



How to Learn Robotics for Beginners

A step by step Guide for you:

1. Inspect core hardware and connectivity.

Description: Confirm the encoder(s) and IMU are physically mounted, battery is connected, and the ESP32 has power and Wi-Fi enabled.

Note: Any loose connections or missing sensors you must fix or purchase.

2. Capture IMU raw stream and measure rate.

Description: Connect the IMU via the ESP32 and stream raw accelerometer/gyro outputs to a serial monitor or logging terminal.

Measure the sample rate (Hz), note noisy axes, and save one short data sample.

3. Log encoder pulses and estimate wheel speed.

Description: Run a brief test (hand-rotate a wheel or run the motor for a few seconds) while logging encoder counts on the microcontroller.

Compute pulses per second and use wheel circumference to estimate linear velocity (quick kinematics check).

4. Observe ROS2 topics and topic frequencies.

Description: With ROS2 running, list encoder and IMU topics and use topic echo/hz to inspect timestamps and message rates.

Confirm the observed frequencies match sensor outputs and flag any mismatches before visualizing in R-Viz.

5. Choose application and final sensor checklist.

Description: Decide indoor vs outdoor and write a one-paragraph plan listing required sensors (encoder, IMU; add GPS for outdoor) and drive type (differential or Ackermann).

Confirm ESP32 as the microcontroller, wireless battery requirement, and list any additional parts to order.