NATIONAL YOUTH ROBOTICS CHALLENGE

NYRC 2027

PARTICIPANT RULES & REGULATIONS

Competition Guide for Students and Teams

15 Competition Categories

Purpose: This guide tells students what they need to know before entering NYRC 2027: the task, robot limits, time, scoring, safety, and competition rules for each category.

Important: Each team is responsible for knowing the rules of the category it enters. Event-specific rules take priority over general rules where they differ.

1. How to Use This Guide

Read the general rules first. Then read the complete section for your competition. Before arriving, check your robot size, weight, power, control mode, and any special equipment requirements.

- General Rules — apply to every competition unless a category says otherwise.
- Competition Sections — explain the task, limits, arena, time, scoring and category rules.
- Safety Rules — apply at all times. A safety decision can stop a run or match.

2. Competition Categories

Code	Competition	Division	Grades
P01	Line Follower Challenge	Primary junior	**Grades 4–5** **Grades 6-8**
P02	Maze Solver	Primary	**Grades 4–5**
P03	Ball Collection Challenge	Primary	**Grades 4–5**
J01	Robo Race	Junior senior	Grades 6–8 Grades 9-12
J02	Robo Soccer – Junior	Junior	Grades 6–8
J03	Robot Arm – Pick & Place	Junior	Grades 6–8
J04	Innovation Showdown	Primary Junior senior	Grades 4-5 Grades 6–8 Grades 9-12
S01	Robo War	Junior Senior	Grades 6-8 Grades 9–12
S02	Robo Soccer	Junior Senior	Grades 4-5 Grades 9–12
S03	Autonomous Navigation Challenge	Senior	Grades 9–12
S04	Mars Rover Challenge	Senior	Grades 9–12
S05	AI Vision Challenge	Senior	Grades 9–12
S06	Drone Obstacle Race	Senior	Grades 9–12
S07	Innovation Showdown – Senior	Senior	Grades 9–12
S08	Robotics Startup Pitch	Senior	Grades 9–12

3. General Rules for All Competitions

3.1 Before Your Run or Match

- Only registered students, approved referees and authorized competition staff may enter the competition area.
- Coaches, mentors, parents and spectators must stay outside the marked competition boundary.
- Enter the arena only when the referee or arena marshal gives permission.
- Do not move, mark, modify or damage the arena or official competition equipment.
- Your robot or system must be presented in its competition configuration and must pass technical inspection before play.
- Place the robot fully inside the official Start Zone or Start Box before the start signal.

3.2 Starting the Run

- The referee will give the start instruction. The signal may be verbal, a buzzer, a light or a countdown.
- The official clock starts according to the rules of the event.
- Any movement before the start signal may be treated as a false start.

- A second false start may cancel the attempt or lead to disqualification where the event rules provide for it.

3.3 During the Run or Match

- Keep the robot inside the legal competition area unless the event specifically allows another movement.
- Do not intentionally skip a required section, use a shortcut, or enter a prohibited area.
- Do not touch the robot during a scored run unless the category rules allow intervention.
- Do not touch scoring objects, arena equipment or an opponent robot unless the referee allows it.
- Do not interfere with another team's robot, control signal, sensors, cameras or scoring system.
- Use only the wireless systems and power levels allowed by the organizer.

3.4 Touch, Reset and Repositioning

- A human touch includes moving, pushing, lifting, steering or repositioning the robot.
- If intervention is allowed, the referee will record it and apply the event penalty or reset rule.
- A team cannot ask for a reset only because the robot performed poorly.
- A reset caused by an official arena or organizer fault may lead to a technical timeout or replay.

3.5 Finish of an Attempt or Match

- The robot reaches the official finish or goal condition.
- The required task is completed.
- The official time ends.
- The robot becomes unable to continue, where the event uses that rule.
- The referee stops the run or match.
- The robot enters a prohibited area, or the team is disqualified.

3.6 Referee Authority

The referee has the final authority during an active run or match. The referee may pause, stop, reset or end a run when needed for safety, rule enforcement, arena failure or equipment protection.

