KFUPM

ROBONEXUS

Saudi Arabia's Flagship Robotics Festival

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RoboNexus Combat Robotics Guidelines

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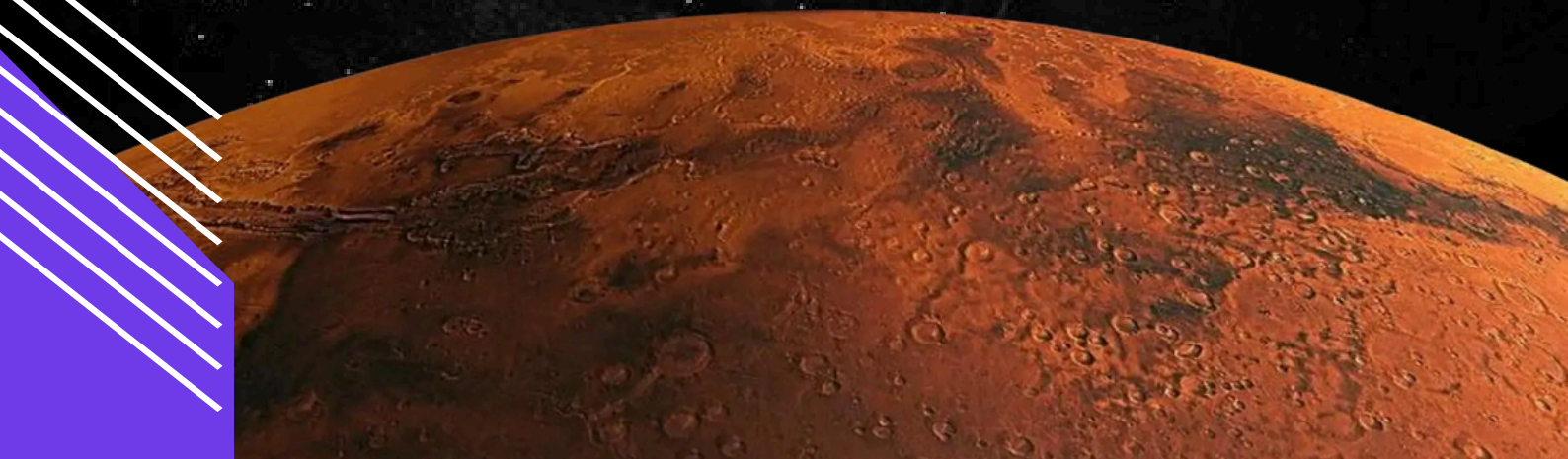

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Section 1: Tournament Rules

1 Introduction

These Tournament Rules outline the definitions and procedures for the RoboNexus contest. Participants may be required to sign additional documents, and RoboNexus reserves the right to update these rules.

1.1 RoboNexus Tournament:

A RoboNexus Tournament celebrates robotic combat. Teams design, build, and control robots to demonstrate creativity, engineering skills, and driving ability.

1.2 Robot Safety:

Safety is paramount during all phases, including design, construction, testing, and competition. Common sense is required. RoboNexus reserves the right to modify the Tournament or Program at its sole discretion to ensure the safety of all attendees.

1.3 *Basic Definitions*

1.3.1 *RoboNexus:*

The corporate entity RoboNexus.

1.3.2 *Producer:*

Collects RoboNexus, Greetings Media, and their officers/employees.

1.3.3 *Officials:*

Executives or designees performing duties at the Tournament.

1.3.4 *Robot / Multi-Bot:*

The combat machine(s) selected to compete.

1.3.5 *Judges:*

A group of at least three people who determine the winner if a match goes the distance.

1.3.6 *Team / Entrant*:

A group of 2+ people associated with a Robot. If a Robot is disqualified, the Team is also disqualified.

1.3.7 *Match Steward*:

The official intermediary between Judges and Teams.

1.3.8 *Primary Applicant*:

The person managing the Team's entry. RoboNexus must approve any changes to this role.

1.3.9 *Alternate*:

A backup Team selected to replace an Entrant unable to compete.

1.3.10 *Tournament / Program*:

Includes all on-location activities, production, and exhibition of the event.

1.4 Documents and Information

1.4.1 *Primary Documents*:

(a) Tournament Rules: Define operational safety and fairness.

(b) Design Rules: Define robot construction requirements.

1.4.2 *Responsibilities*:

Competitors must use the latest version of documents and ensure RoboNexus has their current email.

1.4.3 *Violations*:

Rule violations may result in penalties, removal, or prize forfeiture.

1.4.4 *Prizes*:

Team members must sign allocation and acceptance forms to receive prizes.

1.5 Right to Exclude/Remove:

Officials may exclude any robot judged to be a safety hazard, even if it meets Design Rules. Officials may remove any Robot or Team at any time without explanation. These decisions are final and not subject to appeal.

1.6 Rules Interpretation

1.6.1 *Supremacy:*

These documents supersede previous rules.

1.6.2 *Conflicts:*

If rules conflict, the most restrictive requirement applies.

1.6.3 *Final Authority:*

RoboNexus has sole discretion over rule interpretation, match-ups, and scheduling. Decisions are final and binding.

1.6.4 *Rule Changes:*

RoboNexus may amend rules at any time.

1.6.5 *Clarification:*

If a design is not addressed in the Rules, the Entrant must contact RoboNexus for clarification before construction. No waivers will be issued for non- compliant robots.

2 General Tournament Rules

2.1 Teams Tournament:

Teams and Team members are subject to the following regulations:

2.1.1 Team Name:

RoboNexus may require any Team to change its name at any time. The name must be unique and not identical or confusingly similar to a previously registered Team or a commercially trademarked name. RoboNexus may also require a name change if the name is inappropriate. Once accepted, a Team's name cannot be changed without written permission.

2.1.2 *Team Technical Expertise:*

At least one member (or a combination of members) must possess the knowledge and understanding of all technical aspects of the Team's Robot to ensure safe operation.

2.1.3 *Team Size Limits:*

A Team must consist of a minimum of 2 people. There is no maximum limit on Team size; however, RoboNexus may limit the number of members allowed in the Pit Crew area.

2.1.4 *Team Personnel:*

No person may be a member of more than one Team.

2.2 *Additional Definitions*

2.2.1 Arena:

The enclosed area where combat takes place between Robots. The Arena may also be made available for supervised testing purposes.

