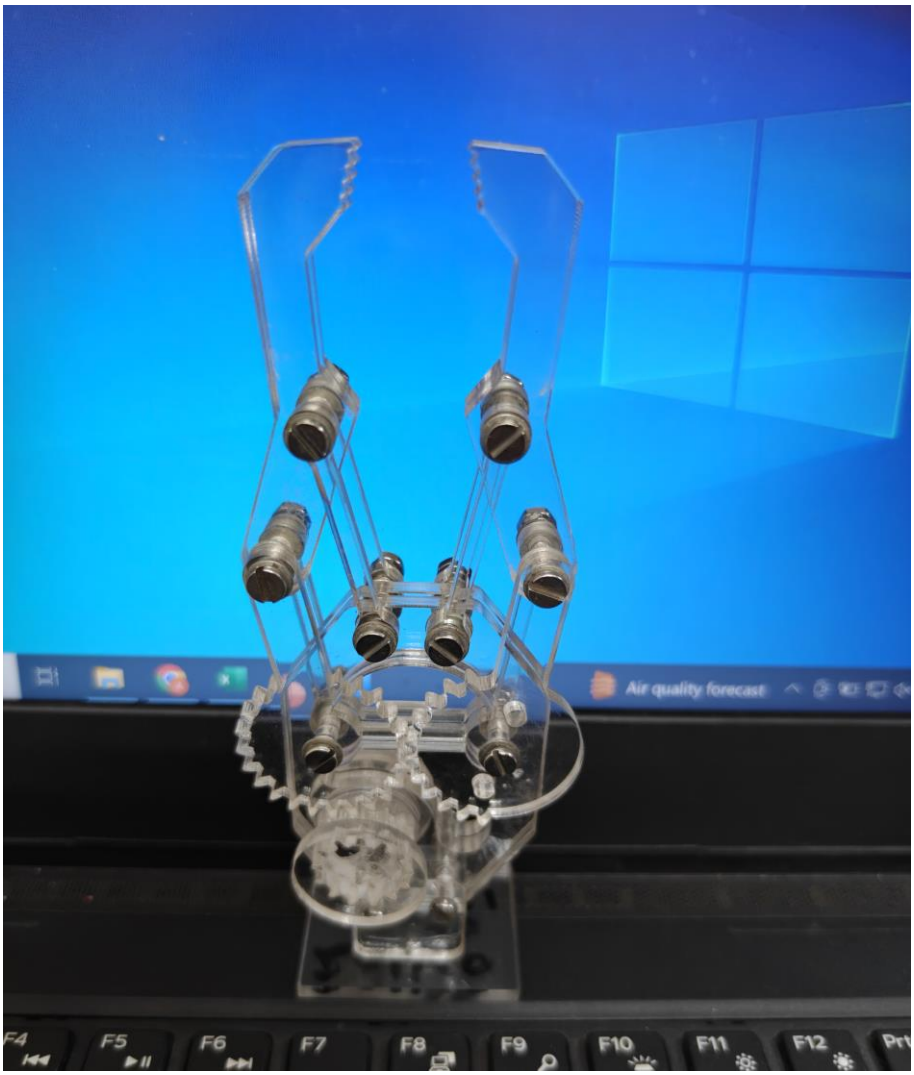
CO9: Collaborate and communicate effectively as a member of a team for proficient problemsolving.

OBJECTIVES OF THE PROJECT ACTIVITY

- To enhance students' understanding of motion mechanisms by applying theoretical principles of Kinematics to real-time working models.
- To encourage creativity, innovation, and engineering thinking through mechanism design and model development.
- To promote hands-on learning and improve problem-solving skills by simulating, fabricating, and testing mechanical linkages and transmission systems.
- To develop teamwork, project planning, and communication skills through collaborative project execution.
- To assess student performance using OBE parameters through demonstration, documentation, and evaluation of the designed mechanisms.

