REPORT ON ROBOTICS WORKSHOP

ORGANISED BY

DEPARTMENT OF COMPUTER APPLICATION, MERCY COLLEGE

The Department of Computer Application of Mercy College, Palakkad organized a 10 days' workshop on Robotics starting from 26 December, 2025 at BCA Lab and D2 Classroom. The workshop was organized to provide both theoretical knowledge and practical exposure to robotics, embedded systems, and modern electronic technologies. The resource persons for the workshop were Mr. Krishnakumar from Srishti Innovative Computer Systems, TechnoPark, Trivandrum. The workshop was attended by the students of BCA department, including first-year and second-year students, along with students from the physics department. In addition, four students from Victoria College also partnered and actively participated in the workshop. The presence of students from different departments and colleges made the workshop more collaborative and enriching.

Day 1 – Introduction to Robotics

On the first day, the workshop started with an introduction to robotics. The students learned what a robot is and how robots are used in real-life applications such as industries, hospitals, space missions, and daily life. The importance and need for robots in reducing human effort and increasing efficiency were discussed. The basic components of a robotic system, such as sensors, actuators, controllers, and power supply, were also introduced. By the end of the day, the class gained a clear understanding of the purpose and role of robotics in modern technology.

Day 2 – Embedded Programming and Arduino IDE Setup

On the second day, the session focused on embedded programming basics and the installation of the Arduino IDE. The students learned what embedded systems are and how they are used in electronic devices. Steps to install and set up the Arduino IDE were demonstrated and practiced. The class learned how to select the correct board and port and how to upload a simple program. This session built a foundation in programming microcontrollers and gave students hands-on experience with the development environment.

Day 3 – Introduction to Microcontrollers (ESP32)

On the third day, the workshop introduced the ESP32 microcontroller. The students learned its features, specifications, and advantages over other microcontrollers. The pin configuration and working of the ESP32 were explained in detail. A basic tutorial was conducted to help students understand how to interface and program the ESP32. By the end of the session, the class developed familiarity with ESP32 as a powerful and efficient microcontroller for robotics and IoT applications.

Day 4 – Simulation Exercises on Wokwi and Tinkercad

On the fourth day, the class was introduced to online simulation tools like Wokwi and Tinkercad. The students performed simple circuit simulations and tested sample codes virtually. This helped them understand how connections and logic work before implementing them on real hardware. The session enhanced their confidence in designing and testing circuits in a safe and cost-effective environment.

Day 5 – Sensors and Digital Read/Write Operations

On the fifth day, the topic of sensors and digital input/output operations was covered. The students learned how sensors detect environmental changes such as light, distance, and temperature. Digital read and write operations were demonstrated using simple examples like turning LEDs on and off. This session helped the class understand how a microcontroller communicates with external components.

Day 6 – Analog Read Using IR Sensor and Ultrasonic Sensor (HC-SR04)

On the sixth day, the class learned analog reading using sensors such as the IR sensor and the HC-SR04 ultrasonic sensor. The working principle of these sensors was explained, and students were shown how to obtain analog data from them. They learned how distance measurement works using ultrasonic waves and how IR sensors are used for object detection. This session strengthened their understanding of sensor-based input in robotic systems.

Day 7 – Servo Motor and DC Motor Control (L298N)

On the seventh day, the focus was on motors and motor drivers. The students learned the difference between servo motors and DC motors. The working of the L298N motor driver for controlling DC motors was demonstrated. They were taught how to control motor direction and speed using programming. This session helped students understand motion control, which is an essential part of robotics.

Day 8 – Software Serial and Bluetooth Communication

On the eighth day, the topic of communication protocols was introduced, focusing on Software Serial and Bluetooth communication. The class learned how wireless communication is established between devices. The use of Bluetooth modules to send and receive data was demonstrated. Students understood how robots can be controlled remotely using wireless technologies.

Day 9 – Design and Control of a Bluetooth-Controlled Rover

On the ninth day, all the concepts learned earlier were combined to design and control a Bluetooth-controlled rover. The students worked in groups to assemble the components, connect motors and sensors, and program the system. The rover was controlled using a mobile device through Bluetooth.

This practical session improved teamwork, problem-solving skills, and real-world application knowledge.

Day 10 – CAD Modelling and 3-Part Assembly Using Fusion 360

On the final day, the workshop introduced CAD modelling using Fusion 360. The students learned the basics of 3D design and modeling. They created a three-part assembly and understood how individual parts are combined to form a complete structure. This session highlighted the importance of design in robotics and product development and improved the students' creativity and design-thinking skills.