2.2.2 *Driving Platform:*

The area adjacent to the Arena where Team members operate their Robots. RoboNexus may limit the number of Team members allowed on the platform during a contest.

2.2.3 *Activation/Deactivation:*

"Activation" is the process of applying power to the Robot's weapons and mobility systems. "Deactivation" is the removal of all power from these systems.

2.2.4 *Disqualification:*

The Robot is no longer allowed to compete in the Tournament.

2.2.5 *Expulsion:*

One or more Team members must leave the Tournament premises for the duration of the event.

2.2.6 *MiniBot:*

A Multi-Bot segment with no active weapon (as defined in the Design Rules) weighing no more than 9 kilograms.

2.2.7 *Pit Area:*

The designated area where Robots and support equipment are prepared, maintained, stored, and tested.

2.3 Competitor Responsibilities

2.3.1 *Response to Officials:*

Competitors must follow the verbal instructions of RoboNexus Officials immediately. Failure to comply may result in penalties.

2.3.2 *Promptness:*

Competitors must arrive on time for all meetings, inspections, ceremonies, and events.

2.3.3 *Match Readiness:*

Competitors are responsible for knowing their scheduled Match time and having their Robot combat-ready at least 30 minutes in advance. Note that exact match times may shift based on previous match outcomes.

2.3.4 *Pit Crew Availability:*

Each Team must have a person available at their designated Pit Table during inspections or contests. At other times, a note must be left with contact information for key crew members. If a Robot is scheduled for a Match and Officials cannot locate the Pit Crew, the Team will Forfeit the Match.

2.3.5 *Informing Officials:*

Competitors must immediately inform Officials of any problems with remote-control radios, their Robot, or any factor affecting participation.

2.4 Operators:

Multiple members of the same Team may control a Robot during a Match. The number of Operators is limited to the number of members allowed on the Pit Crew.

2.4.1 *Positions:*

Operators may only control a Robot from the designated "Driver's Platforms" adjacent to the Arena.

2.5 Robot Completeness:

Each Robot must be a complete unit and not dependent on components from other Robots competing in the Tournament.

2.5.1 *Sharing of Parts:*

A Robot (including its remote control) must not contain parts from any other Robot that is still eligible to compete. A Robot may utilize parts from another Robot only if that other Robot has been eliminated from the competition.

2.5.2 *Sharing of Transmitters:*

Two Robots cannot use the same remote-control transmitter unit.

2.6 Prohibited Activities:

RoboNexus expects safe and legal behavior. Violations may result in Disqualification or Expulsion.

2.6.1 *Unruly Behavior:*

Fighting, belligerence, threats of violence, or abusive physical contact with any RoboNexus Official will not be tolerated and can result in immediate Expulsion of the entire Team.

2.6.2 *Vehicles in Pit Areas:*

Scooters, bicycles, skateboards, skates, and powered vehicles (Segways, hoverboards) are prohibited in the Pit Areas. Exceptions are made for wheelchairs used by disabled persons and official operations vehicles.

2.6.3 *Running and Playing:*

Running in the Pit Area is prohibited except in emergencies. Running while carrying charged pneumatic tanks or sharp/dangerous parts may result in the revocation of a Pit Pass. Horseplay, tossing items, and operating remote-control vehicles in the Pit Area are strictly forbidden.

2.6.4 *Team Property:*

No Team member may deliberately touch or handle the Robot, tools, or equipment of another Team without explicit verbal authorization.

2.6.5 *Smoking:*

Tobacco products and nicotine vapor devices (e-cigarettes) are prohibited in the Pit Areas and any marked "No Smoking" zones.

2.6.6 *Dangerous Items:*

No firearms, weapons, explosives, or lasers may be brought to the Tournament. Pointing a laser at any person will result in immediate Team Expulsion.

2.6.7 *Pets:*

No pets are allowed at the Tournament.

2.6.8 *Fire Marshals:*

Fire Marshals may place additional requirements or restrictions on any persons at the Tournament to ensure compliance with local safety ordinances.

3 Pit and Preparation Area Rules

3.1 *Pit Access*

3.1.1. ***Pit Areas:*** Theterm "Pit Area" encompasses several distinct zones within the Tournament premises:
(a) Main Pit Area: Where Robots are stored and prepared.
(b) Battery Charging Area: Where all main Robot batteries are charged.

3.1.2. ***Pit Table***: Each Team is assigned a specific, numbered table in the Main Pit Area. This number must not be obscured. Team members are responsible for all activities occurring at their table.

3.1.3. ***Pit Crew and Passes:*** The "Pit Crew" consists of Team members wearing "Pit Passes" (laminated cards issued by RoboNexus).A Pit Pass must be worn and visible at all times in the Pit Area.

- Passes should be removed when actively Activating or Deactivating a robot (to prevent snagging).
- Teams are issued up to 5 Pit Passes (limited to the actual number of Team members).
- Transferring Passes: Passes are exchangeable only between members of the same Team. Transferring a pass to a non-Team member will result in immediate confiscation and expulsion from the Pit Area.

3.1.4. ***Visitors:*** Subject to safety requirements, visitors may be allowed into designated areas if they have received prior approval from RoboNexus and

are escorted by a Team member. There is a strict limit of 2 visitors per escort.

3.2 Pit Safety Requirements

Common sense and safety awareness are required at all times. RoboNexus reserves the right to revoke the Pit Pass of any member violating these rules.

3.2.1 *Personal Protective Equipment (PPE):*

- Eye Protection: All persons in the Pit Areas must wear shatterproof safety glasses or face masks at all times. Corrective glasses are not a substituteunless they have shatterproof lensesand side shields.

3.2.2 *Foot Protection:*

Closed-toe shoes with full soles are mandatory. Sandals, open-toe shoes, or bare feet are prohibited in the Pit Area.

3.2.3 *Runaway Prevention:*

When stored at the Pit Table, the Robot's motion system (wheels, tracks, legs) must be suspended off the ground with at least 1 cm clearance. The Robot must be incapable of translational motion even if the drive system inadvertently activates.

3.2.4 *Protective Covers:*

All sharp edges, pinch hazards, and weapons must have Safety Covers and Restraints installed at all times, unless a Pit Crew member is actively working on that specific component.

3.2.5 *No Hazardous Work at Tables:*

Welding, power grinding, and sanding are strictly prohibited at the Pit Table. These operations must be done only in the designated Welding and Grinding Area, and teams are responsible for bringing their own tools and equipment for any work done there.