LIST OF PROJECTS WITH PHOTOGRAPHS

Title of the Project	Robotic Gripper
Name of the Students	S A Shibiga (24114030) C Maria Stelina Fernando(24114031)



Scan the QR Code for Mechanism Simulation

Title of the Project

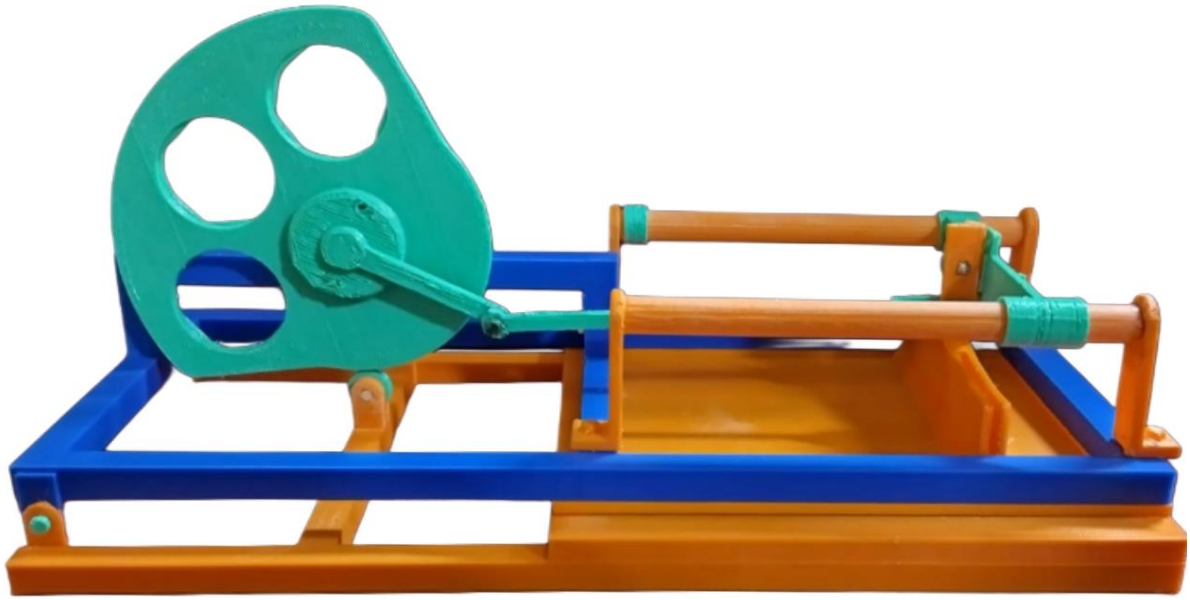
Mini Screen-Printing Machine Using Slider Crank Mechanism

Name of the Students

S.Gnana Murugan-24114043

M.Aathivel-24114051

V.Jeffery samuel-24114003



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Title of the Project	Four Bar Loco Motive Wheel
Name of the Students	Mathanraj S – 24114034 Sudalai J– 24114040 Makesh raja E - 24114055

