YANTRA Warz

Official Competition Rulebook

"Creating Intelligence Robotics Industry in Nepal by 2045"

Robotics Association of Nepal (RAN) | Yantra X | Intelligence & Entrepreneurship Festival

1. Competition Theme

YANTRA Warz is an open robot combat competition, a fight to the death, in which Good must fight Evil and safeguard the earth from the terrifying effects of Climate Change. Evils spread all over the world, depleting the earth's natural resources in the form of war robots. The battle has begun; let us see who will emerge victorious, Good or Evil. May the good continue.

The competition is held in two weight categories, the 8 kg category and the 15 kg category, so that participants can demonstrate their inventiveness within the limits of their chosen category. Robotics plays the central role in this challenge: teams must design, build and drive rugged, remote-controlled machines that combine mobility, protection and weapon systems in a safe and fair contest of engineering.

2. Objectives

- Design and construct a remote-controlled combat robot capable of fighting in a one-on-one tournament.
- Encourage creativity, innovation and sound mechanical, electrical and control engineering.
- Promote safe building, handling and operation of batteries, pneumatic and hydraulic systems and weapons.
- Develop strategy, driving skill and teamwork between the team members who build and control the robot.
- Inspire participants to contribute to creating the robotics industry of Nepal by 2045.

3. Team Challenge / Competition Overview

Mission: Each team must design and construct a remote-controlled robot capable of fighting a one-on-one tournament, and use it to defeat opposing robots by immobilizing them or winning on judges' points.

Team Challenge:

1. Design and build a wirelessly controlled combat robot that meets the dimension, weight, power and safety requirements of its category (8 kg or 15 kg), and submit the portfolio before the deadline.
2. Present the robot for inspection, arena testing and verification before the event.
3. Fight one-on-one matches in the arena. A robot wins if its opponent is immobilized, if its opponent is disqualified or thrown out of the arena, or on judges' points if both robots remain mobile.
4. Respect the limits on mobility, power, pneumatics, hydraulics and weapons, and follow all safety rules and the instructions of the organizers and judges.
5. Advance through the tournament by winning matches, as the organizers announce.

4. Team Specification

1. A team may consist of a maximum of 4 participants.

2. Participants can be from the same or different institutes.
3. Teams may represent schools, colleges, institutions or independent groups.
4. Every team must have a unique name. The organizers reserve the right to reject entries from any team whose name they deem inappropriate, offensive or conflicting. Organizers must be notified when a team's name has been changed.
5. Each team must nominate one team leader as the official contact person. The controlling member of a team (the robot driver) should be easily identified.
6. Each team may register 1 robot(s) per category.

5. Robot Specification

5.1 Robot Type and Locomotion

All robots must have easily visible and controlled mobility in order to compete.

1. Permitted robot types: remote-controlled combat robots.
2. Permitted methods of mobility:
    - Rolling (wheels, tracks or the whole robot).
    - Manually operated jumping and hopping are allowed. However, the maximum height of any part of the machine must not exceed 6 ft (1.83 m) during any stage of its jumping or hopping, and any damage caused by this mechanism is solely the responsibility of the team.
3. Not allowed: flying using airfoils, helium balloons, ornithopters and similar means.
4. Robots must not secure themselves to the ring surface using suction cups, diaphragms, sticky treads, glue or other such devices.

5.2 Size and Weight

The competition has two categories:

Category	Maximum weight	Maximum dimensions (L × W × H)
8 kg category	8 kg	400 × 400 × 400 mm
15 kg category	15 kg	500 × 500 × 500 mm

1. The robot must fit in a box of the dimensions of its category at any given point during the match.
2. The weight of the robot must not exceed the limit of its category (8 kg or 15 kg). Only a 5% tolerance will be considered (0.4 kg for the 8 kg category and 0.75 kg for the 15 kg category).
3. Minimum robot weight: 7.5 kg for the 15 kg category. *And 4 kg for the 8Kg category*
4. All pneumatic tanks or sources and batteries must be on board and count toward the weight. The weight of the remote controller is not counted.

5.3 Control and Autonomy

1. Robot control mode: remote-controlled. The machine can be controlled through a wireless remote only.
2. There must be binding capability between transmitters and receivers, and they must stay connected through polycarbonate and metal-bar barriers. Only remotes with this facility are allowed.
3. Interference in the wireless systems will not be considered for a rematch or for the result.

