

Robotics: Complete Learning Guide

1. Background of Robotics

Robotics combines mechanical engineering, electronics, and computer science. Early industrial robots appeared in the 1960s for manufacturing automation.

Modern robotics includes drones, autonomous vehicles, humanoid robots, and AI-powered systems.

2. Core Components

Mechanical systems: motors, gears, frames.

Electronics: microcontrollers, sensors, ESC, power systems.

Software: embedded programming and control algorithms.

AI & Vision systems.

3. How to Learn Robotics

Step 1: Learn electronics basics.

Step 2: Study programming (Python, C++).

Step 3: Practice with Arduino or Raspberry Pi.

Step 4: Learn control systems and PID.

Step 5: Explore ROS.

Step 6: Build real projects.

4. Skill Levels

Beginner: simple robotic kits.

Intermediate: sensor integration and embedded systems.

Advanced: autonomous navigation and AI.

Architect/Engineer: complex robotic systems.

5. Certifications

ROS Certifications.

Industrial Automation Certifications.

Embedded Systems Programs.



6. Tools

Arduino, Raspberry Pi, ESP32.

Gazebo, Webots.

ROS, Python, C++.

Betaflight, ESC Configurator, ExpressLRS.

Fusion 360, SolidWorks.

Conclusion

Robotics requires hands-on experimentation and continuous learning.