

# ROBOT ARM

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## PROJECT MEMBERS:

H P Jeevan (1BI18EC051)

G Rohith (1BI18EC045)

Emyl Varghese George (1BI18EC044)

**PROJECT MENTOR:** Dr. Sree Ranga Raju M N (B. E, MTech, Ph.D.)

## OVERVIEW:

The purpose of designing a mechanical robotic arm is to simulate the actions and movement capabilities of a human arm. Robotic arms are constructed with multiple beams connected by special types of hinges. For a mechanism to be classified as a mechanical arm, it must be able to grab and hold an object, and transfer it to a new location.

Robotic arms expand the usefulness of robots, allowing them to be more useful in everyday society. Our project focuses on the optimal design of a robotic arm using MATLAB and Simulink, with the intention of creating a functional hardware model.

## GOALS:

1. To move the end effector link of the robotic arm to a specified position in its configuration space.
2. To pick and place objects to a desired location.
3. To repeat the motion multiple times with minimum errors.

## SPECIFICATIONS:

The robotic arm is constructed using three links and three joints with a gripper attached to the end effector. The joints are controlled using 4 motors – 2 stepper and 2 DC motors. The motors are connected to an Arduino Uno microcontroller which receives commands from MATLAB.

- Software Requirements: MATLAB and Simulink
- Hardware Requirements: Arduino Uno, 2 servo motors, 2 DC motors, 1 IMU sensor.

## LITERATURE SURVEY:

1. Peter Corke (MATLAB robotics system toolbox) - <https://petercorke.com/toolboxes/robotics-toolbox/>  
Using this toolbox, we have simulated and visualized the robotic arm in MATLAB.
2. Simulink support for Arduino - <https://in.mathworks.com/hardware-support/arduino-simulink.html>  
With Simulink® Support Package for Arduino® Hardware, we have used Simulink to develop and simulate algorithms that run standalone on your Arduino.