4. Non-standard or self-made remote control systems must first be approved by the organizers.
5. The team must pair the wireless remote with the machine before putting it into the arena.

5.4 Power System

1. The machine can be powered electrically only. Use of an IC engine in any form is not allowed.
2. Maximum operating voltage: the electric voltage between any 2 points anywhere in the machine must not be more than 48 V DC at any point of time.
3. Only bots with on-board batteries are allowed. The power supply must be on board only.
4. All efforts must be made to protect battery terminals from a direct short and a resulting battery fire. Failure to do so will cause direct disqualification.
5. Use of damaged or non-leak-proof batteries may lead to disqualification.
6. Special care must be taken to protect the on-board batteries. If the judges find that a battery is not properly protected, the team will be disqualified immediately.
7. Change of battery is not allowed during the match.

5.5 Mechanical and Electronic Construction

1. Ready-made robots and ready-made electronic modules: Not allowed
2. The robot must have an accessible emergency power switch.
3. Sharp edges, exposed dangerous wiring, liquid leakage or harmful materials are prohibited. All weapons must have a safety cover on any sharp edges.
4. If a robot or weapon design does not fit within the categories in these rules, or is ambiguous or borderline, teams must contact the event organizers.

5.6 Pneumatic System

1. Robots can use pressurized non-flammable gases to actuate pneumatic devices. The maximum allowed outlet nozzle pressure is 12 bar.
2. The storage tank and pressure regulators used by teams must be certified. Teams using pneumatics must produce the Safety and Security letters at the Registration Desk at the venue. Failing to do so will lead to direct disqualification.
3. Participants must be able to indicate the pressure used with an integrated or temporarily fitted pressure gauge. There must also be a provision to check the cylinder pressure on the bot.
4. The pressure in the cylinder must not exceed the rated pressure at any point of time.
5. There must be a safe way of refilling the system and determining the on-board pressure.
6. All pneumatic components on board must be securely mounted. Care must be taken while mounting the pressure vessel and armor so that, if ruptured, it will not escape the robot. The terms "pressure vessel", "bottle" and "source tank" are used interchangeably.
7. The entire pneumatic setup must be on board. No external input from outside the arena may be given to the robot for the functioning of its pneumatic system.

5.7 Hydraulic System

1. Robots can use non-inflammable liquid to actuate hydraulic devices, for example cylinders.
2. All on-board hydraulic components must be securely mounted. Special care must be taken while mounting the pump, accumulator and armor so that, if ruptured, direct fluid streams will not escape the robot.
3. All hydraulic liquids must be non-corrosive and the device must be leak-proof.
4. The maximum allowed pressure is 12 bar.
5. Participants must be able to indicate the pressure used with an integrated or temporarily fitted pressure gauge.
6. The entire hydraulic setup must be on board. No external input from outside the arena may be given to the robot for the functioning of its hydraulic system.

5.8 Weapon Systems

Robots can have any kind of magnetic weapons, cutters, flippers, saws, lifting devices, spinning hammers and similar weapons, with the following exceptions:

1. Liquid projectiles are not allowed.
2. Any kind of inflammable liquid is not allowed.
3. Flame-based weapons are not allowed.

6. Robot Verification / Homologation

These rules are to be followed strictly:

1. The bots must be available to the organizers for inspection 10 days before the event.
2. The bots must be tested in the organizers' arena 7 days before the event.
3. Verification of the bots must be done 4 days before the event.
4. Only verified robots are permitted to participate. Any modification after verification must be approved by the organizers.
5. Failing to comply with the above rules might lead to immediate disqualification.
6. Each event has safety inspections, and it is at the inspectors' sole discretion whether a robot is allowed to compete. As a builder you are obligated to disclose all operating principles and potential dangers to the inspection staff.

7. Arena Specification

7.1 General Arena Requirements

1. Arena base: a square base of 14 ft × 14 ft.
2. Cage: the arena has a cage-like structure around the base. The height of the cage is 8 ft (10 ft from the ground).
3. Arena surface material:Metal
4. Starting zone: Corner

7.2 Arena Layout and Components

Arena Description:

The arena consists of a square base with a cage-like structure around it, with a base of 14 ft × 14 ft and a cage height of 8 ft (10 ft from the ground).