- Stop an unsafe robot or match.
- Require a robot to be removed.
- Order a reset.
- Issue a penalty or record Did Not Finish (DNF).
- Request a technical inspection.
- Approve a replay when an official fault significantly affected the result.

Fairness: A referee may enforce the published rules but may not change a scoring rule to help or hurt a particular team.

3.7 Arena Fault and Replay

Arena Fault: An organizer-controlled problem that significantly affects a team, such as timer failure, official equipment failure, scoring-system failure, incorrect official setup, loss of organizer-provided power, communication failure, or an arena obstruction not caused by the team.

Replay: A replay may be approved when the arena fault significantly affected the result and the team did not cause the fault.

No Replay: A replay is not given just because a robot, battery, program, strategy or operator made a mistake, or because the team believes it can perform better.

3.8 Mandatory Safety Rules

- Never cross or bypass a safety barrier.
- Do not use robots with exposed hazardous electrical connections, damaged batteries, loose parts, sharp exposed edges, or unsafe/uncontrolled moving mechanisms.
- Emergency stop systems must remain accessible to authorized staff.
- Follow an emergency-stop instruction immediately.
- Do not restart a robot after an emergency stop without referee or safety-officer permission.
- Spectators must remain behind the marked safety boundary.
- The Safety Officer may stop competition activity when an immediate hazard exists.

4. P01 — Line Follower Challenge

Primary | Grades 4–5

Junior I Grades 6-8

What You Have to Do

Follow the marked route as accurately and quickly as possible without manual steering.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous only
Robot size	Maximum 25 × 25 × 25 cm
Weight	**Maximum 2 kg**
Power	Maximum 12 V; battery included in weight

Competition Area

6 ft × 4 ft (1829 × 1219 mm) white/matte mat with a black line about 15 mm wide.

Important Dimensions

Track line: 15 ± 2 mm; Start Box: 300 × 300 mm; Finish Box: 300 × 300 mm; minimum curve radius: 100 mm; minimum track-to-edge clearance: 150 mm.

What You May Find in the Area

- Straight sections
- Gentle curves
- Sharp turns
- Optional split-and-rejoin route
- One controlled junction and a finish gate

Time Limit

Maximum 3 minutes per scored session. Multiple runs may be allowed; fastest valid run counts.

Scoring

Fastest valid completion time. Penalties apply for leaving the track or skipping a required section. If the robot leaves the course and must be repositioned, the event reset/penalty rule applies.

Safety

No exposed sharp edges. Keep cables and timing equipment outside the robot path.

Rules for Students

- Start completely inside the Start Box.
- Follow the marked line autonomously.
- Manual steering is not allowed.
- A temporary loss of the line is allowed only while correcting and returning to the course.
- Do not intentionally skip a section or take a shortcut.
- At a junction, the robot must make the required route decision.
- The run ends only when the official finish condition is met.

5. P02 — Maze Solver

Primary | Grades 4–5

What You Have to Do

Navigate the maze and reach the goal using autonomous decision-making while keeping time and/or path length low.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous only
Robot size	Maximum 15 × 15 × 15 cm
Weight	**Maximum 2 kg**
Power	Maximum 12 V

Competition Area

Recommended 3.0 × 3.0 m modular maze with white floor and black walls. Checkpoints and intersections are marked.

Important Dimensions

Corridor: 200–250 mm; wall height: 100–150 mm; wall thickness: 10–20 mm; Start and Goal Zones: 300 × 300 mm; minimum turning pocket: 300 × 300 mm.

What You May Find in the Area

- Dead ends
- Multiple route choices
- 90° turns
- At least one misleading branch
- 3–5 checkpoints and one final goal

Time Limit

Maximum 5 minutes per attempt. The format may include 2 qualifying attempts and a best-of-final format.

Scoring

Primary score is valid completion time. Checkpoint completion may be used as a secondary measure. Missing the goal or bypassing a required checkpoint makes the run invalid.

Safety

Walls must be stable and free of sharp corners. No overhead obstruction.

Rules for Students

- Start fully inside the Start Cell.
- No part of the robot may extend into the next corridor before the start.
- Remote control is not allowed.
- Do not send navigation instructions to the robot during the scored run.
- Touching maze walls is allowed unless the event scoring rule says otherwise.
- Do not climb over, move or damage maze walls.

