

SIMPLE AND POWERED MACHINES



**TEACHER:
CERTIFIED
TRAINER**

**DURATION:
12 CLASSES (1 HOUR PER
CLASS)**

**MODE:
OFFLINE**

This is powered mechanical and hands on learning solutions with various experiments that line text book and concepts to real world experiences. Each session consists of building new motorised and non-motorised working models and understanding its relation to real life application and also learning the STEM concepts of that particular model. Imported robotic kits and motors will be used by children for building which will be of high-quality plastic respectively, designed by Lego.

COURSE CURRICULUM

1. Robotic Kit Components :

- Beams & Angular Beams: Structural elements that provide support and framework for robotic models.
- Axles: Rods that support gears and transmit motion.
- Gears: Mechanical components that engage with driver and driven components to alter speed and torque.

- **Motors & Battery Pack:** Motors provide the power for mechanical movements, while the battery pack supplies the energy needed to operate them.
- **Bushes:** Support structures that enable smooth rotation of axles.
- **Pulleys:** Mechanical devices that change the direction of force, making it easier to lift loads or transfer motion.
- **Cams:** Mechanical components that convert rotary motion into linear motion, enabling controlled movement in robotic mechanisms.

2.Horizontal & Vertical Gear Meshing

- Transfer of motion across different planes.

3.Driver and Driven Gears

- Understanding input vs. output gear functions.

4.Speed Control Using Gear Ratios

- Effect of gear size on speed and torque.

5.Circumference and Its Relation to Speed & Time

- Impact of wheel size on travel speed.

6.Linear and Circular Motion

- Comparing different movement types and applications.

7.Friction

- Understanding the concept of friction.

8.Centripetal and Centrifugal Forces

- Concepts related to circular motion.

9.Area and Pressure

- Distribution of force over a surface area.

10.Energy Transfer Using Gear Chains

- Efficient energy transfer through linked gears.

11. Robotic Models and Real-Life Applications

- Building models representing real-world machines.

Class Structure

1. Introduction to Mechanical Components

- Learn about the functionality of motors, sensors, and controllers used in simple and power machines.

2. Supervised Self-Assembly of Models

- Build working robotic models with guidance from certified trainers, applying mechanical design principles.
3. Understanding Mechanical Concepts
 - Delve into the physics behind the simple machines, discussing how they work and their real-world applications.
 4. Practical Experiments and Challenges
 - Engage in hands-on challenges that reinforce learning, including:
 - Power Car Projects: Demonstrate energy transfer and efficiency.
 - Mechanical Advantage Tasks: Solve problems using levers and pulleys.
 - Design Challenges: Create and test models under various conditions.