Exception: Drilling a small number of holes is allowed at the Pit Table, provided all shavings are contained and immediately cleaned.

3.3 No Robot Activation:

Under no circumstances may a Robot be Activated (powered on) in the Pit Area. Activation is only permitted in the Arena.

3.3.1 *Pneumatics/Hydraulics:*

Systems must not be pressurized in the Pit Area. All shut-off valves must be closed, and pressure-relief valves open.

3.3.2 *Pressure Tank Storage:*

Pressurized pneumatic storage tanks are allowed in the Main Pit Area only if:

(a) They are undamaged and meet Design Rules pressure limits.
(b) They are equipped with a pressure relief valve or burst disk.
(c) They are securely installed in the Robot or a container (no loose tanks allowed).

3.3.3 *Prohibited Operations:*

Tank Charging: No pneumatic tank charging in the Main Pit Area.
Fuelling: No gasoline or flame system filling in the Main Pit Area.
Battery Charging: No main Robot battery charging in the Main Pit Area.

3.3.4 *Robot Location*

Once a Robot arrives at the Tournament, it cannot be removed from the premises until it is no longer competing. Parts may be brought in or out, but theRobot itself must substantially remain on-site.

3.4 Robot Testing and Transport

3.4.1 *Robot Transport:*

When moving the Robot to/from the Pits or Arena:

(a) The Robot must be on a rolling dolly or cart. Driving the robot or hand-carrying it is prohibited.
(b) All Safety Covers and Restraints must be installed.
(c) The Robot must be completely Deactivated.
(d) No Passengers: Riding on robots or carts is strictly prohibited.

3.5 Battery Charging Rules

3.5.1 *Designated Area:*

Main Robot batteries must be charged only in the designated "Battery Charging Area." If batteries are not removable, the entire Robot must be moved to this area.

3.5.2 *Charger Requirements:*

Teams must provide their own chargers, clearly labeled with the Team Name and Pit Table number.

3.5.3 *Lithium Safety:*

- Lithium chargers must have automatic overcharge protection.
- Containment: Teams must use containment envelopes (LiPo bags) or other functional safety means during charging. Emergencies: If a battery swells or smokes, it must be immediately placed in the provided sand buckets or salt-water baths.

3.5.4 *RC Transmitters:*

A specific exception exists for radio-control transmitter batteries; these may be charged at the Pit Table using unmodified, commercially made chargers.

3.6 *Cleanliness and Waste*

Teams must keep their Pit Table clear of trash and debris. RoboNexus provides specific disposal containers for hazardous materials (fuel, oil, hydraulic fluid, damaged batteries). Disposal of hazardous waste in regular trash is a violation of local codes and may result in Disqualification.

4 Remote-Control Radio Use

4.1 *Design Rules Compliance:*

All robot radio-control equipment ("R/C Equipment") must strictly comply with the requirements set forth in the Design Rules document, including regulations regarding allowed frequencies and control types.

4.2 *Unauthorized Use:*

To prevent radio interference and safety hazards, Teams must follow all instructions from RoboNexus Officials regarding the operation of their R/C Equipment.

4.3 *Penalty:*

The unauthorized or improper use of any radio control transmitter is grounds for the Disqualification of a Robot and/or the Expulsion of a Team.

4.4 *Radio Operation Restrictions:*

Radio transmitters and receivers must not be powered on in the Main Pit Area or any location other than The Arena.

Exception: Radios may only be powered on in other areas if specifically authorized by a RoboNexus Official who is present to supervise the operation.

4.5 *Transmitter Responsibility:*

Teams should clearly label each remote-control transmitter with their Team Name and Pit Table number. RoboNexus and its affiliates assume no responsibility for the safeguarding, loss, or damage of any transmitters or remote-control equipment.

5 Safety/Technical Compliance

5.1 *The Safety/Tech Inspection:*

To be eligible to compete in the Tournament and be officially defined as a "Robot," an Entrant's machine and any associated auxiliary systems must pass a full Safety and Technical Inspection ("Safety/Tech Inspection").

5.2 *Safety Administrator (SA):*

The RoboNexus Official responsible for scheduling robots for Inspection and recording the results. The SA is the primary point of contact for any questions or disagreements regarding inspection scheduling and procedures.

5.3 Safety/Tech Inspector:

A RoboNexus Official responsible for inspecting robots for strict compliance with all Rules. Inspectors also oversee the safe preparation, handling, and testing of robots at the Tournament.

5.3.1 Disagreement with Inspector:

If an Entrant disagrees with an Inspector's decision regarding Rule compliance, they may notify the SA to request a review. Similarly, if a Team believes a requested test is unnecessary or damaging, they may refuse the test and request a review. Any review will be conducted by RoboNexus or a designated proxy, and the resulting decision will be final.

5.4 Safety/Tech Checks:

The Safety/Tech Inspection confirms that the robot complies with all Design Rules and Tournament Rules.

5.4.1 Full Disclosure:

During Inspection, an Entrant must fully and accurately disclose all features of the robot that could affect safety or compliance. Deliberate misrepresentation or hidingof features may result in Disqualification.

5.5 Robot Weighing

5.5.1 Tournament Official Scale:

One specific scale will be designated the "Official Scale." This scale governs all official weigh-ins. RoboNexus will ensure the accuracy and consistency of this scale.

5.5.2 Weight Limit:

The weight limit specified in the Design Rules is strictly enforced. The robot is weighed in its combat-ready configuration, including all gases and liquids.

5.5.3 Dithering:

If the digital reading on the Official Scale fluctuates between two values ("dithering") for more than 5 seconds, the highest displayed weight will be recorded.

5.5.4 Alternate Configuration Weights:

If a robot uses modular weapons or alternate configurations, *each* configuration must be weighed separately and must be within the weight limit.

5.5.5 MultiBot Segment Weight

A MultiBot is weighed as a collective whole to ensure it meets the total limit. Additionally, each individual segment (robot) must be weighed separately, and a sticker indicating its weight must be applied to the segment. If a segment is modified, it must be re-weighed and re-labeled.

5.5.6 Other Scales:

Teams may use other scales for reference, but the Official Scale is the only authority for compliance.

5.6 Additional Inspections and Testing:

Passing the initial inspection does not exempt a robot from future checks.

5.6.1 Robot Modification:

If a robot is modified in any way that affects safety, operation, or appearance, the Team *must* request a re-inspection. Failure to request re-inspection after a modification can result in Disqualification.