- A reset is allowed only under the official reset procedure.
- The robot cannot be manually guided through the maze.
- The goal is reached only when the official finish condition is satisfied.

6. P03 — Ball Collection Challenge

Primary | Grades 4–5

What You Have to Do

Collect as many scoring balls as possible and put them into the scoring container before time runs out.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous or remote-controlled; the competition may announce one mode before the event
Robot size	Maximum 25 × 25 × 25 cm
Weight	Maximum 2 kg
Power	Maximum 12 V

Competition Area

Recommended 2.4 × 1.8 m rectangular arena with three collection zones and one scoring bin.

Important Dimensions

Start Zone: 300 × 300 mm; three Collection Zones: about 400 × 400 mm; scoring-bin opening: 250–350 mm; minimum boundary height: 50 mm.

What You May Find in the Area

- 12–20 lightweight foam balls
- Three collection zones
- One home/scoring area
- Zones may carry equal or different point values

Time Limit

3 minutes per attempt. The recommended format is 2 attempts; best score counts.

Scoring

A ball scores only when it is completely inside the scoring bin before time expires. Balls carried outside the arena do not score.

Safety

Use soft balls and rounded arena walls. No heavy or projectile-capable collection mechanism.

Rules for Students

- Only official competition balls can score.
- Do not touch the balls during an active attempt.
- The robot may collect, push, carry or otherwise transport balls with its approved mechanism.
- A ball partly outside the scoring area gets no points.

- Do not manually place a ball in the scoring area.
- Do not block another team's robot where a multi-robot format is used.
- Do not intentionally damage the arena, scoring bin or barriers.

7. J01 — Robo Race

Junior | Grades 6–8

Senior I Grades 9-12

What You Have to Do

Complete the obstacle course in the shortest valid time.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Remote-controlled or autonomous
Robot size	Maximum 25 × 25 × 25 cm
Weight	Maximum 5 kg
Power	Maximum 12 V

Competition Area

15–20 m course. Recommended competition space is 8 × 3 m with a minimum 600 mm clear lane.

Important Dimensions

Lane: at least 600 mm; ramp length: 1.2–2.0 m; ramp angle: 10–15°; speed breakers: 30–50 mm high; hurdle: 50–100 mm high; minimum curve radius: 400 mm.

What You May Find in the Area

- Start straight
- Curved section
- Zig-zag
- Speed breakers
- Ramp/slope
- One hurdle and finish gate

Time Limit

Maximum 3 minutes per run. Best valid time counts.

Scoring

Ranking is based on completion time. Skipping an obstacle gets a penalty or may invalidate the run. Leaving the course may require a restart from the last checkpoint or start, as announced at briefing.

Safety

Ramps and hurdles must be secured. No exposed fasteners in the robot path.

Rules for Students

- Start fully behind the starting line.

- All wheels or tracks must be inside the starting lane.
- Do not move before the start signal.
- Complete all required obstacles in order.
- Stay inside the race lane.
- Do not deliberately bypass an obstacle.
- Obstacle contact is allowed unless the obstacle is marked no-contact.
- Any human assistance is allowed only under the published intervention rule.

8. J02 — Robo Soccer – Junior

Junior | Grades 6–8

What You Have to Do

Two teams use one or two robots to score more goals by moving the ball into the opponent's goal.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Remote or software controlled
Robot size	**Maximum 30 × 30 × 30 cm**
Weight	Maximum 5 kg
Power	Maximum 12 V; remote is not part of robot weight

Competition Area

Recommended 1525 × 2740 mm playing field. A venue may vary the size by up to ±10% only where required by the venue.

Important Dimensions

Goal width: 500 mm; centre circle: about 600–1000 mm diameter; boundary wall: 50–100 mm; protected operator zones outside the field.

What You May Find in the Area

- Green field mat
- White boundary and centre markings
- Centre circle
- Two colour-coded goals
- One lightweight ball

Time Limit

Two halves of 5 minutes with a short interval. The clock may stop for official interruptions.

