

# Exodia-2k19-Robowars

## The Battle For Glory



### About

War brings destruction, war brings death. This time Exodia come mindless without fear, beat the thrill and be ready for the kill. Experience an adrenaline rush as the mighty robots fight for survival in a one on one battle. Come and conquer, fight and emerge as the ultimate survivor. Its not just a game, its an ultimate rush to glorify your skills.

### TASK

Design and construct a wired or wireless (remote controlled) robot capable of fighting a tournament against other bot(s). In this glorious battlefield Every team should come With mighty armours, nifty axes and more innovative weapons, these merciless mercenaries shall be ready to manufacture and fight for the glory of their makers, upholders of the dignity of the club.

### Design Specifications:

#### Robot Dimensions:

- Dimensions of the bot should not exceed 700mm x 700mm x 1000 mm(lxbxh). The external device used to control the bot is not included in the size constraint.
- Weight of the bot should not exceed 28kg (excluding remote control and wires).
- If the robot is solely powered by onboard batteries (wireless robots), we will consider the weight of bot excluding battery, so battery should be easily removable.

**NOTE** the Following exceptions and limitations

- ▶ Liquid projectiles.
  - ▶ Any kind of inflammable liquid.
  - ▶ Flame-based weapons.
  - ▶ Any kind of explosive or intentionally ignited solid or potentially ignitable solid.
  - ▶ High power magnets or electromagnets.
  - ▶ Radio jamming, tazers, tesla coils, or any other high-voltage device.
  - ▶ Tethered or un-tethered projectiles.
- ▶ Weapons or defenses that stop combat completely of both (or more) robots. This includes nets, tapes, strings, and other entanglement device.

**Mobility:**

- All robots must have easily visible and controlled mobility in order to compete.
- Any machine component should not be detached (intentionally) during any point of the battle.

Methods of mobility include:

- Rolling (wheels, tracks or the whole robot)
- Walking (linear actuated legs with no rolling or cam operated motion).
- Shuffling(rotational cam operated legs)
- Jumping and hopping is **NOT** allowed
- Flying (airfoil using, helium balloons, ornithopters, hovercrafts etc.) is **NOT** allowed

**Battery and power:**

- The machine can be powered electrically only. Use of an IC engine in any form is not allowed.
- The electric voltage between 2 points anywhere in the machine should not be more than 24 V DC at any point of time. Power consumption of the bot should not exceed **200W (For Mobility) and 150W (For weapons).**
- If a team is using AC voltage then they will have to convert the AC voltage to DC voltage before using it on the machine and the voltage should not exceed 24V between any two points on the machine at any point of time.
- All efforts must be made to protect battery terminals from a direct short and causing a battery fire, failure to do so will cause direct disqualification.
- 230V AC power will be provided.

**Robot Control Requirements:**

- If the machine is wired then the wire should remain slack under all circumstances during the competition. All the wires coming out of the machine should be stacked as a single unit. The wires should be properly insulated. Teams are suggested to use only rated wires. Robot can be controlled wirelessly also. Off board power supply is allowed.
- Remote control systems from toys might be used. Remote control systems available in the market may also be used.

### **Pneumatics:**

- Robot can use pneumatic devices actuated by pressurized non-inflammable gases. Maximum allowed outlet nozzle pressure is 12 bar.
- Participants must be able to indicate the used pressure with integrated or temporarily fitted pressure gauge. Also, there should be provision to check the cylinder pressure on the bot.
- Entire pneumatic setup should be on-board, no external input (from outside the arena) can be given to the robot for functioning of its pneumatic system.

### **Hydraulics:**

- Robot can use non-inflammable liquid to actuate hydraulic devices e.g. cylinders.
- All hydraulic setup should be on-board and it must be securely mounted. Special care must be taken while mounting pump, accumulator and armour to ensure that if ruptured direct fluid streams will not escape the robot also the entire system should be leak proof .
- Maximum pressure is 12 bars.