Obstacles and Objects:

- Cage: surrounds the square base, with polycarbonate and metal-bar barriers. Robots stay in the arena and the match stops immediately if a robot is thrown out.
- Pit: a robot that falls in the pit is declared disabled.

Starting and Finishing Conditions:

Robots must only be activated in the arena, in testing areas, or with the express consent of the event coordinators. The remote must be paired with the machine before the robot is put into the arena. Once the robots have entered the arena, no team member may enter it at any point of time. If a fight has to be halted and changes have to be made to the arena or to the condition of the robot(s), only the organizers will do it. A match ends when a victory condition in Section 8 is met.

8. Rules and Scoring

8.1 One-on-One Combat Match

Objective: Defeat the opposing robot in a one-on-one fight by immobilizing it, or win on the judges' points if both robots remain mobile.

Criteria for Victory:

1. A robot is declared victorious if its opponent is immobilized.
2. A robot is declared immobile if it cannot display linear motion of at least 5 inches in a timed period of 30 seconds. If both robots remain mobile after the end of the round, the winner is decided subjectively by the judges.
3. A robot that is deemed unsafe by the judges after the match has begun is disqualified and declared the loser. The match is halted immediately and the opponent is awarded a win.
4. If a robot is thrown out of the arena, the match stops immediately and the robot still inside the arena is automatically declared the winner.
5. Robots cannot win by pinning or lifting their opponents. Organizers allow pinning or lifting for a maximum of 10 seconds per pin or lift; then the attacker robot is instructed to release the opponent. If, after being instructed to do so, the attacker is able to release but does not, its robot may be disqualified.
6. If two robots become entangled, or a crushing or gripping weapon is used and becomes trapped within another robot, the competitors must make the timekeeper aware. The fight is stopped and the robots are separated by the safest means.
7. If a robot falls in the pit, the robot is declared disabled.
8. If a draw occurs, points are given on the basis of aggression, damage, control and strategy, as defined in Section 10.

9. Score Summary

Result	Outcome
Opponent immobilized, thrown out of the arena or disabled in the pit	Win
Opponent disqualified as unsafe	Win
Both robots mobile at the end of the round	Winner decided by judges on aggression, damage, control and strategy

Final Score Calculation:

Where judges' points are used, the robot with the higher total across aggression, damage, control and strategy is declared the winner.

10. Tie-Breaker

If a match is a draw, the judges decide it on the following criteria:

1. **Aggression:** judged by the frequency, severity, boldness and effectiveness of attacks deliberately initiated by the robot against its opponent. If a robot appears to have accidentally attacked an opponent, that act is not considered aggression.
2. **Damage:** through deliberate action, a robot directly or indirectly reduces the functionality, effectiveness or defensibility of an opponent. Damage is not relevant if a robot inadvertently harms itself. If a pressure vessel or a rapidly spinning device on a robot fragments, any damage to the opponent is not considered deliberate.
3. **Control:** a robot is able to attack an opponent at its weakest point, use its weapons in the most effective way, and minimize the damage caused by the opponent or its weapons.
4. **Strategy:** the robot exhibits a combat plan that exploits its strengths against the weaknesses of its opponent, or a deliberate defense plan that guards its weaknesses against the strengths of the opponent.
5. Final decision by the judges / organizing committee.

11. Sanctions on Competition Day

11.1 Absence and Delay

1. Teams must report to the competition area at the announced reporting time.
2. Teams that are not ready after the announced notice period may be considered absent.
3. Rules for late arrival and missed matches: Decide by Judge

11.2 Misconduct and Violations

1. Disrespectful behavior toward participants, judges, organizers or spectators may result in sanctions.
2. Deliberate damage to the arena or equipment is prohibited.
3. Unauthorized assistance, interference or manipulation of competition equipment is prohibited. All resources provided by the organizers at the time of competition may be used only after the organizers' consent.
4. Teams disqualified for disobeying any of the competition rules are removed from the competition. Surprising the organizers with an exploitation of a loophole may cause a robot to be disqualified before it even competes.
5. Robots found unsafe, with unprotected batteries or pneumatics, or in breach of the verification schedule, may be disqualified as stated in the relevant sections.

12. Safety Rules

Compliance with all event rules is mandatory.

