



Stair Climbing Robot Challenge Rules & Regulations

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Objective

Design and build a robot capable of climbing a staircase with a maximum step height of 6 inches, navigating up to 10 consecutive steps. Robots may be manual or autonomous, and can be programmable or non-programmable. The competition tests design, mobility, and efficiency.

Team Composition

- **Grade 6 to Grade 12**
- Each team may have up to **3 members**.

Robot Specifications

1. Dimensions

- Maximum size: **30 cm x 30 cm x 30 cm (length x width x height)**.
- Robots will be checked during verification and must fit within the size box.

2. Power Supply

- Robots must be **battery-powered**.
- Allowed battery types: **Li-Ion or Li-Po**.
- Maximum voltage: **12V**.
- Batteries must be safely mounted and insulated.

3. Control System

- Robots can be:
 - **Manual** → Controlled via Bluetooth, PS3 joystick, wireless transmitter/receiver or Wired.
 - **Autonomous** → Fully self-navigating using programmed logic or non - programmed logic.

- Robots can be:
 - **Programmable** (microcontroller-based, e.g., Arduino, ESP32, Raspberry Pi Pico).
 - **Non-Programmable** (wired/wireless control without coding).

4. Mobility

- Maximum **6 motors** allowed.
- Must support:
 - Forward and backward motion
 - Turning (left & right)

5. Prohibited Elements

- No **OG555 motors, Johnson geared motor or BLDC motors.**
- No **readymade stair-climbing kits or models.**
- No **hazardous or unsafe materials.**

Game Setup

- The arena will include different types of stair structures:
 1. **Standard Steps** — Up to 10 steps, max 6 inches.
 2. **Irregular Steps** — Uneven widths and heights.
 3. **Inclined Ramps** — Mixed with stairs.

Scoring Criteria

1. **Time Taken** — Faster robots score higher.
2. **Successful Climbing** — Points for each step completed without falling
3. **Base Time** — Total time taken by the robot to reach top of the staircase.

4. **Bonus Time** — For each stair climbed successfully on the first attempt, a time bonus will be deducted from the final time as follows:

- Autonomous mode: —2 seconds per stair
- Manual mode: —1 second per stair
- This reward encourages smooth and efficient climbing performance.

5. **Penalty Time** — If the robot falls down or is touched by the player during the run, a time penalty will be added to the final time as follows:

- Manual mode: +5 seconds
- Autonomous mode: +2 seconds
- This rule ensures careful operation and stability during the run.

6. **Final Time Calculation**—

$$\text{Final Time} = \text{Base Time} + \text{Total Penalty} - \text{Total Bonus}$$

Competition Rules

- Matches will have a **fixed time limit**.
- **Technical inspection** of robots before the competition is mandatory.
- Robots must start at the **designated start point**.
- Limited **repair time** may be granted if a bot malfunctions before startup.
- No modifications allowed during an active run.
- Referee/judge decisions are **final and binding**.
- **Unsportsmanlike behavior** will result in disqualification.

Safety Requirements

- Robots must not use **flammable, toxic, or hazardous materials**.
- A **safety check** will be conducted before matches.
- Robots must be designed to be stoppable by officials at any **time**.
- Teams are responsible for of their bots. safe operation

Team Conduct Expectations

- Each team may have **up to 3 members**.
- Teams must show respect towards mentors, referees, and other teams.
- Robots should not intentionally damage arena setups.
- Teams should manage **time and resources** effectively.
- Professional handling of equipment is expected.
- Teams must keep their workspace clean after the event.