Scoring

Each goal = 1 point unless an event notice says otherwise. More goals wins. Fouls may lead to a free kick or penalty.

Safety

Use a soft ball. Robot edges must be rounded or covered. Deliberate high-energy collisions are not allowed.

Rules for Students

- Robots stay inside the playing field.
- Operators stay in their Operator Zone.
- Operators cannot enter the field during active play.
- Use only the official ball.
- Normal accidental contact is allowed; dangerous deliberate contact is not.
- Do not pin an opponent beyond the allowed time.
- Do not intentionally trap or hold the ball beyond the allowed time.
- A goal counts only when the whole ball crosses the official goal line.

9. J03 — Robot Arm – Pick & Place

Junior | Grades 6–8

What You Have to Do

Pick the required objects from the source area and place them accurately in the target zones as quickly as possible.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Manual, programmed or semi-autonomous as announced for the event
Arm footprint	Maximum 600 × 600 mm
Arm height	Maximum 600 mm unless the event announces otherwise
Station load	**Recommended maximum 7 kg**
Power	Maximum 12 V for student-built low-voltage systems unless approved

Competition Area

One workstation per team, about 1200 × 800 mm, with a Home Zone, Source Tray and five target zones.

Important Dimensions

Source Tray: 300 × 300 mm; five targets: 100–150 mm each; minimum 150 mm between target centres; marked arm footprint.

What You May Find in the Area

- Objects of different shapes/weights
- Source tray
- Five precision target pads
- Home position
- Optional obstacle bar

Time Limit

Maximum 4 minutes per attempt.

Scoring

Points are given for correctly placed objects. A bonus may be given for completing all objects. Time is a tie-breaker. An object not fully inside its target may get reduced or no points according to the scoring sheet.

Safety

A power isolation switch is required. Stay out of the moving-arm safety zone.

Rules for Students

- Start the arm in the official Home Position.
- Objects are positioned by the arena marshal.
- Move objects using the robot/arm mechanism.
- Do not directly place an object into a target.
- Do not move or manipulate target areas.
- Dropped objects may be recovered only under the published recovery procedure.
- Keep hands outside the active arm workspace.

10. J04 — Innovation Showdown

Primary I Grades 4-5

Junior | Grades 6–8

What You Have to Do

Present a prototype, simulation, engineering concept or working solution to a real-world problem, preferably linked to an SDG.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Power	Use protected low-voltage venue power unless separately approved

Competition Area

Recommended 3 × 3 m team station with a 1.2–1.8 m demonstration table, presentation screen and 1.5 m audience setback.

Important Dimensions

Presenter zone: 2 × 1.5 m; clear demo table area; audience line; judges outside the demonstration zone.

What You May Find in the Area

- Presentation screen
- Project/demo table
- Judging desk
- Queue lane and audience boundary

Time Limit

8 minutes total: up to 5 minutes presentation and 3 minutes Q&A.

Scoring

100-point framework: Problem 15; Innovation 20; Technical solution 20; Prototype/demo 20; Impact/SDG relevance 15; Communication 10.

Safety

Disclose prototype hazards. No mains electrical experiments, fire, pressurized systems or hazardous materials without written approval.

Rules for Students

- Stay within the assigned presentation area.
- Start only when the referee/moderator gives permission.
- The official timer controls the session.
- Students must perform the demonstration themselves.
- Mentors cannot operate the prototype during judging.
- Judges may ask technical questions to confirm student understanding and ownership.

11. S01 — Robo War

Junior I Grades 6-8

Senior | Grades 9–12

What You Have to Do

Two robots compete to push, lift, tip or otherwise force the opponent outside the marked combat boundary.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Remote or software controlled
Robot size	**Maximum 30× 30 × 30 cm**
Weight	Maximum 5 kg
Power	Maximum 12 V; remote is not part of robot weight

Competition Area

1800 mm diameter circular combat floor with a white edge of about 76 mm. The arena must have a protective enclosure.

Important Dimensions

Combat diameter: 1800 mm; white edge: about 76 mm; recommended safety exclusion zone: 1500 mm outside the enclosure; two start boxes.

