



## 2019 SumoBot Challenge

*A Challenge that connects you to the [Robotex Competition](#)*

This challenge concludes in a **single elimination tournament**  
**Top 9 teams** from each division, based on scores, will compete for awards

### Goal

To design, build, and program an autonomous robot that can push one or more opponent sumo robot(s) off an elevated wrestling ring. SumoBot with a maximum mass limit, 1 kg for ES Mini Class, 2 kg for MS Medium Class, and 3 kg for HS/BK Mega Class.

### Who Can Play

Class	Divisions	Mass
Mini SumoBot	ES	1 kg
Medium SumoBot	MS	2 kg
Mega SumoBot	HS/BK	3 kg

### Requirements

Autonomous robot, any platform, costing \$1,500 USD or less, and meets the following design constraints, which will be **verified during Check-In**:

- Class of robot to be determined at check-in.
- Robot can demonstrate it is running an edge avoidance and opponent search program by negotiating the SumoBot ring from the assigned starting position.
- Team members are the only people allowed to design, construct and programming of SumoBot robots.
- Base of the robot must **not** exceed 400 square cm. With no height limit.

## Challenge Specifications

### Robot Restrictions (Not Allowed)

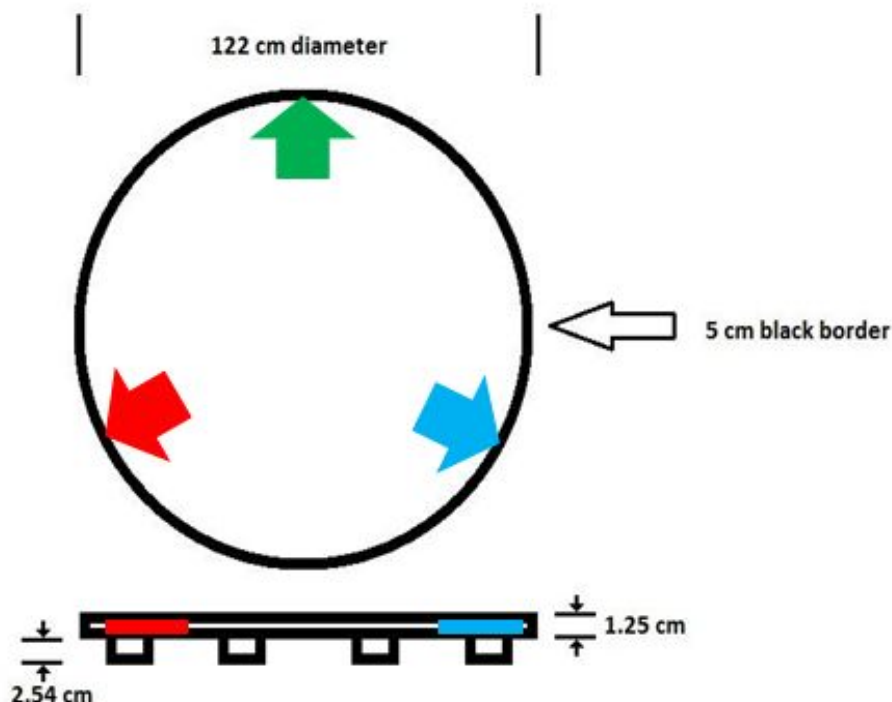
- Jamming devices, such as IR LEDs, intended to saturate the opponents IR sensors.
- Parts that could break or damage the ring or the other robot(s).
- Parts that are intended to damage the opponent's robot or operator. Normal pushes and bangs are not considered intent to damage.
- Devices that can store liquid, powder, gas or other substances for throwing at the opponent.
- Sticky substances or adhesives to improve traction.
- Devices to increase down force such as a vacuum pumps and/or magnets.
- No sharp edges(any edge that can easily cut skin).

### Ring Specifications

- Approximately ~122 cm diameter white circular area with an ~ 5 cm black edge border.
- SumoBot ring constructed with approximately ~1.25 cm thick plywood or other suitable non-magnetic material.
- The SumoBot ring is to be elevated by ~2.54 cm by various support block attached to the bottom of the SumoBot ring, support structures must be at least 1 cm from the top edge of the SumoBot ring.

### Robot Placement

- Painted on the edge of the sumo ring will be three colored edges approx 20 cm in length spaced 120 degrees apart.
- Upon the track monitor's instructions, teams will center their SumoBot on one of the colored edges facing outboard.
- SumoBots must be placed near the edge so that their SumoBot breaks the plane of the inside edge of the black line and facing outward / away from-the center.



## **General Rules of Play**

- SumoBot matches are quick and often end in a draw. You will have a match card that allows you up to 25 matches. The 10 top scores of your 25 matches will be your overall score.
- During the scoring period teams report to the judges table and check in, you will be told which ring to go to for your match.
- Every effort will be made to start 3 robots in all sumo matches. However, if needed a match can be between just two teams (in this situation max points possible is only 2).
- If two Sumobots fall at nearly the same time, the LAST Sumobot to hit the floor, as determined by the track official, will be awarded the point.
- Only one team member may sit ringside and start the robot, other team members need to be behind them in support of their SumoBot.
- Each team competes on a sumo ring with a robot that they have constructed themselves to the specifications listed within this document.
- The match starts on the track monitor's command and continues for 1 minute, or until there is only one SumoBot left on the SumoBot ring, whichever occurs first.
- At the judge's discretion, IF the SumoBots show little to no perceivable movement (a stalemate) for an excess of 5 seconds, THEN the clock will be stopped and the robots will be reset at the starting point and the remaining time will be played out.
- The track monitor's decisions are final, they determine the winner of the match.
- Sumobots pushed off the edge of the sumo ring are eliminated for that match.

## **Scoring**

- Teams accumulate between 0 to 4 points during Sumo Matches. The max points that can be earned in a single match with 3 SumoBots is 4 pts; in a match with (2) SumoBots is 3 pts.
- Any time a SumoBot is pushed off the edge of the ring a point is awarded. When two SumoBots are both in physical contact when the third SumoBot is pushed off the edge, then both surviving SumoBots receive a point.
- If only one robot is left on the track before time ends, that robot receives a point for being on the track, and a bonus point for finishing the match early.
- If time ends all robots remaining on the track receive a point.
- The match will be stopped and restarted for the remaining time under the following conditions:
  - The remaining SumoBots show little to no perceivable movement (a stalemate) in excess of 5 seconds.
  - If it is unclear whether progress is being made or not, the track monitor can extend the time limit for observable progress for up to 15 seconds.
- The 9 SumoBot teams with the highest 10 match scores will compete in the tournament.

## **Tournament Scoring**

The top nine teams will be paired into three groups and compete in a 3 round tournament.

**Round One:** Each group will fight until one SumoBot is pushed off the ring.

- The losing SumoBots for each of the three matches are eliminated.
- These SumoBots place 7th, 8th, and 9th respectively according to their 10 match aggregate score.

**Round Two:** The remaining six teams will fight until one SumoBot is pushed off the ring.

- The losing SumoBots for each of the two matches are eliminated.
- These SumoBots place 5th and 6th respectively according to their 10 match aggregate score.

**Round Three:** The remaining four teams fight in an all or nothing SumoBot Throwdown starting around the ring at 90 degree intervals.

- 4th place to the first SumoBot pushed out.
- 3rd place to the second SumoBot pushed out.
- 2nd Place to the third SumoBot pushed out.
- The surviving SumoBot is the Champion!