# Mech Velocity
# (ROBORACE)

## TASK

- Teams have to build a manually controlled Robo-Race bot, which should be able to get over all the obstacles and complete the circuit within least possible time.

## BOT SPECIFICATIONS

- The dimensions of the bot should be less than or equal to **300 mm X 300mm X 300mm** (lxbxh) and the bot should be under **5Kg**. failing which the team will be disqualified from the competition (the dimensions includes tires). An error of (±5%) is permitted.
- The bot must be controlled manually.
- Teams can use both wired as well as wireless control mechanisms. In the case of wired bots, the length of the wire should be a minimum of **2 metres** so that the wire remains slackat any instant of time. If the participants use a wireless mechanism they have to use either a dual-frequency remote, Bluetooth, or Wifi.
- The dimensions of the remote are not included in the size constraint of the bot.
- The Bot may have an onboard power supply or remote power supply any case.
- Participants are not supposed to use any readymade Lego components or readymade gripping mechanism. However, the participants are allowed to use ready-made gear assemblies.
- The mechanism used should be such that only one person will control the bot.
- Failing to meet any of the above specifications will lead to immediate disqualification.

## POWER SUPPLY

- The participants should use an electric power supply i.e. the powersource should be on the bot or kept outside the arena. The power source must be non-polluting and must satisfy the safety constraints determined by the organizers.
- In the case of an electric power supply, the voltage between any two points should be less than or equal to 12V DC at all times during the run.
- AC power supply will not be provided and cannot be used in the competition.

## ARENA

**T**he Arena may contain some hurdles such as marble tray, sand pit, slotted bridges, hanging bridges, See-Saw planks, Rocky Ramp, Slanting roads, etc. The width of the arena will be designed as per the size of the bot given.

## GAMEPLAY

- This event may consist of one or many rounds.
- Each team will run its manually controlled bot through the arena. This round is the qualification round to enter the next round. In this round your bot will be tested structurally, mechanically, technically and your skills of controlling bot will be challenged to its peak. The bot must go through various modules (difficulties) as quickly as possible and cross the finishing line.
- If the bot has some technical issues then first technical hand touch of 3 mins will be given to fix it. This time will not be added to the total time. (teams should carry all required tools and other equipments)
- If the bot gets stuck in any module or falls off the track then the bot will be placed manually at the start of that particular module for which a hand touch penalty of 5 seconds will be added to the total time.
- If the bot skips any module, the time penalty of the respective module will be added to the total time (Which will be declared right before the competition).

## JUDGING CRITERIA

- The bot would be checked for safety before starting and will be disqualified if found unsafe for other participants.
- Only one team member is allowed to handle the bot. No other team member is allowed to enter the arena.
- The final selection will be made by the net time, viz, the time after adding the penalties. The team with a lower net time will qualify.
- The bot will be liable for disqualification if it causes any kind of damage to the arena.
- A robot will be declared immobile if it cannot display linear motion of at least one inch in a timed period of 30 seconds. A robot with one side of its drive train disabled will not be counted out if it can demonstrate some degree of controlled movement.

- **The organizers reserve the right to change any or all of the above rules as they deem fit.**

Change in rules, if any will be highlighted on the website and notified to the registered teams.

## TEAM SPECIFICATIONS

- A team may consist of a **maximum of 4 members.**
- Students from different educational institutes can form a team.

## ELIGIBILITY CRITERIA

- All students with a **valid identity card** from their respective educational institutes are eligible to participate.

### A. Mobility:

All robots must have easily visible and controlled mobility in order to compete. Methods of mobility include:

1. Rolling (wheels, tracks or the whole robot).
2. The robots should not secure itself on the ring surface by using suction cups, diaphragms, sticky treads, glue or other such devices.

### B. Battery and Power:

1. The machine must be powered electrically. Use of an IC engine in any form is not allowed. Onboard batteries must be sealed, immobilized-electrolyte types (such as gel cells, lithium, NiCad, NiMH, or dry cells).
2. The electric voltage between any 2 points on the machine should not exceed 12V DC at any point in time. Participants will have to bring their own converters for standard power supply according to Indian standards.
3. Participants must protect the battery terminals from a direct short and causing a battery fire, failure to do so will cause direct disqualification.
4. The use of damaged, non-leak-proof batteries may lead to disqualification.
5. Special care should be taken to protect the onboard batteries. If the judges find that the battery is insufficiently protected, the team will be disqualified immediately.
6. Change of battery will not be allowed during the match.
7. Only bots with onboard batteries will be allowed.
8. A team cannot use the same bot with different names in the same categories more than once by just modifying certain components of the bots.
9. The supply from the battery to all the weapons and power systems should qualify the following fail-safes:
    a. A manual disconnect (switch) that can be turned off without harming the person doing it, i.e. No body parts or weapons should come in the way of the switch.
    b. Manual emergency stop that can be triggered through the radio controller

***If teams do not show up during their allotted slot, they will be disqualified.***

10. The following weapons cannot be used:
    a. Liquid projectiles (Foam, liquefied gases)
    b. Any kind of inflammable liquids
    c. Weapons causing invisible damage (Electrical weapons, RF jamming weapons and others).
    d. Weapons causing opponents' weapons (spinners) to entangle in them (Chains, Ropes or loose Fabrics).

**A. Event Specific Terminology:**

1. Disabled: A robot is not functioning correctly due to either an internal malfunction or contact with the opposing robot or Arena Hazard.
2. Immobilized: In the judges' opinion, a robot is not responsive for a specified period of time.
3. Pinning: Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilize it.
4. Radio Interference: Refers to a situation where at least one robot becomes unresponsive or non-controllable due to the effect of the other robot's

remote-control signal.

5. Restart: This occurs after a fault or a timeout has been declared and the competing robots are ready to continue.
6. Stuck: A robot is hung up in a part of the arena, an arena hazard or an opponent, such that it is effectively non-responsive.
7. Tap-Out: Occurs when a robot's operators decide that they no longer want to continue the match and concede the win to the opposingteam.
8. Technical Knockout: This occurs when a robot wins due to the immobilization of its opponent even though, in the judges' opinion, no action of the winning robot caused the opponent's immobilization.
9. Timeout: A temporary halting of a match. Timeouts are usually called to separate robots but can be called for other reasons as well.