What You May Find in the Area

- Raised circular combat floor
- Two start zones
- Protective enclosure
- Referee/E-stop position

Time Limit

3 minutes per bout. A bout can be won by the published push-out/knockout rule; if both robots remain active, the event may use judge scoring or number of clear push-outs as announced.

Scoring

A robot that is fully pushed out of the combat disk wins the bout. If no robot is eliminated, the published tie-break or scoring system is used.

Safety

Safety rules take priority. No destructive weapons, projectiles, explosives, flames, hazardous chemicals, exposed high voltage, intentional entangling systems or injury-causing mechanisms. Batteries must be mechanically protected.

Rules for Students

- Only inspected and approved robots may enter.
- The arena must remain fully enclosed during combat.
- Do not move before the referee start signal.
- Use only approved mechanisms to interact with an opponent.
- Do not target spectators, operators, staff or safety structures.
- Do not intentionally damage the arena.
- The referee can stop the match immediately for battery hazards, exposed wiring, fire, smoke, overheating, enclosure damage, unsafe mechanical failure or other danger.

12. S02 — Robo Soccer – Senior

Junior I Grades 6-8

Senior | Grades 9–12

What You Have to Do

Two teams use one or two robots to score more goals than the opponent while following referee rules.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Remote or software controlled
Robot size	Maximum 25 × 25 × 25 cm
Weight	Maximum 5 kg
Power	Maximum 12 V

Competition Area

Recommended 8.0 × 5.0 m field with a 1.5 m safety perimeter. A smaller compact field may be used only if announced before registration.

Important Dimensions

Centre circle: 1.2 m diameter; goal width: about 1.5 m; goal depth: 0.5–0.7 m; boundary wall: 75–100 mm; operator zones outside perimeter.

What You May Find in the Area

- Full field
- Centre circle
- Two goals
- Team/operator stations
- Scoreboard and referee lane

Time Limit

Two halves of 5 minutes with a short interval. Official interruptions may stop the clock.

Scoring

Goal = 1 point. Illegal holding, intentional collision, defence-zone violations and other published fouls may lead to free kicks or penalties.

Safety

Use a soft ball. Goal frames must be protected. Robot edges must be rounded. Keep a clear operator/spectator boundary.

Rules for Students

- Stay within the playing field.
- Operators stay outside the field in their designated zones.
- Use only the official ball and goals.
- Normal play contact is allowed; dangerous or intentional collisions are not.
- Follow referee decisions on fouls, restarts and penalties.

13. S03 — Autonomous Navigation Challenge

Senior | Grades 9–12

What You Have to Do

Navigate the course fully autonomously and complete the required checkpoints and finish condition.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous only
Robot size	Maximum 30 × 30 × 30 cm
Weight	Maximum 5 kg
Power	Maximum 12 V

Competition Area

Recommended 6 × 4 m modular navigation field with changeable wall and obstacle modules.

Important Dimensions

Corridor width: 500–700 mm; Start/Finish: 500 × 500 mm; checkpoint markers: 300 × 300 mm; minimum obstacle clearance: 150 mm.

What You May Find in the Area

- Intersections
- Dead end
- Obstacle zone
- Narrow passage
- Checkpoint sequence and final finish zone; qualifying and final setups may differ

Time Limit

Maximum 5 minutes per run. Two qualifying runs may be used; best valid run counts.

Scoring

Suggested 100-point framework: completion 40; checkpoint coverage 20; time 25; collision/route penalties 15. The exact scoring is published with the final map.

Safety

Stable low-height obstacles. No hidden trip hazards. Robots must remain inside the arena.

Rules for Students

- The robot must be fully autonomous once the run starts.
- No manual steering is allowed.
- Wireless communication may be used only where expressly allowed and must not provide outside human decision-making.
- The robot must pass all mandatory checkpoints.
- Do not move, damage or bypass arena structures.
- Manual help receives the published penalty and may require a reset.
- The final course may use different obstacle positions, checkpoint sequence, route geometry, object positions or visual markers while keeping the published size and safety limits.