5.6.2 Right to Request:

If any Official or Competitor believes a robot is non-compliant, they may request a re-weigh or re-inspection at any time (except during a Match).

5.6.3 Best Effort:

Teams selected for re-inspection must make their best effort to prepare the robot immediately. Failure to cooperate may result in Disqualification.

5.6.4 Non-Compliance Penalties:

(a) Accidental non-compliance (outcome not affected): The robot must be modified to comply. (b) Accidental non-compliance (outcome potentially affected): The robot may be Disqualified. (c) Deliberate non-compliance: The robot may be Disqualified. (d) Deliberate non-compliance endangering safety: The Team is subject to Expulsion.

5.7 Damaged-Robot Requirements:

If a robot is damaged by combat or other means, it must meet the following requirements before it can be Activated again:

5.7.1 Activation/Deactivation Access:

If damage prevents the robot from meeting Activation/Deactivation time limits, it must be repaired before being turned on.

5.7.2 Safety Covers:

If covers or restraints are damaged, new ones must be fabricated that meet Design Rules.

5.7.3 Electrical Systems:

Damaged Master Switches must be replaced or repaired to full functionality before the robot is Activated.

5.7.4 Pneumatic Systems:

(a) If a pressure storage tank is damaged structurally, it must be immediately depressurized and never used again at the Tournament.

(b) Damaged valves or components must be replaced before the system is pressurized.

5.7.5 Hydraulic Systems:

Damaged reservoirs or components must be repaired or replaced to full integrity before the system is pressurized.

5.7.6 Flame Systems:

(a) Damaged gas tanks must be immediately depressurized and never used again.

(b) Damaged components must be replaced before the system is pressurized.

5.7.7 Competitor Responsibility:

It is the Team's responsibility to constantly check for damage. Deliberate Activation of a damaged, non-compliant robot may result in Disqualification.

5.8 Officials and Safety:

If a RoboNexus Official determines at any time that a robot poses a threat to Tournament safety, RoboNexus reserves the right to require specific modifications. If such modifications are not possible, the robot may be Disqualified.

6 Match Descriptions

6.1 Competition Terminology

6.1.1 Tournament Definitions

(a) Match: A one-on-one combat competition used for eliminations.

(b) Rematch: A repeat Match occurring when a previous Match was stopped or declared incomplete.

(c) Arena: The armored venue where Matches take place.

(d) Round: One set of Matches where all remaining Competitors compete to advance.

(e) Eliminations: The standard Tournament format of successive Rounds leading to one winner.

(f) Hazards: Powered obstacles in the Arena controlled by persons outside the arena.

6.1.2 Match-Specific Terminology

(a) Disabled: A Robot is malfunctioning due to internal failure or combat damage.

(b) Disqualification: A Robot and Team are removed from the Tournament.

(c) Engagement Avoidance: Deliberately avoiding contact with an actively pursuing opponent.

(d) Fault: Moving or activating weapons before the official Match start. **(e) Forfeit:** Losing a Match due to not being ready or specific illegal actions. **(f) Incapacitated:** A Robot is deemed non-Responsive by a Referee for a specified time.

(g) KnockOut (KO): Winning because the opponent Robot is Incapacitated by an attack.

(h) Lifting/Grappling: Controlling an opponent's motion by raising them or grabbing/holding them.

(i) Pinning: Holding an opponent stationary against the Arena edge through sheer force.

(j) Postponement: Delaying a Match from its scheduled time.

(k) Radio Interference: Loss of control due to the opponent's signal.

(l) Responsive: The ability to display controlled, directed translational movement.

(m) Restart: Resuming a Match after a Fault or Timeout.

(n) Stuck: A Robot is hung up on the Arena or opponent and is effectively non-Responsive.

(o) Tap-Out: Not Allowed. Teams cannot concede a Match voluntarily.

(p) Technical KnockOut (TKO): Winning due to opponent Incapacitation that was not caused by the winner's direct action.
(q)Timeout: AtemporaryhalttotheMatchcalledbyRefereesorOfficials.

6.2 Matches

6.2.1 Match Format:

Matches begin with two Robots in colored squares on opposite sides of the Arena. They must remain motionless until the official start. Once started, Robots fight to Incapacitate their opponent.

6.2.2 Robot Weapon Operation:

At the start of a Match, a Robot must demonstrate the effective operation of at least one powered weapon system. Failure to do so may result in a Forfeit.

6.2.3 Match Time Limits:

Matches last for 3 minutes of fighting time (excluding Timeouts), unless terminated early.

6.2.4 Early Termination:

A Match ends early upon Forfeit, Disqualification, or Incapacitation.

6.2.5 Time Between Matches:

Teams may compete in multiple Matches per day but are guaranteed at least 60 minutes between Matches. Teams unable to compete after this period may be required to Forfeit. Officials will attempt to schedule fair intervals between Matches.

6.2.6 Match Postponement:

Teams may request a postponement due to technical issues, subject to Official approval. Once granted, any further postponement requires the approval of the *opposing* Team. RoboNexus reserves the right to postpone any Match at its sole discretion for production reasons.

6.3 Tournament Judges:

Judges provide informed subjective decisions on Matches that go the full 3 minutes.

- **Composition:** There will be at least 3 Judges per Match.
- **Head Judge:** Appointed to break ties if necessary.
- **Duties:**
  - Decide Match outcomes (if no KO occurs).
  - Watch for technical/safety violations.
  - Recommend Disqualifications.

6.4 Referees:

Referees supervise the Competitors and the Match flow.

- **Assignment:** 2 Referees per Match.
- **Duties:**
  - Start/Stop Matches.
  - Declare KnockOuts (KO).
  - Call Timeouts.
  - Enforce safety.
- **Authority:** Referees may eject any disruptive person from the Arena area immediately.

6.5 CrewBots:

CrewBots are the safety personnel managing Robot movement near and inside the Arena.

6.5.1 Entry andActivation:

CrewBots escort Robots into the Arena, supervise Activation, and secure the Arena doors.

6.5.2 During Timeouts:

CrewBots may enter the Arena to assist in separating Robots (unsticking) or ensuring safety.

6.5.3 Post-Match:

CrewBots determine when it is safe to open doors. They supervise Deactivation and exit. No Team member may open the Arena doors.

6.5.4 Authority:

CrewBots may eject disruptive Team members and recommend Disqualification for safety violations.