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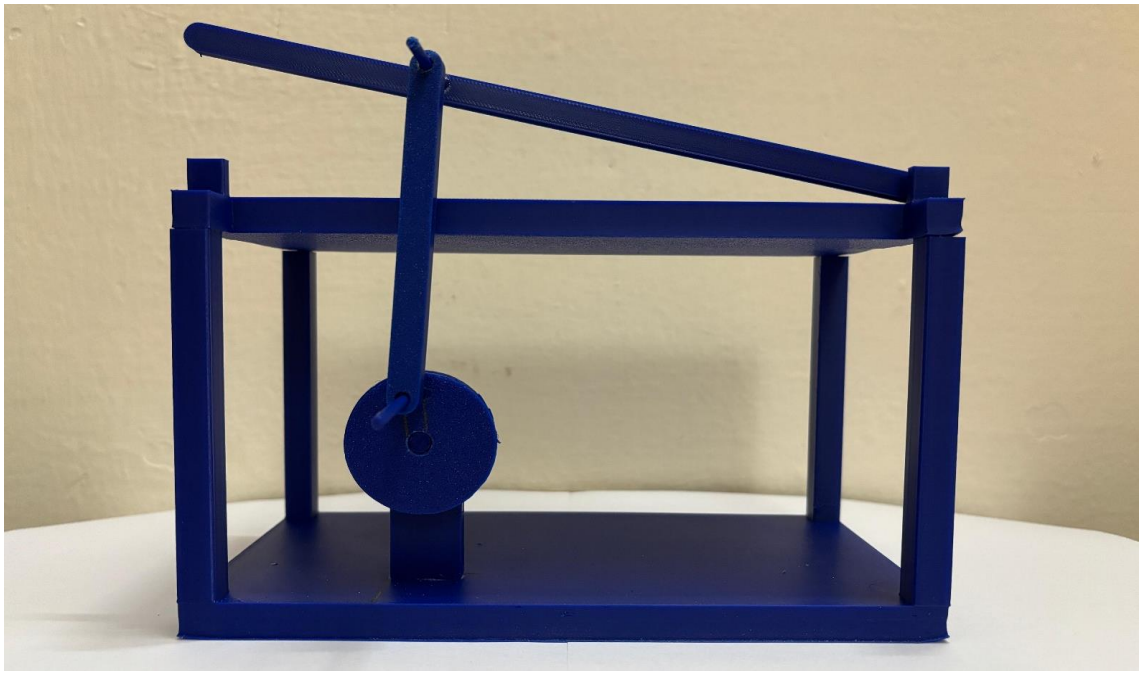
Title of the Project	Paper Cutting Machine Using Slider Crank Mechanism
Name of the Students	Subramanyan P (24114016) Renil Jackson J (241140138) Santhosh Kumar S (24114060)



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Title of the Project Prosthetic Knee Joint

Name of the Students

Nagaraj P (24114008)
Santhosh S(24114023)
Blessing Samuel Paul C(24114027)