1. All robots must pass a safety inspection before participating. Special care must be taken to protect the on-board batteries and pneumatics; robots without proper protection will not be allowed to compete.
2. Robots must have an accessible emergency power switch.
3. Batteries must be handled, charged and stored safely. The voltage between any 2 points in the machine must not exceed 48 V DC.
4. Sharp edges, exposed dangerous wiring and hazardous materials are prohibited. All weapons must have a safety cover on any sharp edges.
5. Proper activation and deactivation of robots is critical. Robots must only be activated in the arena, in testing areas, or with the express consent of the event coordinators.

6. Only authorized team members may enter the arena. Once the robots have entered the arena, no team member may enter it at any point of time.
7. Teams must follow instructions from referees, judges and safety officials.
8. All participants build and operate robots at their own risk. Combat robotics is inherently dangerous and no amount of regulation can cover all the dangers involved. Please take care not to hurt yourself or others when building, testing and competing. Not following this rule may result in disqualification.
9. The organizers may stop any robot or match if a safety risk is identified.

13. Technical Documentation Submission

Each team must submit a portfolio of its machine, consisting of a written abstract and a video (if possible) of the working model, before the competition.

Video Details:

1. The video must be at least 1 minute long, an unedited clip showing the machine's performance to the fullest. All destructive mechanisms used must be shown working.
2. It is not necessary to explain the mechanisms in the video. All portfolios are used strictly for seeding purposes. The elimination procedure is objective, and the evaluation of every participant will be published on the website. The organizers assure the total privacy of the matter submitted.
3. The video and written abstract are the criteria for the selection of your robot. Even if the machine is incomplete, send the portfolio based on the current state of the machine before the deadline instead of sending it late or not at all.
4. All submissions must be made online before the deadline.

Submission Requirements:

- File format: written abstract and video [PDF for document and video format MP4].
- Maximum document length: 5 pages.
- Submission deadline: 20 days before the event.
- Submission method: online, by emailing the video of the robot to yantrawarz@ran.org.np.
- File naming format: [TeamName_YantraWarz].

14. Judging and Rule Changes

1. Judges and referees evaluate matches according to the criteria specified in this rulebook.
2. All results and scoring decisions must be recorded using the official score sheet.
3. Teams may raise questions or objections through their nominated team leader.
4. Any appeal must be submitted within [specified time] after the result is announced.
5. The decisions made by the judges are final, subject to the announced appeal procedure. Teams that are disqualified for disobeying any of the competition rules are out of the competition.
6. The competition date will be published one month before the event.
7. The organizers reserve the right to clarify, modify or update the competition rules, and the above rules are subject to change by the organizers. Any official changes will be communicated to all participating teams.
8. Any situation not covered by this rulebook will be decided by the organizing committee.

16. Registration fee (per team)

Category	Duration	Fee(NPR)	Window
15KG	Normal Registration	NPR 4500	Opening of registration
	Late Registration	NPR 6000	registration closes
8 KG	Normal Registration	NPR 4000	Opening of registration
	Late Registration	NPR 5500	registration closes

How to register

1. Fill in the online registration form at yantra.ran.org.np with team details.
2. Pay the fee and upload the payment receipt(For Nepali Participants).

17. Awards & Certificate Policy

17.1 Awards

Category	Award	Cash prize	Additional benefits
15KG	Winner	NPR 60,000	Participation Certificate, Winner Certificate and feature in Yantra Media
	Runner-up	NPR 35,000	Participation Certificate, Winner Certificate and feature in Yantra Media
8KG	Winner	NPR 50,000	Participation Certificate, Winner Certificate and feature in Yantra Media
	Runner-up	NPR 25,000	Participation Certificate, Winner Certificate and feature in Yantra Media
	Other Participants	To be announced	Winner Certificate and feature in Yantra Media

17.2 Certificate policy

1. Certificates of Excellence or Achievement go to all award winners.
2. Certificates of Participation go to all participating teams.
3. Teams disqualified for breaking the rules are not eligible for any certificate.

Note: Prizes are subject to applicable government taxes

18. Contact Details

Lead, Yantra Warz: Omkar Jaiswal, 9803926279, Robotics Association of Nepal

Lead, Yantra: Kiran Khatri, 9766387092, Robotics Association of Nepal

Milan Tamang, Vice-President, Robotics Association of Nepal Managing Director, Yantra X: Intelligence & Entrepreneurship Festival: 9860059600

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**** Some of the rules and regulations, and minor gameplay are subject to change as required in future ****