



ROBOTICS AND AI CLUB

Program Progress and Learning Outcomes 2025–2026



Vishwa Bharti Public School
Noida

Overview of the Classes

The Robotics and AI Club at Vishwa Bharti Public School was established to bridge the gap between theoretical science and practical engineering. The sessions were designed to provide a comprehensive introduction to the fields of robotics, electronics, and artificial intelligence, fostering a culture of innovation and "learning by doing."

Yearly Highlights

The monthly progression focused on a systematic transition from simple circuit assembly to the development of complex, autonomous machines. Students explored the differences between various microcontroller platforms, such as the Arduino Uno and Nano, and learned how to interface them with external hardware to execute specific commands.

A significant portion of the curriculum was dedicated to "machine perception," where students learned how robots use sensors to collect and interpret environmental data. By combining programming (software), electronics (hardware), and mechanical design, students successfully built integrated, functional robotics projects that solve real-world problems.

Student Progress Summary

Junior Robotics and AI Club:

The Junior Robotics and AI Club focused on building a strong foundation in electronics, basic automation, and introductory AI concepts using an Arduino Nano-based kit. Students learned circuit building, sensor interfacing, and basic programming logic through practical activities.

Projects Completed and Learning Outcomes:

Traffic Light System

Students learned basic LED control, timing logic, and how automated systems manage traffic signals.

Smart Basketball Hoop

Students learned sensor detection and how input signals can trigger actions such as lighting or scoring indicators.

Automatic Street Light using IR Sensor

Students learned about automation using sensors and how lights can automatically turn on/off based on detection.

Smart Home System with LCD Display

Students learned how multiple components work together, including sensors, display modules, and microcontroller programming.

Radar System using Ultrasonic Sensor

Students learned distance measurement, ultrasonic sensing, and basic visualization of detected objects.

Voice Command LED Control

Students were introduced to basic AI interaction where voice input can trigger electronic responses.

Smart Obstacle Alert System

Students learned how sensors detect obstacles and generate automatic alerts for safety systems.

Gesture-Controlled Light System

Students understood how sensor data can be interpreted to control devices without physical touch.

These projects helped students understand automation, sensor interaction, and the basics of intelligent electronic systems, forming a strong foundation for future robotics learning.

Senior Robotics and AI Club

The Senior Robotics and AI Club participated in an advanced learning track focused on autonomous mobility, robotics control systems, and introductory AI-based robotics using an Arduino Uno-based kit. Students explored more complex robotics concepts including navigation, wireless communication, and intelligent response systems.

Sensors and Components

Students worked with Ultrasonic sensors, IR sensors, Motion sensors, and Bluetooth modules to design responsive and interactive robotic systems.

Projects Completed and Learning Outcomes:

Maze Solver Robot

Students learned algorithmic thinking, path detection, and autonomous navigation using sensor data.

Edge Detector Robot

Students understood fail-safe programming and how robots detect and avoid edges or drop-offs using IR sensors.

Bluetooth Controlled Car

Students learned wireless communication and remote robot control using mobile devices.

Hi-Fi Bot

Students explored interactive robotics where a robot detects a person and responds with a greeting using sensors and servo motors.

Giggle Bot

Students learned how robots can produce reactions based on sensor input, introducing concepts of interactive robotic behaviour.

AI Object Detection Alert Robot

Students built a robot that detects nearby objects and intelligently alerts users, introducing basic AI-style environmental awareness.

Smart Human Follower Robot

Students learned how robots can track and follow a moving person using ultrasonic sensors and programmed logic.

Voice Controlled Robot

Students explored voice-based control using Bluetooth communication, demonstrating how robots can respond to human commands.

These projects helped students develop skills in robot navigation, wireless communication, intelligent automation, and AI-inspired robotics behaviour, preparing them for more advanced robotics systems.

Challenges Encountered and Resolutions

The path to technical proficiency involved several critical hurdles. Many students initially faced difficulty in building coding logic—specifically, translating a physical goal into a sequence of "if-else" statements. This was addressed through guided flow-charting exercises.

Furthermore, understanding sensor calibration proved challenging, as environmental factors often led to inconsistent data. Students were taught "thresholding" techniques to stabilize these inputs. Finally, debugging circuits and programs required significant practice; students learned to use the Serial Monitor to systematically identify whether a failure was caused by hardware wiring or software syntax.

Assessment Planning & Coordination

The program was meticulously structured to ensure maximum engagement. Each session followed a strategic workflow of demonstration, hands-on building, and coding practice. Instructors provided conceptual explanations of scientific principles before students began assembly. Regular monitoring and progress checks ensured that students maintained high standards of safety and technical accuracy throughout the construction process.

Student Progress and Evaluation

Students were evaluated based on their ability to move through the project lifecycle independently. Evaluation metrics included circuit accuracy, code logic development, and troubleshooting ability. Through consistent practical experimentation, students showed a marked improvement in their resilience and their ability to diagnose and fix errors without immediate instructor intervention.

Learning Outcomes

By the conclusion of the program, students achieved the following core competencies:

Electronics Fundamentals: Developed a clear understanding of circuit flow, electronic components, and how different devices interact within a robotics system.

Microcontroller Programming: Gained proficiency in the Arduino IDE and learned logic-based programming to control sensors, motors, and output devices.

Sensor Integration: Learned how to integrate and manage multiple sensors within a single system to create responsive and automated robotics projects.

AI-Based Automation Concepts: Understood how intelligent systems respond to inputs such as voice commands, gestures, motion detection, and environmental data.

Human–Robot Interaction: Explored how robots can interact with humans through voice control, gesture recognition, and sensor-based responses.

Smart Decision Making in Robots: Learned how programmed logic allows robots to analyse sensor data and make automated decisions, such as obstacle detection and human following.

Problem-Solving and Debugging: Improved analytical thinking and troubleshooting skills through debugging circuits, refining code, and iterative design processes.

These learning outcomes helped students develop a strong foundation in robotics, automation, and introductory artificial intelligence concepts, preparing them for more advanced STEAM learning in the future.



Overall Reflection

The Robotics and AI Club has been a great success, promoting STEAM and introductory AI learning at Vishwa Bharti Public School. Through hands-on projects, students learned not only how to build robots but also how intelligent systems can sense, process data, and respond to real-world inputs. Activities involving sensor-based automation, voice commands, and human-robot interaction helped students understand the growing role of robotics and artificial intelligence in modern technology. The program successfully developed creativity, problem-solving skills, and a strong interest in future technologies.