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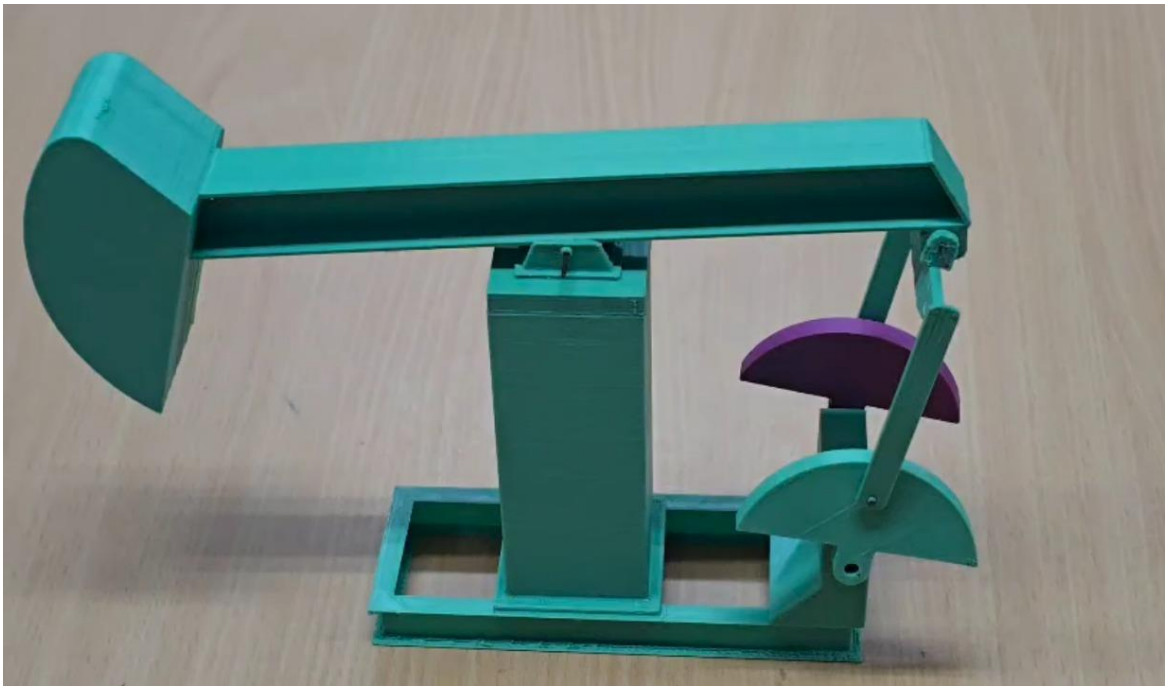
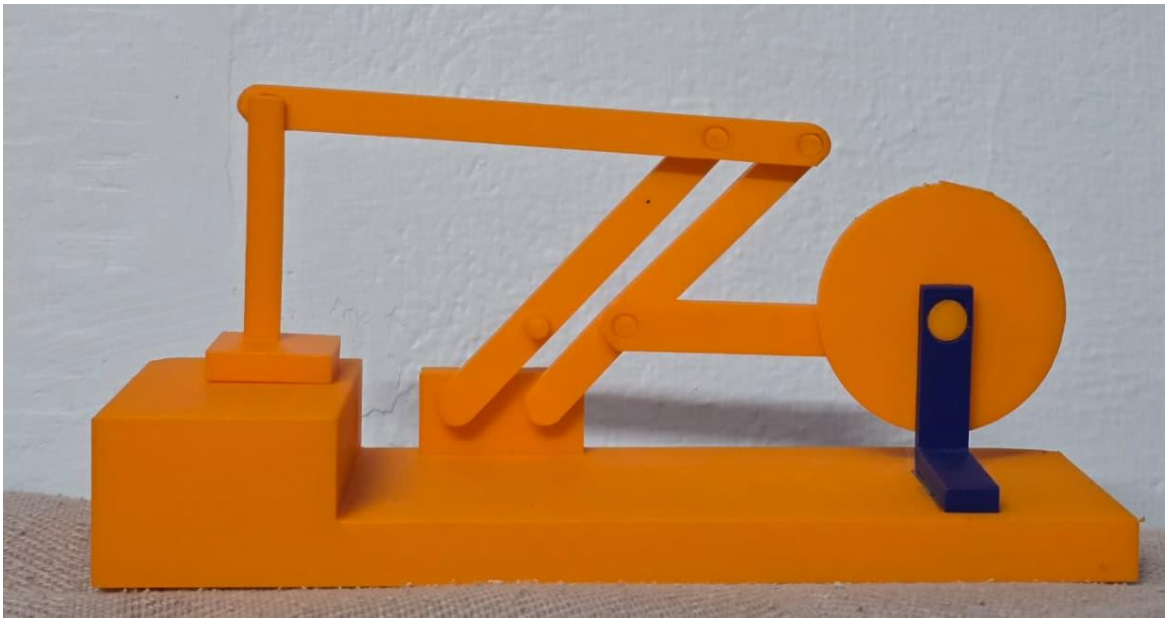
Title of the Project	Oil Pump Jack using Four Bar Mechanism
Name of the Students	Nareshkumar S (24114403) Parani dharan S (24114061) Nadesan L (24114045) Akash S (24114407)



Scan the QR Code for
Mechanism Simulation

Title of the Project	Automatic Stamping Machine using Crank Rocker Mechanism
Name of the Students	Lokesh M – 24114044 Kanish Kumar M R – 24114046 Sankar M - 24114047



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Title of the Project	Mechanism For Opening and Closing of the Screen
Name of the Students	Karthik Subramanian S (24114014) Nithish A (24114010) Daniel Samraj C (24114035)

