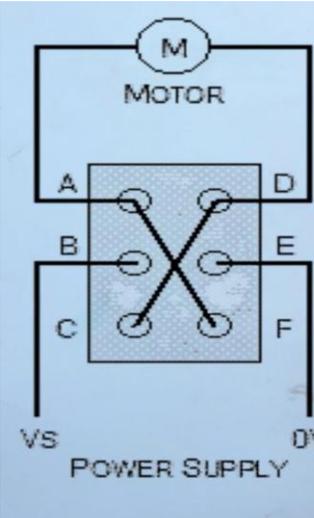
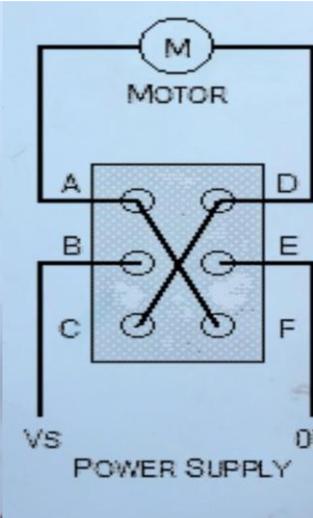


**Experiment No.1: Project-Based Learning Activity 1: Construction and Operation of a Simple Wired Robot**

<p><b>Objective:</b></p>	<p>To introduce students to fundamental robotics principles through a hands-on project. The activity aims to develop foundational skills in mechanical assembly, basic circuit wiring, and motor control by building and operating a simple wired robot.</p>
<p><b>Outcome:</b></p>	<ul style="list-style-type: none"> <li>❑ <b>Demonstrate Mechanical Assembly Proficiency:</b> <ul style="list-style-type: none"> <li>• Accurately assemble a robot chassis by mounting DC motors, wheels, and a caster wheel.</li> </ul> </li> <li>❑ <b>Construct and Understand a Motor Control Circuit:</b> <ul style="list-style-type: none"> <li>• Correctly wire two DPDT (Double Pole Double Throw) switches to independently control two DC motors.</li> <li>• Explain how a DPDT switch is used to reverse the polarity and thus the direction of a motor.</li> </ul> </li> <li>❑ <b>Operate and Control the Robot:</b> <ul style="list-style-type: none"> <li>• Manoeuvre the robot to move forward, backward, left, and right using the wired remote.</li> <li>• Populate an observation table with the robot's behavior corresponding to different switch inputs.</li> </ul> </li> </ul>
<p><b>Tasks Problem Statement, Procedure, Observation, Discussion, and Report</b></p>	<p><b>1) Mechanical Assembly:</b>  <b>Problem Statement:</b> Construct the physical frame and locomotion system of the robot.  <b>Procedure:</b> Refer to the introductory video here <a href="#">Part 1 video</a> and instructions to assemble the chassis, motors, and wheels:</p> <p><b>2) Control Circuit Wiring:</b>  <b>Problem Statement:</b> Wire the DPDT switches to the motors and power source to create a functional remote control.  <b>Procedure:</b> Refer to the introductory video here <a href="#">Part 2 video</a> and the circuit diagram below to complete the wiring. Ensure all connections are secure.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>



**3) Robot Operation and Testing: Problem Statement:** Verify the robot's functionality by testing all movement commands.

**Procedure:** Place the robot on a flat surface, connect the battery, and operate the Left and Right switches to fill the observation table below.

**Observation:** Complete the observation table with the resulting robot movement.

Sr. No.	Left Switch Position	Right Switch Position	Observed Robot Movement (e.g., Forward, Turns Left)
1	Forward	Forward	
2	Backward	Backward	
3	Forward	Backward	
4	Backward	Forward	
5	Center (Off)	Forward	

**Discussion, and Report**

Answer the following questions:

1. Explain the function of the "cross-connection" on the DPDT switch. How does it enable the motor to reverse its direction?
2. What is the purpose of the caster wheel in the robot's design?
3. What would happen if both motors were wired to a single DPDT switch? Describe the robot's possible movements.
4. Based on your observations, what distinguishes a "pivot turn" (one wheel forward, one backward) from a "curve turn" (one wheel moving, one stopped)?

**Result:**

- Mechanical assembly and construction completed neatly: Yes/No
- All robot movements demonstrated: Yes/No
- Questions answered satisfactorily ? Yes/No

**Faculty Signature & Date:** \_\_\_\_\_

**Conclusions:**