7 Contest Procedures

7.1 Prior to Match Start

7.1.1 Arena Pit Crew:

Subject to safety rules, Pit Crew members may move the Robot into the Arena. However, during Activation and Deactivation, at most one Pit Crew member per Robot is allowed inside the Arena.

7.1.2 MultiBot Weights:

If a MultiBot's segments are not obviously equal in weight, the Team must inform the Judges of each segment's weight prior to the Match.

7.1.3 Initial Robot States:

Before the Match starts, Robots must be:

(a) Completely inside their starting square.

(b) Motionless on the floor.

(c) Having all external weapon components motionless.

(d) Un-ignited (if using a flame system).

Note: Spring devices and autonomous functions may be armed/enabled.

7.2 Beginning of the

7.2.1 Match *Starting Lights:*

Combat occurs only when the Starting Lights are Green.

7.2.2 Countdown:

Referees determine readiness. An Operator from each Team presses a button to confirm readiness.

7.2.3 Match Start:

The Match officially begins when lights turn from Red to Green (or upon Referee verbal declaration).

7.2.4 Fault:

Premature movement or procedure violations result in a "Fault" and a Restart. More than two Faults in a single Match may result in Forfeit.

7.2.5 Restart:

Robots must return to starting positions and states (see 7.1.3.) before a Restart.

7.3 During the Match

7.3.1 Referee Observation:

Referees monitor for Pinning, Lifting, Grappling, Stuck robots, Incapacitation, Avoidance, flame violations, and Radio Interference.

7.3.2 Timeouts:

Any Referee can call a Timeout. All Robots and weapons must immediately stop moving.

7.3.3 Pinning:

Holding an opponent stationary is allowed for 10 seconds max. If the attacker does not release after instruction, the Team may be Disqualified.

7.3.4 Lifting:

Lifting an opponent is allowed for 10 seconds max (or 30 seconds if actively moving the opponent around the Arena). Failure to release upon instruction may result in Disqualification/Forfeit.

7.3.5 Grappling:

Grabbing and holding is allowed for 30 seconds max. Failure to release upon instruction may result in Disqualification/Forfeit.

7.3.6 Single Robot Stuck:

A Robot stuck on the Arena must free itself within 20 seconds or be declared Incapacitated.

Exception: If stuck within the first 60 seconds of the Match, the Match may be stopped, the robot freed, and the Match restarted (if both Competitors agree).

7.3.7 Both Robots Stuck:

(a) If two Robots are stuck together (or both stuck on the Arena), a Timeout is called. CrewBots will separate them if safe.

(b) If safe to continue, the Match Restarts.

(c) If unsafe to separate (or unsafe to continue), the Judges decide the winner (if > 60 seconds elapsed) or schedule a Rematch (if < 60 seconds).

7.3.8 Restart After Unsticking:

CrewBots will right inverted robots and orient them to prevent immediate contact

7.3.9 Responsiveness:

A Robot is "Responsive" if it displays controlled translational movement. Random movement or rotation only is considered non-Responsive.

7.3.10 Radio Interference:

Teams must report interference immediately. A Timeout will be called to resolve it. Unresolved interference may result in Officials declaring a winner.

7.3.11 Flame Effects:

Flame damage to an opponent is valid.

7.3.12 "Flame Off":

If a Robot uses flames in a "No-Flame Zone," the Referee will order "Flame Off." Failure to comply may result in Forfeit.

7.3.13 Flame System Failure:

If flames cannot be turned off, the Match stops. The Robot must be driven to the center until fuel is exhausted. Officials decide whether to restart or declare a default winner.

7.3.14 Robot Fire:

If a Robot catches fire (unintentionally), the Match may be stopped. Officials are *not* obligated to extinguish the fire or allow entry until it burns out.

7.4 Match Winner Criteria

7.4.1 Forfeit (Rules Violation):

UnanimousJudges' agreement on a rule violation resultsin Forfeit.

7.4.2 Forfeit (Engagement Avoidance):

Deliberately avoiding contact after a Referee warning results in Forfeit.

7.4.3 Single Incapacitation (KO):

A Referee may request a responsiveness check at any time. The Team has 20 seconds (final 10 counted down) to demonstrate controlled movement. Failure results in Incapacitation (KnockOut). Obvious non-responsiveness can be declared immediately without a count.

7.4.4 MultiBot Incapacitation:

Occurs when >60% by weight of the segments are Incapacitated.

7.4.5 Multiple Incapacitation (TKO):

If both Robots become Incapacitated non-simultaneously, the last one moving wins.

7.4.6 Simultaneous Action (TKO):

If both become Incapacitated within 5 seconds of an impact:

- >60 seconds elapsed: Judges decide the winner.
- <60 seconds elapsed: Rematch (or Judges decide if Rematch is impossible).

7.5 Judges' Determination (Scorecard):

If a Match goes the full 3 minutes, Judges assign points based on four criteria. The winner is determined by majority vote.

- **Aggression (2 Points):** Frequency, severity, and boldness of *primary weapon* attacks. Ramming with a wedge (without a weapon) does not count as Aggression.
- **Control (1 Point):** Ability to dictate the fight, avoid hazards, and minimize damage received.
- **Damage (1 Point):** Reducing the opponent's functionality or effectiveness (directly or via Hazards). Self-inflicted damage is not counted.
- **Strategy (1 Point):** Exploiting opponent weaknesses, protecting own weaknesses, and using Hazards effectively.

7.6 Disqualification and Forfeit

7.6.1 Non-Compliance:

Deliberate failure to follow instructions results in Disqualification.

7.6.2 Safety Violation:

Unanimous decision by Officials/Judges results in Disqualification.

7.6.3 Inappropriate Behaviour:

Referee may eject a disruptive Operator. If the Robot cannot run without them, the Team loses by Forfeit.

7.6.4 Attacking Hazards:

Deliberately attacking Arena Hazards results in Forfeit.

7.6.5 Post-Match Attacks:

Attacking an opponent after the Match ends may result in Disqualification or Expulsion.

7.7 RoboNexus Authority:

RoboNexus Officials have the final authority to Disqualify any Team for safety or technical violations at any time. All decisions are final.

8 Tournament Format

8.1 Tournament Contestants

The contestants in the Tournament are initially composed of:

- **(a)** 24 Entrant Teams
- **(b)** 8 Alternate Teams

8.2 Activity Sequence

The Tournament consists of **three** activities in the following sequence:

1. **Rehearsal Matches** (Optional/Practice)
2. **Qualifying Round** (Selection for Championship)
3. **Championship Tournament** (Double Elimination Bracket)

8.3 Rehearsal Matches

Practice fights in the Arena for production personnel to test coverage.