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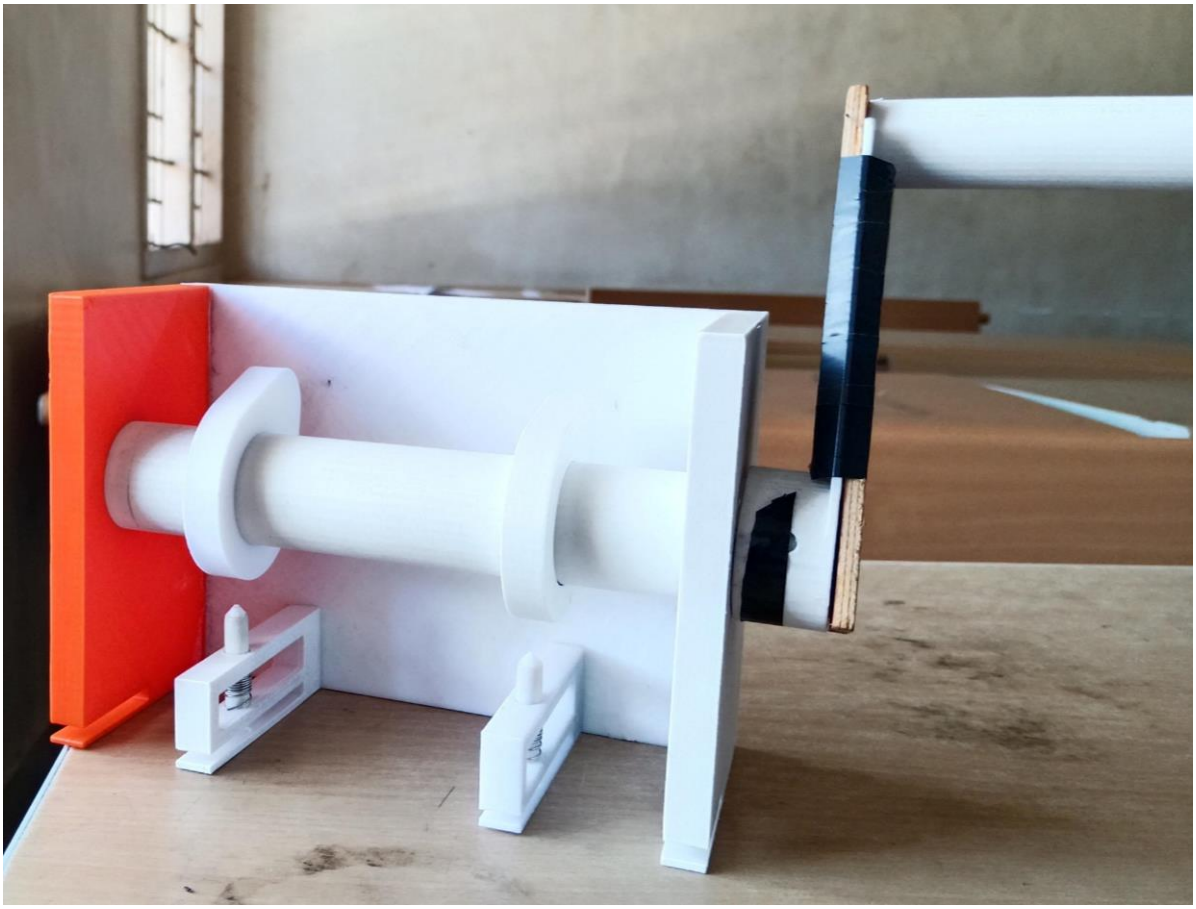
Title of the Project	Punching Machine Using Cam Mechanism
Name of the Students	R Gurusivabalan - 24114024 Balaji B - 24114032 P Senthil Kumaran - 24114033



