

Mechanics of Machine Laboratory (MOM Lab)

About the Laboratory

Introduction

The Theory of Machines Laboratory provides practical knowledge of the kinematics and dynamics of machine elements and mechanisms. It bridges the gap between theoretical concepts and real-world engineering applications through hands-on experimentation. The laboratory enables students to study the motion, velocity, acceleration, and force transmission in various mechanical systems. It is equipped with experimental setups such as **the Quick Return Mechanism, Slider Crank Mechanism, Screw Jack, Belt and Pulley Drive, Cam and Follower, Universal Governor, Gyroscope, Whirling of Shaft, Rotating Mass Balancing Machine, Slip and Creep Mechanism, Epicyclic Gear Train, Coriolis Component of Acceleration, and Single and Double Hook's Joint apparatus**. These experiments help students understand the operating principles, performance characteristics, and engineering applications of different mechanisms. The laboratory develops analytical, experimental, and problem-solving skills while enhancing students' ability to interpret engineering data and validate theoretical concepts. It also promotes technical report writing, teamwork, and safe laboratory practices. The laboratory supports the attainment of Course Outcomes (COs) and Programme Outcomes (POs) and prepares students for advanced studies in machine design, robotics, automotive engineering, manufacturing systems, and industrial application.

Objectives of the MOM Lab

The Theory of Machines Laboratory aims to provide students with practical knowledge of the kinematics and dynamics of machine elements and mechanisms.

The key objectives are:

1. To understand the working principles of various mechanisms and machine elements through experimental investigation.
2. To correlate theoretical concepts with practical observations related to the motion of machines.
3. To analyse the velocity, acceleration, force transmission, and balancing of mechanical systems.
4. To study the performance characteristics of gears, governors, gyroscopes, shafts, cams, and power transmission systems.
5. To develop experimental, analytical, and problem-solving skills using standard laboratory equipment.
6. To enhance technical competency in conducting experiments, recording observations, analysing data, and preparing engineering reports.

Learning Facilities Available to Students:

The laboratory enables B.Tech (UG) students to develop a comprehensive understanding of the theoretical principles and practical analysis of the dynamic behavior of machines. It also provides hands-on experience in studying governing mechanisms and emphasizes the importance of safety measures during experimentation. Infrastructure facility: The MoM Laboratory can accommodate up to 20 students at a time for conducting practical experiments. The laboratory is fully air-conditioned and provides a comfortable, safe, and well-equipped learning environment for B.Tech students.

1. Perform experiments based on the Theory of Machines curriculum.
2. Study various mechanisms used in industrial machines.
3. Analyze velocity and acceleration in planar mechanisms.
4. Understand balancing of rotating and reciprocating masses.
5. Investigate the performance of governors, gears, cams, and belt drives.
6. Measure experimental parameters using standard laboratory instruments.
7. Compare theoretical calculations with experimental observations.
8. Develop practical knowledge of machine components used in automobiles, manufacturing systems, robotics, and power transmission.

Faculty In-Charge

Dr. Mukesh Kumar

Technical Staff

- **Mr. Surender Pal** – Technical Assistant
- **Mr. Manpal** – Technician

Laboratory Courses

Course Code	Course Name	Programme
MEPC214	Theory of Machines (P)	B.Tech. – Mechanical Engineering, 4th Semester
PIPC208	Theory of Machines (P)	B.Tech. – Production & Industrial Engineering, 3rd Semester
RAPC205	Mechanics of Machines (P)	B.Tech. – Robotics and Automation, 3rd Semester

Major Equipment

Equipment	Quantity	Utilization
Quick Return Mechanism Apparatus	01	B.Tech. (UG)
Slider Crank Mechanism Apparatus	01	B.Tech. (UG)
Screw Jack Apparatus	01	B.Tech. (UG)
Belt and Pulley Apparatus	01	B.Tech. (UG)
Cam and Follower Analysis Apparatus	01	B.Tech. (UG)
Universal Governor Apparatus	01	B.Tech. (UG)
Gyroscope Apparatus	01	B.Tech. (UG)
Whirling of Shaft Apparatus	01	B.Tech. (UG)
Rotating Mass Balancing Machine Apparatus	01	B.Tech. (UG)
Slip and Creep Mechanism Apparatus	01	B.Tech. (UG)
Epicyclic Gear Train Ratio Apparatus	01	B.Tech. (UG)
Coriolis Component of Acceleration Apparatus	01	B.Tech. (UG)
Single and Double Hook's Joint Apparatus	01	B.Tech. (UG)