- Only Alternate Teams that volunteer may participate.
- There are no declared winners or losers.

- Match duration may vary from the standard 3 minutes.
- Participants may earn prize money.

8.4 Qualifying Round

Used to select the final field for the Championship Tournament.

- **Participants:** Includes the **24 Entrant Teams** and the **8 Alternate Teams (32 Teams total).**
- **Format:** 16 one-on-one standard Matches (3 minutes).
- **Outcome:**
  - (a) The 16 winners automatically advance to the Championship.
  - (b) Wildcards: RoboNexus will select 8 of the Qualifying Round losers to fill the final spots in the Championship.
  - (c) The remaining losers are eliminated (or may serve as emergency Replacements).

8.5 Championship Tournament

The Championship Tournament uses a **Double Elimination** format with the 24 advancing teams.

8.5.1 Format:

Teams are divided into a "Winner's Bracket" and an "Elimination Bracket." A Team is not eliminated from the Tournament until they have lost **two** Matches.

8.5.2 Progression:

- **Winner's Bracket:** Teams who continue to win advance through this bracket.
- **Elimination Bracket:** Teams who lose a Match in the Winner's Bracket drop to this bracket. A loss in this bracket results in elimination.

8.5.3 Finals:

The winner of the Winner's Bracket will face the winner of the Elimination Bracket for the Tournament Championship.

8.6 Championship Seeding

After Wildcards are selected, RoboNexus ranks all advancing Teams from **#1 to #24**. Seeding determines match-ups (Highest vs. Lowest).

8.7 Selection Criteria

RoboNexus selects participants for Qualifiers and Wildcards at its sole discretion, based on:

- Safety and Functionality
- Team History and Performance
- Robot Design, Originality, and Entertainment Value
- Potential Match-up Excitement

8.8 Replacement Teams

If a spot opens due to Forfeit or Disqualification, RoboNexus may select a Replacement Team. Typically, this is a Team that lost in the immediately preceding round.

8.9 Robot Ranking

Rankings are used for Seeding.

8.9.1 Criteria:

Based on points accumulated during the Tournament.

8.9.2 Points:

- **2 points** for each win in the Winner's Bracket.
- **1 point** for each win in the Elimination Bracket (Loser's Bracket).
- **1 point** for each win caused by opponent Forfeit.
- **2 points** for Tournament Championship.
- **1 point** for Runner-up. *Note: No points are given for any Bye.*

8.9.3 Tie-Breakers:

- Most KnockOuts.
- Fastest average KnockOut time.
- Judges' scores.

9 Rules Enforcement

9.1 Rules Compliance:

In all matters regarding these Rules and applicable civil or criminal laws, RoboNexus and the Producer reserve the right to warn, fine, Disqualify, or Expel any Team or individual Team member for non-compliance.

9.2 Team Responsibility:

The action of any single Team member is the responsibility of the whole Team. If an individual member violates the Rules, the entire Team may be penalized, Disqualified, or Expelled.

9.2.1 Team Member Expulsion:

If a Team member is Expelled, they must immediately leave the Tournament premises. They must surrender their Pit Pass, and the Team cannot replace them with a new member. The Expelled member may be declared ineligible for future RoboNexus events.

9.2.2 Team Expulsion:

If an entire Team is Expelled, they must vacate their Pit Table, surrender all Pit Passes, and leave the Tournament premises immediately. The Robot and Team members may be excluded from future RoboNexus competitions.

9.3 Repeated Warnings:

Teams may receive warnings for unintentional rule violations. However, repeated offenses trigger an escalation process:

(a) First Warning: The violation is explained; the Team is warned not to repeat it.

(b) Second Warning: The Team is informed that a subsequent violation of the same rule will result in Disqualification.

(c) Third Warning: The entire Team and their Robot are Disqualified.

(d) Egregious Violations: Certain severe violations may result in immediate Disqualification without prior warning.

9.4 Protests and Appeals:

Teams have no right to protest or appeal the decision of a RoboNexus Official, Judge, or Referee.

10 Combat Robot Basics

10.1 Movement

- Robots must be capable of controlled movement using wheels, tracks, legs, or other approved mobility systems. Non-wheeled robots (e.g., shufflers,
- walkers) are allowed and may receive weight bonuses as defined in the weight section.

10.2 Robot Control

- All robots must be fully driver-controlled.
- Autonomous functions are allowed only if they can be overridden by the driver at any time. Fully autonomous robots are not allowed. Robots must immediately
- shut down the drive and weapon power if the control signal is lost.

10.3 Weapons

Robots may use any permitted active weapon system, including spinners, hammers, lifters, flippers, crushers, and saws. All robots are required to have an active weapon. Weapons must not fire autonomously. Weapons must remain inactive until the robot is powered up inside the arena.

10.4 Multibots

Multibots are allowed provided:

- The combined weight does not exceed the class limit (including bonuses).
- All bots meet activation, safety, and control requirements. All
- bots can be activated/deactivated within the allotted
- activation time. Each bot in a Multibot must have its own master switch.

10.5 Size Limit

- Robots may not exceed 50 cm × 70 cm × 50 cm in their starting
- configuration. Expanded or extended states (weapons, arms, lifting platforms) may not exceed 75 cm in any direction.

10.6 Component Protection

- Robotsmust protect internal electronics, batteries, receivers, and wiring with armor or rigidhousings. Exposedmoving parts (belts, gears, chains)
- must be shielded to prevent debris ejection. Sharpedges must be covered during handling and transport.

11 Weight Limit

11.1 Maximum Weight

All robots must be lightweight class and may weigh up to **27 kg**.

11.2 Weight Exemptions

The following do not count toward the official weight:

- Weapon locks and transport restraints
- Safety covers
- Team identification flags or panels
- Required labelling
- Safety tethers
- Protective weapon guards used during transport only

These items must be removed before the match begins.

11.3 Weight Bonuses

Non-wheeled robots (e.g., shufflers, walkers) may receive a weight bonus.

- The bonus amount will be specified by the organizers and may vary depending on design complexity. Bonus eligibility requires pre-approval of the mechanism.

12 Activation & Deactivation Requirements

12.1 Master Switch

Each robot must have an easily accessible master power switch that disconnects all drive and weapon power. The switch must be operable with one hand.