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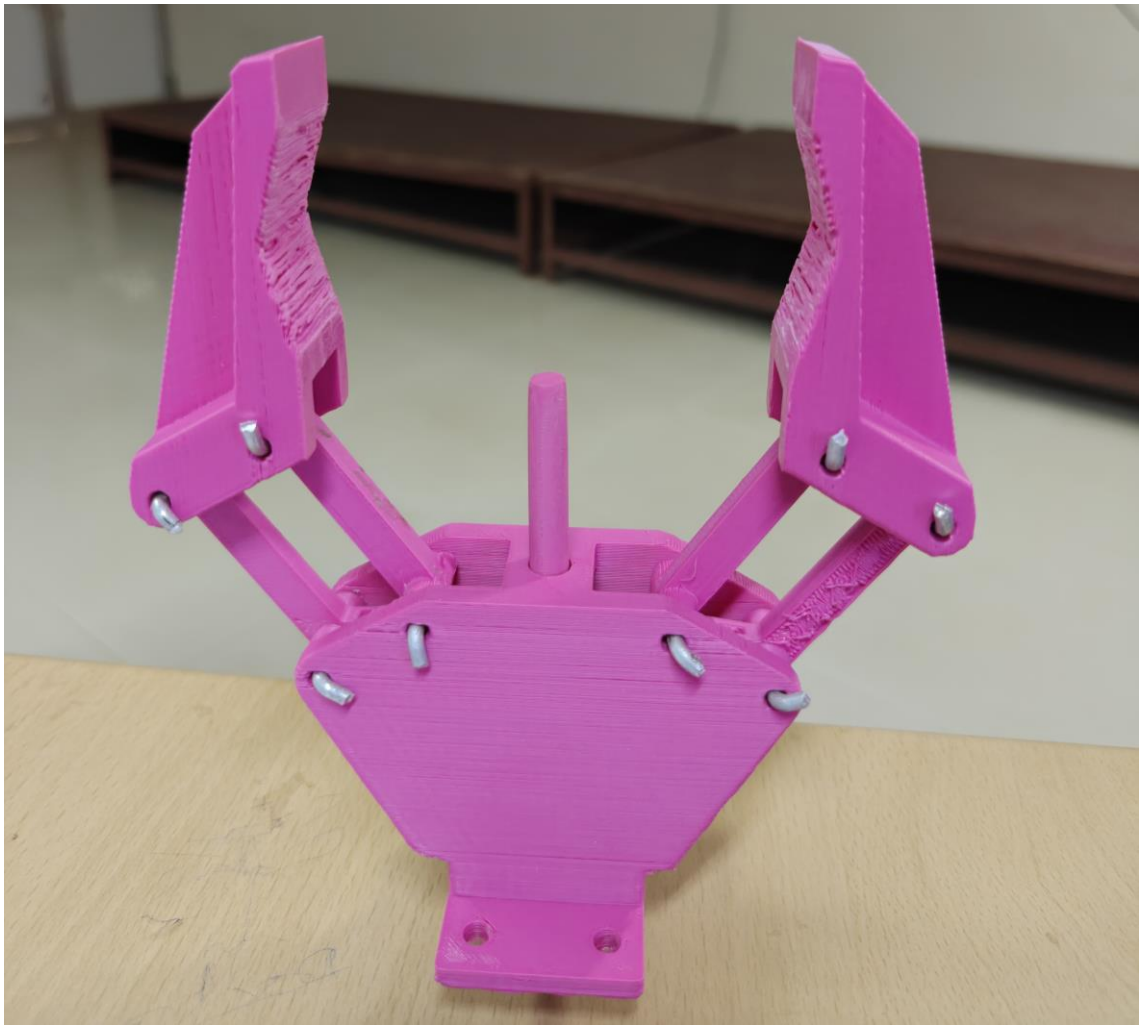
Title of the Project Robot Gripper Mechanism

Name of the Students Mari Raja N.S-24114049
Mohamed Safik Fazil S -24114056
Harihara Suthan M -24114063



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OUTCOMES ACHIEVED

- Students demonstrated strong conceptual understanding of motion mechanisms by successfully designing and fabricating working models.
- Students gained hands-on experience with fabrication tools, linkages, and transmission systems, bridging the gap between theory and practice.
- Collaborative teamwork enhanced communication and planning skills, reflecting real-time engineering project environments.
- The activity strengthened Outcome-Based Education (OBE) mapping, showing improvement in course outcomes related to application, innovation, and experimentation.
- Students exhibited creativity and an engineering mindset, highlighting their capability to develop functional solutions for practical applications.
- The project exposure increased confidence, curiosity, and motivation to pursue higher-level engineering challenges and research.

COURSE INSTRUCTORS

Dr. Kathiresan M.

Professor/ Mechanical Engineering

Dr. Andrews A.

Asst. Prof. (Sr. Gr.)/ Mechanical Engineering