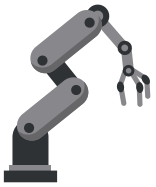
CUBOT Moodle Year Course

LESSON PLAN



TITLE:	**Lesson 5**
LESSON:	**5 / 32**
DURATION:	1h
TOPICS INTRODUCED:	Speed vs Accuracy

INTRODUCTION:

By the end of this lesson, students will understand the challenges of programming robots to move accurately in the real world and the strategies used to improve their performance in dealing with imperfections.

Note: This lesson requires an active internet connection for Arduino firmware updates.

RESOURCES REQUIRED:

1. Visual aids (images or diagrams of robots)
2. Printed handouts with key information (optional)
3. Access to a computer or tablet for research (optional)

LESSON STRUCTURE:

1. Introduction – Dealing with imperfections in robot movement

LESSON 5

1. Introduction (5 minutes)
 - Begin the lesson by discussing the fact that real-world robots often don't drive in straight lines or finish where intended.
 - Explain that this happens due to various real-world imperfections.

2. Causes of Imperfections (10 minutes)
 - Discuss the factors that contribute to imperfections in robot movement, such as slippery or dusty surfaces, bumps on the track, and variations in motor speed.
 - Ask students if they have experienced similar challenges when programming robots.

3. Strategies to Improve Accuracy (15 minutes)
 - Present strategies to improve a robot's accuracy when navigating:
  - Driving the robot more slowly: Explain that slower movements reduce the likelihood of slipping or wheel-spin.
  - Adjusting motor speed: Encourage students to experiment with motor speed to find the optimal setting.
  - Cleaning the surface and wheels: Emphasize the importance of a clean environment for accurate movement.
 - Discuss the analogy of an F1 car on gravel to illustrate the importance of a suitable surface.

4. Introducing Sensors (5 minutes)
 - Mention the use of sensors, such as touch and ultrasonic sensors, as tools to improve robot accuracy.
 - Clarify that sensor use will be explored in future lessons.

5. Responding to Feedback (5 minutes)
 - Explain that in robotics and engineering, it's crucial to respond to feedback.
 - Emphasize that testing the robot, observing its behavior, and making adjustments based on feedback are essential steps in improving performance.

6. Real-World Application (5 minutes)
 - Share a real-world example of how robots are used in Amazon's massive warehouse for item movement.
 - Highlight how precise robot movement is critical in such scenarios.

7. Conclusion (5 minutes)
 - Summarize the key points of the lesson, including the challenges of robot movement, strategies to improve accuracy, and the importance of responding to feedback.
 - Encourage students to embrace the iterative process of robotics.

Homework/Extension Activity:
- Assign a hands-on project where students program a robot to navigate a specific path, testing different speeds and surface conditions to improve accuracy.