

Aryabhata Science Centre State Meet 2023

A State Level Autonomous Robotics Competition.

To design a fully autonomous robot that can follow a black line, collect an object placed on the track and deliver it to the workstation as fast as possible.

Contest description:

- After starting the robot, the robot has to run over the course and follow the black line.
- The ranking is determined by the time the robot needed to go from the start to the finish line and the points collected during the run.
- The time is measured from the referee's signal till the robot stops at the designated work station in the arena. (The workstation location is marked as a black rectangle box of size 40 cm X 30 cm).
- The robot must be fully behind the start line before the run starts.
- If the robot loses the line, it must return to the line so that it does not shorten its way thanks to the line loss.
- If the run time exceeds 5 minutes or if the robot leaves the playing field, the referee terminates the round.
- The runs are organized in several rounds.
- During the qualifications, robots proceed to the next round if they successfully finish the run.
- Robots with the highest points in the last qualification round qualify for the finals.
- In the finale part, the races will be held on a knock-out basis
- In case of a tie, a repeated race may be ordered by the organizers and/or performance of the two robots in previous rounds may be considered.

Robot Specifications:

The robot is fully autonomous and must not be dangerous.

- Throughout the race(including the start) no external connection is allowed apart from the power source.(It is preferable that the power source is onboard. Organizers will only provide a 220V socket. And participants won't be allowed to touch the power wires during the run).

- The robot must not be touched or interfered with in any way after the player starts it and until the referee allows so.
- Maximum size of the robot is 40cm(length)x25cm(width)x25cm(height) cm.
- Maximum weight of the bot is 7 kg.
- The teams must also provide at least 2 photographs/images and 2 paragraphs of text describing the robot/team in electronic form for publishing purposes prior to arrival to the competition.(The submission will reward extra points).
- The maximum voltage between the terminals of a motor can be 12V.

Playing field :

- Playing field ground is white and of size 8ft X 8ft.
- The track is marked by a black line, approx. 1.5 cm wide.
- The line does not cross itself; however, it may have a discontinued line or breaks in between.
- Starting and finishing lines are marked by two perpendicular marks 5 cm off the track.
- Minimal distance between the line and playing field border is 15 cm.
- There could be slight level differences on the playing field (but we will aim to have the playing field nicely flat).

There are no objects in the first qualification round. The object will be placed anywhere on the track. For a successful run, the robot must move the object and deliver it to the workstation. The robot should be that autonomous to successfully pass any track described earlier without a configuration change.

a) An object:

- There will be an object laid on the track (at a random place).
- Its size is at least 4 cm(w) x 4 cm(h) x 4 cm(l) , and weighs at least 100 g.
- The robot must grab/hold/pick it and move it to the workstation.
- The robot must not damage the arena while moving the object.

b) Line cut-off:

- The line will have discontinuation at any place for max. 10 cm.

- Indicating the discontinuation with a visible light will award extra points.
- After the gap, the line will continue anywhere within $\pm 15^\circ$ from the original direction.
- The playing field border is at least that far so that at both extremal angles the line could continue and the safety distance mentioned above is met.
- After passing the obstacle, the robot must continue to follow the line.

Power of officials and liability:

- If a robot or a participant violates the rules, the referee may disqualify them from the race. He may also disqualify the participant or the robot for further races.
- No objections against the decisions of the referee or the organizers are allowed.
- The organizers may change the rules without prior notice, e.g. based on number of participants, local conditions etc.
- The participants are responsible for their robots and their safety and will be liable for all damages caused by them, their robots or their equipment.
- The organizers will not be under any circumstances held liable or responsible for any accidents of the participants or any damages caused by the participants, their robots or their equipment.

Participants are requested to visit the website (<https://astec.assam.gov.in/>) for any new updates.

Event Coordinators:

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