### **Weapons:**

- The robot **weapon system** should NOT use any kind of un-tethered projectile mechanism, solid or fluid.
  - Usage of any inflammable liquid, explosives or any flame based weapons is strictly **PROHIBITED**.
  - Usage of nets, glue, tape or any kind of entanglement device is **NOT** allowed.
  - Usage of any high power magnets, electromagnets, tazers, tesla coils or any kind of high voltage device is **NOT** allowed.
  - Tethered projectile with a maximum length of 2 feet is allowed. If the projectile breaks away from its tether without opponent intervention, the bot is immediately disqualified.
- \*Spinning weapons which do not come in contact with the arena at no point of time are allowed. In no case should the arena be damaged by any bot. Violation of this will lead to immediate disqualification .

## Competition Rules

### General Rules:

- A team may consist of 5(max.) members as required.
- The students must carry valid student ID cards of their college which they will be required to produce at the time of registration.
- More than one team can participate from same college but with different robots.
- Students from different educational institutes can form a team.

### Event Format:

- The machine will be checked for its power rating, weight and dimensions before the commencement of the event.
- The competition will be on a knock out and point basis both.
- There will be 3 matches for 5 minutes max between each two teams.
- Only one person is allowed to control the robot.
- A robot is declared victorious if the opponent robot is immobilized, a robot is declared immobile if it fails to show a displacement of 10cms in 30 seconds.
- If both the bots fail to have contact with each other within one and a half minute both the bots will be disqualified.
- In case a robot falls off the arena, the robot has to maintain a minimum distance of 60 cm from the opponent during its restore. Only 1 restore will be allowed per team.
- If the robot gets immobilized or toppled over by opponent's bot, teams can ask for only 1 restore and second time both teams will be disqualified.
- The robots are not allowed to intentionally cut the opponent's control wires. Violation of this rule will lead to disqualification.
- Points will be given on the basis of **DAMAGE, CONTROL and STRATEGY** (Definition of damage, control and strategy will be decided by the judge and will be binding to all. **NO** discussion will be entertained) When any tie happens between match.
- In case of a tie, the robots will have to battle for a time duration of 2 minutes.
- The organizers reserve the right to change any or all of the above rules as they deem fit.
- Violation of any of the above rules will lead to disqualification.
- Judges' decision will be final and binding to all.

### Safety Rules:

- If your robot does not meet all the above mentioned terms and guidelines, please contact the event coordinators.
- If your robot design does not seem fit within the above given rules and conditions during inspection, the judges have every right to not allow your bot to compete.
- The judges reserve the right to alter the rules and regulations whenever required. So taking advantage of any loop holes in the above regulations might result your bot being disqualified. Robots should not be turned on anywhere other than the arena or in the holding area.

- All weapons must have a safety cover on any sharp edges.
- All participants build and operate their robots at their own risk, there is always a chance of accidents and no amount of regulations can cover it.
- Please take care to not hurt yourself or others when building, testing and competing.

### **Arena Specifications (Refer Last page for arena design)**

- (1) Arena contains two zone :--Non fighting zone and fighting zone
- (2) Non fighting zone is for escaping and replanning for fight.
- (3) Fighting zone is for fight and you will get more point if you stay more in fighting zone.

### **Certificate policy**

- Certificate of excellence will be awarded to top 2 teams.
- Certificate of participation will be given to all the teams registered for the competition.
- Disqualified teams will not be considered for any certificate.

### **Registration Fees**

- **INR 600/- only.**

### **Important Note:**

These rules may change any time, even without explicit notification to teams. However the document uploaded here is to be followed as the latest problem statement for all the rules and design specifications. Any change can be observed by the name of the document which will contain a higher version (v1.0 etc) if updated. The Teams acknowledge that it is their responsibility to read, understand and abide by these rules and Exodia, IIT Mandi reserves the right to prevent any team from competing at any time for any reason (including but not limited to the reasons specified elsewhere in this document).

For any query regarding competition or problem statement feel free to contact coordinators. We are happy to help.

### **Event Coordinators**

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# *Arena Design*