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Laboratory Photographs



1. Quick Return Mechanism Apparatus



2. Slider Crank Mechanism Apparatus



4.Screw Jack Apparatus



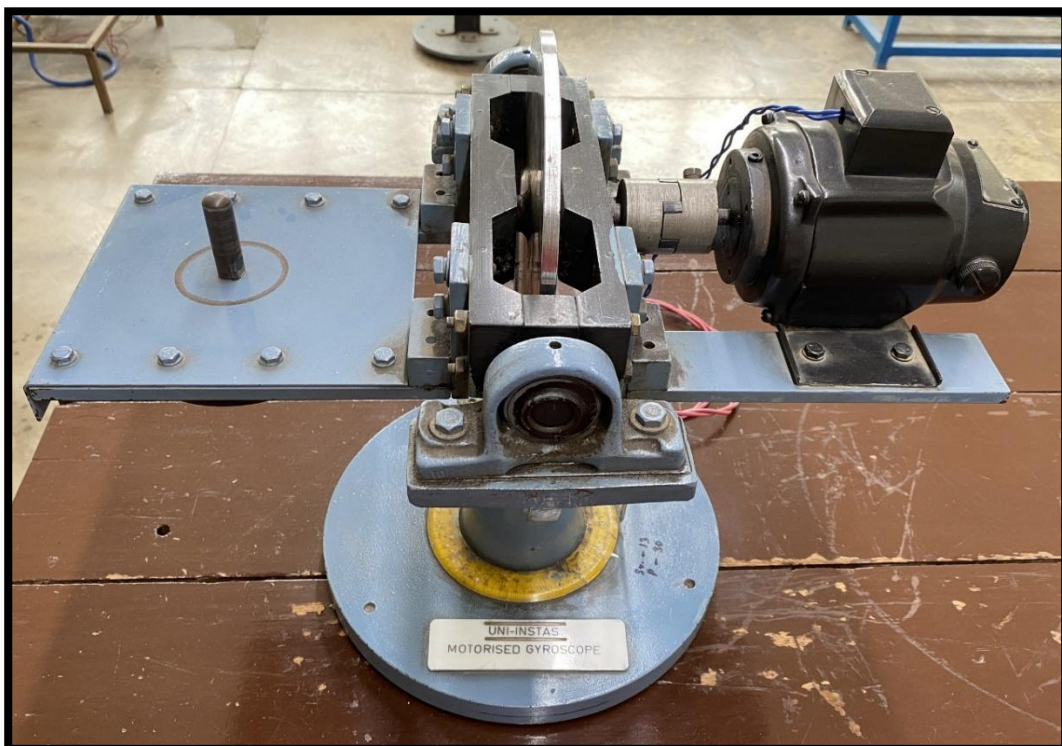
4. Belt and Pulley Apparatus



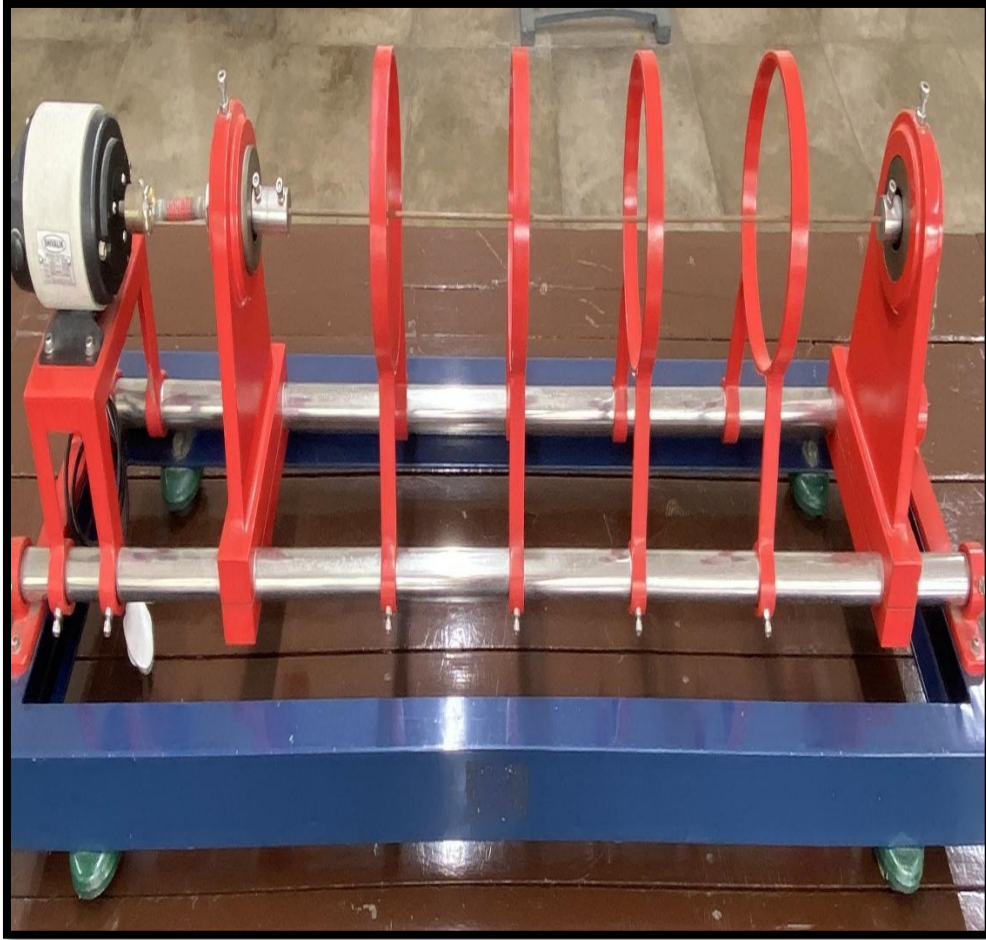
5. Cam and Follower Analysis Apparatus



7. Universal Governor Apparatus
8.



7. Gyroscope Apparatus



8. Whirling of Shaft Apparatus



9. Rotating Mass Balancing Machine Apparatus



10. Slip and Creep Mechanism Apparatus



11. Epicycle Gear Train Ratio Apparatu



12. Coriolli's Component of Acceleration Apparatus



13. Single Hook's and Double Hook's Joint Apparatus.