12.2 Indicator Light

A visible indicator light must illuminate whenever any electrical system is active. The light must be clearly visible from outside the robot.

12.3 Activation

Robots must be fully activated and combat-ready within 60 seconds, including removal of weapon locks and safety blocks. Upon activation, neither the drive system nor the weapon may move until commanded by the driver. If the robot cannot safely activate within the time limit, it may be disqualified.

12.4 Deactivation

Robots must be fully powered down within 30 seconds after a match or during emergency procedures. Weapon locks must be reinstalled before removal from the arena.

13 Electrical System

13.1 Maximum Voltage

- Robots may not exceed the maximum system voltage specified by the organizers (60V).

- **Boost circuits** are allowed as long as downstream components meet safety requirements.

13.2 Batteries

Only approved battery chemistries may be used (e.g. LiPo, LiFePO4, NiMH). All batteries must be securely mounted, impact-protected, and enclosed to prevent puncture. Swappable battery packs must have protective casings.

14 Autonomous Functions

Permitted autonomous functions include:

- Self-righting Weapon
- spin-up automation
- Hazard avoidance
- Proximity slowing Driver-
- assisting sensors

All functions must be overridable at any time. Weapons may not activate autonomously. Fully autonomous robots are prohibited.

15 Remote Control

15.1 Requirements

- All robots must be remotely operated using an approved Digital Spread Spectrum (DSS) or equivalent interference-resistant radio system.
- Robots cannot be autonomous and must remain under the driver's direct control at all times.

15.2 Failsafe

- All systems must automatically cease motion (drive and weapon) if the transmitter loses power or signal. This will be verified during inspection.

15.3 Frequency Management

- Teams are responsible for ensuring that their radio systems do not interfere with, or become interfered by, other competitors' systems operating in the same frequency band.
- Each team must declare their operating band or DSS system upon registration.

15.4 Control System Restrictions

- Pre-1991 analog or narrow-band RC systems are not allowed.
- Tethered control systems are prohibited.
- Custom control systems must receive prior approval from RoboNexus officials before competition.

15.5 Multibot Control Systems

- Each sub-bot must have its own master power switch, indicator light, and failsafe that stops all motion upon signal loss.
- All sub-bots must be activated within the same 60-second setup period prior to a match.
- Sub-bots may be controlled by a single transmitter or by separate transmitters, provided that all control systems operate on non-interfering frequencies.
- All sub-bots must independently meet the same control, safety, and activation standards as a single robot.

RadioRequirement:

- Eachsub-bot weighing over 5.4 kg (12 lbs) or equipped with an active weapon must use aPCM, IPD-coded, 900 MHz, or 2.4 GHz Digital Spread Spectrum (DSS) radio system,as defined in Section 15.1.

16 Construction Materials

16.1 Prohibited Materials

To protect competitors, staff, and the arena, the following materials are not permitted anywhere in the robot:

- Explosives, pyrotechnics, or reactive chemicals.

- Corrosive, acidic, or toxic substances.

- Flammable liquids or gels.

- Lead, mercury, or radioactive materials.

- Glass or brittle ceramics.

- Materials that can shatter and create airborne hazards (e.g., unsealed carbon fiber dust, fiberglass dust).

- Polyurethane foams or other materials that may produce toxic smoke when ignited.

16.2 Exterior Materials

- The robot's exterior must be constructed of durable, non-flammable armor (e.g., aluminum, steel, titanium, UHMW, or polycarbonate).

- Armor and panels must be securely attached; no loose or flexible external parts are allowed.

- No sharp protrusions or unprotected spikes are permitted when handling the robot outside the arena.

- Paint, decals, or cosmetic materials must not obscure team numbers or safety indicators.

16.3 Interior Materials

- Internal components must be securely mounted and shielded.

- All wiring must be insulated, tied down, and protected from abrasion and impact.

- Batteries must be enclosed in a rigid, fire-resistant compartment.

- No liquid cooling systems or open containers are permitted.

- flammable systems are prohibited inside the robot.

16.4 Magnets

- Magnets may be used for traction or stabilization if they do not damage the arena floor or interfere with another robot's electronics.
- Permanent magnets are allowed if approved by inspectors.
- Electromagnets may be restricted or require additional safety measures.

17 Flames

17.1 General Rules

- Flame systems are allowed only as secondary or show effects.
- Flames cannot be used as the robot's primary weapon.
- All flame systems must pass a controlled ignition and emergency shutdown test before approval.

17.2 Fuel and Pressure Systems

- Permitted fuels: propane or butane only.
- Maximum fuel capacity: 0.5 Liters (or equivalent).
- Storage tanks: must be pressure-rated, leak-free, and armored.
- Hoses: must be high-pressure rated, undamaged, and securely connected.
- Tank location: must be as far as practical from heat sources and impact zones.

17.3 Flame Output

- Maximum flame length: 30 cm (1 foot).
- Flames must not contact or be directed toward arena walls, ceiling, or outside the opponent's robot footprint.
- Flame weapons may only be activated within the designated flame-approved zone.

Flames must never be used near arena walls, polycarbonate panels, or any restricted

areas. Any ignition outside the marked zone is strictly prohibited and will result in penalties or disqualification.

- The system must demonstrate immediate ignition and full shutdown control via remote operation. No oxidizers, accelerants, or pressurized
- liquids are permitted.

18 Active Weapons

18.1 Weapon Definition

An active weapon is any powered device designed to damage, control, or disable another robot. Every robot must have at least one active weapon.

18.2 Projectiles

- Untethered projectiles are strictly prohibited.
- Tethered projectiles are allowed only if: The tether is no longer than **2 meters**. The projectile cannot leave the arena or endanger spectators.

18.3 Multiple Weapons

- Robots may include multiple active weapons, provided each complies with safety and weight limits.
- Only one weapon may be armed at a time during testing unless authorized by inspectors.

18.4 Spinners and Rotational Weapons

- All spinning weapons must be mechanically secured and balanced.
- Weapons must come to a complete stop within 30 seconds of power loss or shutdown command.
- External moving parts must not exceed 113 m/s (≈370 ft/s) tip speed unless - approved by organizers.

- Whole-body spinners or drums must have energy containment measures and will be inspected for safety certification.

18.5 Flippers and Lifters

- Pneumatic or electric flippers must include pressure relief valves and durable linkages.
- Must demonstrate safe operation without damaging the arena.
- Robots must have a means of self-righting or disabling the flipper when inverted.