14. S04 — Mars Rover Challenge

Senior | Grades 9–12

What You Have to Do

Drive through simulated Martian terrain, cross slopes and rough ground, collect samples and return to the base zone.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous, remote or hybrid; mode must be declared before the run
Robot size	Maximum 40 × 40 × 30 cm
Weight	**Maximum 5 kg**
Power	Maximum 12 V

Competition Area

Recommended 4 × 2.5 m terrain field with a base zone, ramp, rough terrain, crater and sample stations.

Important Dimensions

Ramp: 10–20°; crater: 400–700 mm diameter and 50–150 mm deep; terrain rocks: 50–120 mm; base: 500 × 500 mm.

What You May Find in the Area

- Base → ramp → rough terrain → crater/obstacle → sample zone → return to base
- Sample locations may change between rounds

Time Limit

Maximum 6 minutes per run.

Scoring

Suggested scoring: terrain completion 20; samples correctly collected 30; checkpoint/base return 20; time 20; robot/environment care 10.

Safety

Terrain pieces must be rounded and anchored. No real soil, glass, sharp stones or hazardous substances.

Rules for Students

- Start fully inside the Base Zone.
- Do not modify terrain modules.
- Cross all required terrain types.
- Do not intentionally bypass a mandatory terrain section.
- Only official sample objects can score.
- A sample scores only when completely delivered into the Base Zone.
- Do not manually recover or move samples during an active mission unless the reset rule allows it.
- Complete the published mission sequence: required terrain → sample goals → return to base.

15. S05 — AI Vision Challenge

Senior | Grades 9–12

What You Have to Do

Use an AI or computer-vision system to identify, classify, locate, count or respond to visual targets in a controlled arena.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Control mode	Autonomous/AI vision; human manual help only as published
Mobile robot size	Maximum 50 × 50 × 50 cm if a mobile platform is used
Weight	**Maximum 5-6 kg**
Power	Maximum 12 V for mobile hardware; laptop power may use venue supply

Competition Area

Recommended 4 × 3 m vision zone with controlled lighting, neutral background, target area and response area.

Important Dimensions

Target area: 2 × 1.5 m; marked camera-to-target distance; fixed light positions; response zone: 1 × 1 m; target sizes: 50–250 mm depending on the round.

What You May Find in the Area

- Printed or 3D visual targets
- Distractors
- Different orientations
- Colours and shapes
- Partial occlusion
- Response zone; unseen target combinations may be used

Time Limit

Maximum 5 minutes per challenge set.

Scoring

Suggested 100-point framework: target detection 25; target identification 25; location 20; correct action 20; speed 10. False positives receive penalties.

Safety

No strobe lighting. Keep lighting and target positions fixed during a scored run. Do not use images that identify people.

Rules for Students

- Camera calibration is allowed only during the marked calibration period.
- Participants may not physically manipulate test objects.
- Targets are placed by approved arena staff.
- The declared AI system must be the system used during the scored run.
- Undeclared models, APIs, outside operators or hidden computing systems are not allowed.
- Internet access may be restricted during scored attempts.
- Human decision-making must not replace the AI system during an autonomous task.
- The AI results used for scoring must come from the declared system.
- The referee may ask the team to explain its AI pipeline.

16. S06 — Drone Obstacle Race

Senior | Grades 9–12

What You Have to Do

Fly through the obstacle course, pass the required gates and finish safely in the shortest valid time.

Team and Robot Requirements

Requirement	Limit / Rule

Team size	2–5 students
Control mode	Manual piloting only; no autopilot unless a separate autonomous class is announced
Drone size	Maximum 450 mm diagonal tip-to-tip
Take-off weight	Maximum 2 kg
Power	Maximum **12.6 V** (4S LiPo) unless the event notice permits otherwise

Competition Area

A protected drone flight course with gates/obstacles and a landing area.

Important Dimensions

Gate positions, flight-cage boundaries and landing requirements are set by the official event setup.

What You May Find in the Area

- Flight gates
- Obstacle sections
- Flight cage/safety net
- Landing area

Time Limit

Use the time limit announced in the event briefing.

Scoring

Fastest valid flight is ranked first, subject to gate, obstacle and landing penalties.

Safety

A dedicated flight-safety procedure is mandatory. The pilot must stay in the marked area and the flight area must remain controlled.

