



Robotics & Drone Training Program

Learn. Build. Fly. Become a Tech Hero.

Course Description

The Robotics and Drone Technology Program provides a practical, industry-focused learning experience in modern automation and unmanned systems. The curriculum covers core areas of electronics, sensors, microcontroller programming, robotics mechanisms, wireless control, IoT applications, drone fundamentals, aerodynamics, flight operations, mission planning, and equipment handling.

Participants gain hands-on experience building functional robotic systems and assembling and operating drones through structured practical sessions and guided project work. The program equips learners with essential technical skills needed in the fields of Robotics, Automation, IoT, and Drone Technology, preparing them for advanced applications and real-world problem-solving.

Course Objectives

- Develop a strong foundation in electronics and sensor integration for building intelligent robotic and unmanned systems.
- Enable learners to program microcontrollers (Arduino/ESP32) for automation, control, and real-time decision-making.
- Teach students to design, assemble, and operate mobile robotic platforms, including line-following, obstacle-avoidance, and wireless-controlled robots.
- Introduce the principles of unmanned aerial systems, including aerodynamics, flight mechanics, components, and safety practices.
- Build practical competence in drone assembly, configuration, simulator use, and supervised flight operations.
- Strengthen problem-solving and project-development skills through hands-on tasks, experiments, and a final integrated project.
- Promote understanding of modern technologies such as IoT, wireless communication, automation, and autonomous systems.
- Prepare learners for future academic, research, or industry roles in Robotics, Automation, IoT, and Drone Technology.

Learning Outcomes

- Upon completion of the program, participants will be able to:
- Understand and apply core concepts of electronics, sensors, and microcontrollers in real-world systems.
- Design, assemble, and program functional robotic mechanisms for autonomous and semi-autonomous applications.
- Build, configure, and operate unmanned aerial systems using simulator and field-based training.
- Apply wireless communication and IoT technologies for remote monitoring and control.
- Execute mission planning, system testing, troubleshooting, and safe operational procedures.
- Integrate hardware and software to develop innovative automation and robotic solutions.
- Demonstrate technical proficiency through a final project showcasing creativity and problem-solving.

Training Methodology

- The program follows a hands-on, application-driven training model:
- Practical-Centric Approach: Majority of learning through guided labs, demonstrations, and real equipment.
- Step-by-Step Skill Development: Concepts progress from fundamentals to advanced implementation.
- Project-Based Learning: Each module concludes with a practical mini-project for skill reinforcement.
- Interactive Sessions: Live discussions, Q&A, troubleshooting, and concept demonstrations.
- Simulator + Field Practice: For drone training, both virtual and real flying sessions are integrated.
- Continuous Assessment: Regular checks through tasks, assignments, and practical evaluations.
- Final Capstone Project: Learners apply complete knowledge to build a fully working robot or drone system.

Eligibility & Requirements

Eligibility

- Students (School/College/Technical) interested in robotics and unmanned systems
- Educators, trainers, and professionals looking to upgrade their technical skills
- Beginners with basic interest—no prior robotics or drone experience required

Requirements

- Basic understanding of computers
- Willingness to work with hardware and coding
- Laptop recommended for programming and simulation
- Ability to participate in outdoor drone practice sessions

Benefits of the Program

Participants will gain:

- Industry-Relevant Skills in robotics, automation, IoT, and unmanned aerial systems
- Hands-On Experience with sensors, microcontrollers, drones, tools, and real hardware
- Strong Technical Confidence to design, build, and troubleshoot complex systems
- Improved Problem-Solving Skills through practical challenges and project work
- Portfolio-Ready Projects for academic and professional use
- Enhanced Career Opportunities in robotics, drones, mechatronics, automation, STEM education, and future tech fields.

Course Modules & Projects

ROBOTICS COURSE MODULES

UNIT 1: Robotics + Electronics Basics		
Days	Topic	Duration (in Min.)
1	History of Robotics What is Robotics? Types of Robots Applications of Robotics	120
2	Robotics in Industries Robotics in Defense, Medical, Agriculture & Healthcare Basics of Automation and Embedded Systems	120
3	Basic Electrical Theory Resistors, Capacitors, Diodes & Transistors Breadboard Prototyping	120
4	Power Supply & Voltage Regulation Ohm's Law & Circuit Calculations Series & Parallel Circuits	120
5	Use of Multimeter Soldering Techniques PCB Basics & Circuit Tracing	120

UNIT 2: Microcontroller Programming		
Days	Topic	Duration (in Min.)
1	Introduction to Arduino Platform Types of Arduino Boards (Uno, Mega, Nano) Arduino Pin Functions (Digital, Analog, PWM, Power)	120
2	Arduino IDE Installation & Setup Writing, Uploading & Debugging Code	120
3	Digital & Analog I/O Programming Loops, Conditions, Arrays & Functions	120
4	Serial Communication (UART, I2C, SPI) Interrupts, Timers & PWM Control	120
5	Using Libraries Introduction to ESP32 Microcontroller	120

UNIT 3: Sensors & Autonomous Systems

Days	Topic	Duration (in Min.)
1	IR Sensor, Ultrasonic Sensor PIR Sensor	120
2	LDR (Light Sensor) Gas Sensors (MQ Series)	120
3	Temperature & Humidity Sensors (DHT Series) IMU Basics (MPU6050)	120
4	Calibration & Filtering	120
5	Sensor-Based Decision Making	120

UNIT 4: Motors, Drivers & Robotics Movement

Days	Topic	Duration (in Min.)
1	DC, Servo, Stepper Motors	120
2	Motor Drivers (L298N, L293D, BTS7960)	120
3	Differential Drive	120
4	Robot Kinematics	120
5	Wheel Alignment & Movement Control	120

UNIT 5: IoT & Wireless Robotics

Days	Topic	Duration (in Min.)
1	Bluetooth Communication	120
2	WiFi Communication (ESP32/NodeMCU)	120
3	IoT Dashboards (Blynk, Thingspeak)	120
4	Cloud Data Logging + App Control	120
5	Remote Monitoring & Web-Controlled Robotics	120

UNIT 6: 3D Printing & Mechanical Fabrication

Days	Topic	Duration (in Min.)
1	Introduction to 3D Printing + Printer Types	120
2	3D Design & CAD Basics	120
3	Slicing Software + Print Parameters	120
4	Mechanical Fabrication + Chassis Design	120
5	3D Print Troubleshooting & Final Assembly	120

UNIT 7: Drone Technology

Days	Topic	Duration (in Min.)
1	Drone Types & Components	120
2	Drone Classification	120
3	Drone Rules & Airspace Basics	120
4	Principles of Flight (Lift, Drag, Thrust)	120
5	ESC, Propellers, Motors, Flight Controller	120

UNIT 8: Drone Assembly & Simulator Training

Days	Topic	Duration (in Min.)
1	Drone Frame Assembly	120
2	Motor + ESC Installation	120
3	Propeller Setup + ESC Calibration	120
4	Simulator – Hover & Basic Controls	120
5	Simulator – Missions & Maneuvers	120

UNIT 9: Drone Flight Training & Final Projects		
Days	Topic	Duration (in Min.)
1	Outdoor Hovering + Stability Test	120
2	Directional Flying Practice	120
3	RTH + Emergency Handling	120
4	Waypoint Mission Training	120
5	Final Project + Certification	120