18.6 Multibot Weapons

- Each sub-bot in a Multibot system must have its own independent activation and safety mechanism.
- All sub-bots must comply with drive, control, and weapon safety requirements.

18.7 Prohibited Weapons

- Explosives, firearms, or combustion projectiles.
- Lasers, microwaves, or directed-energy weapons.
- Liquids, adhesives, foams, or entangling devices (nets, tape, fishing line, etc.).
- Bright strobe or blinding lights.
- Radio jammers or signal interference systems.
- Any weapon that deliberately releases hazardous debris or gases.

19 Internal Combustion Engines

19.1 Internal Combustion Engines

- Internal combustion engines are not permitted in any RoboNexus competition class. Robots must be powered by electric systems only.

Section 3: Arena Specifications

20 RoboNexus Combat Robotics Arena Specifications

20.1 Dimensions & Structure

- Arena Size: 6 m × 6 m internal floor
- space. Height: 2.5 m (fully enclosed).
- Raised Platform: Arena elevated 0.5 m above the ground, includes integrated trap hole system. (Total height of 3 meters)
- Frame Material: Fully welded steel frame, grounded and insulated.
- Bottom Section: Closed steel enclosure housing electrical systems and maintenance access.

20.2 Walls & Roof

- Material: Polycarbonate
- Configuration:
  - o Double-layered panels: Two sheets of 16 mm each.
  - o Gap: 75 mm between layers for energy absorption.

20.3 Floor

- Material: Stainless steel plate, 5–6 mm thick.
- Obstacles and Traps:
  - o Contains a trap hole
  - o Hole size: ~0.6 m × 0.6 m, material: steel.

20.4 Containment & Safety

- Fully sealed enclosure to contain debris, sparks, and fire.
- Ventilation: Sealed exhaust system to handle fumes and minor fire effects.
- Grounding: Electrical grounding on the frame and floor.

20.5 Visual & Monitoring Systems

- Cameras: Minimum 4 high-speed cameras.
- Lighting: Bright, diffuse LED lighting (minimal glare).
- Control Station: Remote operation area outside the arena, shielded and grounded.

20.6 Arena Obstacles

- Central Trap Hole: 0.6 m × 0.6 m opening for eliminations.
- Hammer: steel, moderate power

Section 4: Safety Inspections

21 Safety Inspections

All robots must pass a full safety inspection before they are allowed to compete. Robots that fail any part of the inspection will not enter the arena until all issues are corrected and re-inspected. Passing inspection does not guarantee continued approval; robots may be re-inspected at any time.

21.1 General Requirements

Robots must be fully assembled with all armor, weapons, and attachments installed. Teams must allow inspectors full access to internal components. Required documentation (battery specs, pneumatic ratings, etc.) must be provided on request.

21.2 Mechanical & Structural Safety

Frame and armor must be secure, intact, and free of cracks or loose parts. No unintended sharp edges. Moving components (belts, chains, gears) must be covered or shielded. Weapon mounts and supports must show no excessive play or instability.

21.3 Weapon Safety

21.3.1 Weapon Locks

Each active weapon must have a solid mechanical lock that prevents movement. Locks must remain installed until the robot enters the arena.

21.3.2 Weapon Condition

Spinning weapons must be balanced and firmly attached. Flippers, hammers, crushers, etc. must not bind, leak, or wobble. Prohibited weapons (explosives, untethered projectiles, liquids, corrosives, etc.) are not allowed.

21.3.3 Flame Systems

Flames are allowed only as secondary/show weapons. Fuel tanks must be rated, leak-free, protected from impact, and securely mounted. Hoses must be pressure-rated and undamaged. Demonstrate controlled ignition and shutdown. Flames must not be directed at arena walls or roof, as this can weaken or warp the polycarbonate. Flame range must not exceed 0.3 meters from the nozzle.

21.4 Electrical Safety

21.4.1 Master Switch

Must be clearly visible, accessible, and able to cut all power instantly.

21.4.2 Indicator Light

Must turn on whenever the robot is energized.

21.4.3 Batteries

Batteries must use an approved chemistry, including LiPo, $LiFePO_4$, or NiMH. They must be enclosed in a rigid, fire-resistant housing with internal padding. Swollen, damaged, or loose batteries are not permitted under any circumstances. All

wiring must be fully insulated, neatly arranged, and securely fastened to prevent movement during combat.

21.4.4 Failsafe

Robot must immediately stop both drive and weapon when radio connection is lost.

21.5 Remote Control & Autonomous Functions

All robots must be remotely operated. Autonomous functions are allowed only if the driver can override them immediately. Autonomous behavior must stop when the failsafe activates.

21.6 Pneumatic Safety

All pneumatic tanks must be properly pressure-rated and free of damage. Regulators, valves, fittings, and hoses must be rated for the system's maximum operating pressure. The pneumatic system must show no leaks of any kind. Robots must demonstrate safe pressurization, controlled operation, and complete venting during inspection.

21.7 Fire Safety

Flammable materials must not be placed near heat-producing components. Wood, foam, or other easily ignitable materials must not be exposed near electronics or flame systems. Any spinning weapon that produces sparks must be positioned so that it does not pose a risk to the robot's batteries or fuel system.

21.8 Arena Compatibility

No part of the robot may damage or pryopen arena walls, seams, or roof panels. Magnets must not interfere with arenastructure.

21.9 Functional Test

Robots must successfully demonstrate:

- Drive movement
- Weapon lock installation and removal
- Weapon activation and shutdown
- Master switch operation
- Failsafe test (loss-of-signal stop)
- Flame test (if applicable)
- Pneumatic pressure/vent test (if applicable) Failure on any test requires correction and re-inspection.

22 Rule Changes and Final Authority

All determinations by RoboNexus and the Producer regarding eligibility, safety, rule implementation, judging, match-ups, seeding, match outcomes, prizes, penalties, disqualifications, Competitor or Team removal, substitution, elimination, technical issues, and any interruptions, resumptions, cancellations, or postponements of match play are made at their sole and absolute discretion, and are final, binding, and not subject to appeal. These rules may be updated at any time, and all design approvals, safety inspections, compliance evaluations, and final eligibility decisions lie entirely with the RoboNexus organizers. Competitors are responsible for requesting clarification on any feature, component, or material whose legality is uncertain. The organizers retain full authority to reject, prohibit, or disqualify any robot or Team for safety,compliance, or operational concerns at any stage of the event.