Rules for Students

- Only approved batteries and drone designs may be used.
- The pilot must stay in the marked pilot area.
- Do not enter the flight cage while the drone is active.
- Pass gates in the published sequence.
- Missing or bypassing a gate gives the published penalty.
- Any loss of safe control may stop the flight.
- The referee/safety marshal may stop the flight immediately for loss of control, propeller damage, battery abnormality, unsafe collision, a person entering the flight area, cage damage or another unsafe condition.

17. S07 — Innovation Showdown – Senior

Senior | Grades 9–12

What You Have to Do

Present a substantial technology or robotics innovation that solves a real problem. A prototype, simulator, proof-of-concept or research-backed concept may be used.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Power	Use protected venue power; higher-risk systems need prior approval

Competition Area

Recommended 4 × 3 m team station with demonstration table, presentation screen, judge table and 1.5 m audience boundary.

Important Dimensions

Demo table about 1800 × 750 mm; presenter zone 2 × 1.5 m; audience setback 1.5 m; judge table outside the demo zone.

What You May Find in the Area

- Pitch screen
- Demo area
- Judge desk
- Prototype boundary
- Protected power area

Time Limit

8 minutes total: maximum 5 minutes presentation and 3 minutes Q&A.

Scoring

100-point framework: Problem significance 15; Innovation 20; Technical depth 20; Working prototype/demo 20; Impact/scalability 15; Communication/Q&A 10.

Safety

Disclose hazards. No mains electrical work, fire, pressure, chemical hazards, blades or unsafe/uncontrolled moving mechanisms without written approval.

Rules for Students

- Follow the presentation → demonstration → Q&A sequence.
- The official timer controls the session.
- Students should present and demonstrate the work themselves.
- The prototype should be developed or substantially engineered by the participating students.
- Commercial components may be used where allowed.
- Judges may ask for evidence of testing or operation.
- Mentors may not answer technical questions on behalf of students.

18. S08 — Robotics Startup Pitch

Senior | Grades 9–12

What You Have to Do

Pitch a robotics or automation venture to an investor-style panel. Explain the problem, solution, technology, market and business model.

Team and Robot Requirements

Requirement	Limit / Rule
Team size	2–5 students
Power	Use protected venue power unless approved

Competition Area

Recommended 4 × 3 m pitch/demo station with presenter area, demo table, display and judge/investor table.

Important Dimensions

Presenter zone: 2 × 1.5 m; demo boundary: 2 × 1.5 m; judges: 2–4 m from presenter; audience boundary: 1.5 m away.

What You May Find in the Area

- Pitch screen
- Presenter position
- Investor/judge table
- Prototype demo area
- Visible countdown timer

Time Limit

Suggested format: 7 minutes total — 4 minutes pitch and 3 minutes investor Q&A. Final timing will be published before the event.

Scoring

100-point framework: Problem 10; Solution/innovation 20; Robotics technology 15; Market/customer 15; Business model 10; Feasibility 10; Impact 10; Pitch/Q&A 10.

Safety

Prototype demonstrations must stay inside the marked area. No hazardous demonstrations without prior written approval.

Rules for Students

- Stay within the assigned pitch/demo area.
- The official timer controls pitch and Q&A time.
- Test presentation equipment before the slot.
- Do not interfere with another team's presentation equipment.
- Students should demonstrate the technology themselves.
- Judges may ask about technology, cost, manufacturing, market, scalability, testing and customer application.
- Clearly separate demonstrated results, tested results, projected performance and future plans.

19. Student Pre-Competition Checklist

- I know the exact competition category I am entering.
- My team has 2–5 students, as required by the event.
- My robot/system is within the size and weight limit.
- My power system is within the allowed limit.
- My control mode matches the event rule.
- I know the time limit and scoring method.
- I know whether manual intervention is allowed and what happens after a reset.
- I know where I must stand during the run, match, presentation or flight.
- My robot has no unsafe exposed parts, wiring or damaged batteries.
- I understand that referee and safety instructions must be followed immediately.

Final Reminder: Bring a competition-ready system, know your category rules, and focus on safe, fair and respectful competition.