GLOBAL ROBOTICS CHALLENGE

RULE BOOK 2026

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SUMO ARENA

ROBOTICS BATTLE LEAGUE

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1. Technical Introduction :

The SUMO ARENA: Robotics Battle League is an official competition within GRC 2026, designed to challenge students' abilities in mechanical design, autonomous control, and strategic thinking.
Inspired by traditional sumo wrestling, two autonomous robots face each other inside a circular arena with one clear objective:
Force the opponent robot completely out of the arena.
The competition emphasizes real engineering skills rather than ready-made solutions. Teams are encouraged to design, build, and program their own robots, combining creativity with performance.
Matches are conducted in a head-to-head elimination format, creating an exciting and competitive environment that tests robot strength, stability, control algorithms, and team strategy.

2. Team Composition & Categories:

Team Composition:

- **Each team consists of 2 to 4 students.**
- **One coach is allowed per team.**
- **No human intervention is permitted during matches.**

Competition Categories:

- **LEGO Mini Sumo – 1 KG**
  - **Age Group: 8 – 12 years.**
  - **Robot Type: LEGO only (official LEGO kits).**
- **LEGO Mega Sumo – 3 KG**
  - **Age Group: 12 – 17 years.**
  - **Robot Type: LEGO only (official LEGO kits).**
- **Open Mega Sumo – 3 KG**
  - **Age Groups:**
    - **Youth: 12 – 17 years.**
    - **Adult: 18 – 24 years.**
  - **Robot Type: Open platform (Non-LEGO or VEX).**

3. Robot Specifications:

General Rules:

- **Robots must be fully autonomous.**
- **Manual or remote control is strictly prohibited.**
- **Robots must start each round completely stationary.**

Expansion Rules:

- **A robot may expand or change shape after the round starts, provided that:**
  - ❖ **It does not separate into independent parts.**
  - ❖ **It remains a single centralized robot.**
  - ❖ **The robot does not expand to more than twice its initial footprint area.**
  - ❖ **Small parts falling off with a total mass under 5 grams do not result in round loss.**

Robot Dimensions & Weight

Category	Max Dimensions (L × W)	Max Weight
LEGO Mini Sumo	20 × 20 cm	1 kg
LEGO Mega Sumo	25 × 25 cm	3 kg
Open Mega Sumo	25 × 25 cm	3 kg

LEGO Robot Requirements (Mini & Mega)

- ❖ **Robots must be built exclusively from LEGO® parts, including:**
  - **Parts manufactured and distributed by LEGO®.**
  - **LEGO® licensed parts produced by third-party manufacturers.**
- ❖ **The following are strictly prohibited:**
  - **Any non-LEGO materials or structural additions.**
  - **Additional weights used to increase mass.**
  - **Magnets of any kind.**
  - **VEX or other robotics systems.**
- ❖ **VEX systems are permitted only in the Open Mega Sumo (3 KG) category.**

4. Permitted and Prohibited Mechanisms:

Sensors Regulations:

- **Robots may use standard sensors for navigation and detection (e.g. color, ultrasonic, IR proximity).**
- **High-power laser sensors or any light sources that may cause eye hazards are strictly prohibited.**
- **Any sensor system that may interfere with human safety or arena infrastructure is not allowed.**

It is prohibited to:

- **Use materials, coatings, or active systems specifically intended to mislead, blind, or disrupt the opponent's sensors (e.g. IR-absorbing covers, reflective jammers, strong directed light).**

Permitted Mechanisms:

- **Wheels or tracked drive systems.**
- **Passive wedges and non-sharp front plows.**
- **LEGO motors and sensors (LEGO categories).**
- **Vacuum or suction systems are allowed only in the Open category, provided they do not damage the arena surface.**

Prohibited Mechanisms:

- **Sharp edges or hazardous components.**
- **Projectiles, liquids, adhesives, or fire-based mechanisms.**
- **Entanglement devices (strings, nets, hooks).**
- **Systems intended to interfere with or disrupt opponent sensors.**

5. Arena / Playground Specifications:

Category	Shape	Diameter	Surface Material	Surface Color	White Line Width	Arena Height
LEGO Mini Sumo	Circular	80 cm	Wood	Black (Matte)	5 cm	10 cm
LEGO Mega Sumo	Circular	150 cm	Metal	Black (Matte)	5 cm	15 cm
Open Mega Sumo	Circular	150 cm	Metal	Black (Matte)	5 cm	15 cm

A robot is considered out if any part touches the floor outside the arena.

6. Control & Power:

- **Robots must operate using pre-programmed autonomous control only.**
- **Power source: Internal batteries only.**
- **Each robot must include a clearly accessible main power switch.**
- **Restarting a robot during a round is prohibited and allowed only between rounds.**

7. Starting Positions:

- **Robots are placed at opposite edges of the arena, facing each other.**
- **Robots must remain stationary before the start signal.**
- **After the referee signal, robots must wait 5 seconds before starting movement.**

Maintenance Between Rounds

- **Teams are allowed up to 1 minute between rounds for:**
  - **Small repairs.**
  - **Wheel cleaning.**
  - **Battery replacement.**
- **Structural redesign or major component replacement is not allowed during a match.**

8. Match Duration:

- **Each round lasts a maximum of 3 minutes.**
- **Each match follows a best-of-three rounds format.**

Stall / Deadlock Condition:

- **If both robots are locked together or stationary with no visible movement or progress until the end of the round time:**
  - **The round is declared a draw.**
- **A round ends immediately when a robot is pushed out of the arena.**

9. Scoring and Winner Determination:

Round Win Conditions:

- **A team wins the round by pushing the opponent robot completely out of the arena.**

Simultaneous Exit:

- **If both robots exit the arena at nearly the same time:**
- **The robot that touches the floor outside the arena first is considered the loser.**
- **If this cannot be clearly determined, the round is restarted.**

Time Expiry:

- **If the round time expires with no robot exiting the arena or in a deadlock situation:**
  - **The round is declared a draw.**
- **The team that wins two rounds wins the match.**

Points System:

- **Win: 3 points**
- **Draw: 1 point per team**
- **Loss: 0 points**

10. Penalties:

- **Early movement before the start signal → Round restart.**
- **Human interference or robot restart during a round → Round loss.**
- **Intentional arena damage or illegal mechanisms → Disqualification.**
- **Unsportsmanlike conduct → Match loss.**

11. Safety and Sportsmanship:

- **All robots must be safe and free of sharp or dangerous parts.**
- **Teams are fully responsible for any damage caused by unsafe designs.**
- **Respectful behavior and fair play are mandatory at all times.**

12. Notes:

Pre-Match Technical Judging

- **Mandatory technical inspection and judging will take place before the competition begins.**
- **The inspection includes:**
  - **Verification of robot dimensions and weight.**
  - **Compliance with category regulations.**
  - **Technical discussion with the team about robot design, components, and operation.**

If a robot is found to be pre-built or the team cannot clearly explain:

- **How the robot was designed and built.**
- **The components used.**
- **The working principles of the robot.**

Evaluation points will be deducted accordingly.

The evaluation criteria and deduction system will be announced clearly before the competition.

- **All robots are subject to re-inspection at any time.**
- **Referee and judging decisions are final.**
- **GRC organizers reserve the right to modify rules when necessary.**

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