UOKROBOTGAMES2K26

ROBOT RACE GUIDELINES

GREATNESS SHOWS NO MERCY

ECSC
UNIVERSITY OF KELANIYA

UOK ROBOT GAMES 2K26

ELECTRONICS AND COMPUTER SCIENCE CLUB
UNIVERSITY OF KELANIYA

https://ecsc-uok.com/

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1. Introduction

The Robot Race Competition is designed to challenge participants in robotics, embedded systems, mechanical design, and autonomous navigation. The competition is open to both school level and university level participants in Sri Lanka, encouraging innovation and practical engineering skills.

The challenge focuses on a multi-stage autonomous robot task that combines line following, dotted line handling, object detection and manipulation, color detection for the University Category, wall following navigation, and precision placement.

2. Competition Categories

School Category

a. Color detection is not required.
b. The box shall be placed in any of the designated drop zones after the wall following task is completed.

University Category

a. Color detection is required.
b. The robot shall identify the box color and place the box in the correct matching color zone.

3. Task Overview

The robot shall complete the following sequence fully autonomously. The tasks shall be attempted in the order listed below. All details regarding the arena, pathway, guidelines and scoring criteria are listed below.

Task	Requirement
Task 1: Line Following	The robot shall accurately follow the designated line path from the starting square. The robot shall continue following the path when the line becomes dotted without losing the track.
Task 2: Pick Up Box and Color Identification	The robot shall locate the box at the curved part of the line path (as displayed in arena specifications), detect it, and pick it up using its mechanism. This task applies to both the School Category and the University Category. For the School Category, the robot is not required to identify the color of the box. The robot is only required to carry the box and place it after completing Task 3 - Wall Following. For the University Category, the robot shall identify the color of the box as Red, Green, or Blue. The robot shall clearly indicate the identified color using any suitable method, such as LEDs matching the box color, a display, or another visible indication method accepted by the judges.
Task 3: Wall Following	After completing the line path, the robot shall navigate through the curved section of the arena by following the wall while maintaining a proper distance and avoiding collisions.
Task 4: Final Placement	For the School Category, after completing Task 3, the robot shall accurately place the box within **any** of the designated drop zones. For the University Category, after completing Task 3, the robot shall identify the correct drop zone corresponding to the color of the box being carried and shall accurately place the box within that designated area.

4. Robot Specifications

a. The robot dimensions shall not exceed 20 cm x 20 cm (width x length), at the start of the competition, and will be measured at the entrance. There is no height restriction.

b. Extensions beyond the size limit are allowed only during operation.

c. The robot shall be powered by an internal power supply only, with a maximum of 24 V.

d. The robot shall be completely autonomous after it is placed on the arena. All external communication connections, including Bluetooth, Wi Fi, laptop, phone, or remote-control connections, shall be terminated before the robot is placed on the arena. Any external communication or remote control after placement on the arena shall result in disqualification.

e. The robot shall be activated only by using onboard switch or switches physically available on the robot. No Bluetooth, Wi Fi, laptop, phone, or remote-control activation is allowed after the robot is placed on the arena.

f. The robot shall be built by the team. Pre-assembled robot kits are not allowed.

g. Allowed components include microcontrollers such as Arduino or Raspberry Pi, sensors such as IR, ultrasonic, or camera sensors, motors, and grippers.

h. The robot shall not separate into multiple parts or leave components in the arena.

i. Any damage, scratches, or modification to the arena will result in a deduction of points.

j. The robot shall function under the given lighting conditions without external aid.

k. Teams are advised to bring fully charged batteries and spare batteries.

5. Arena Specifications

The arena shall be prepared by the organizers in accordance with the specifications below. All dimensions and values are retained from the original guideline.

Item	Specification
Outer area	12 ft x 12 ft
Main arena	8 ft x 8 ft
Arena floor	Non gloss matte plywood

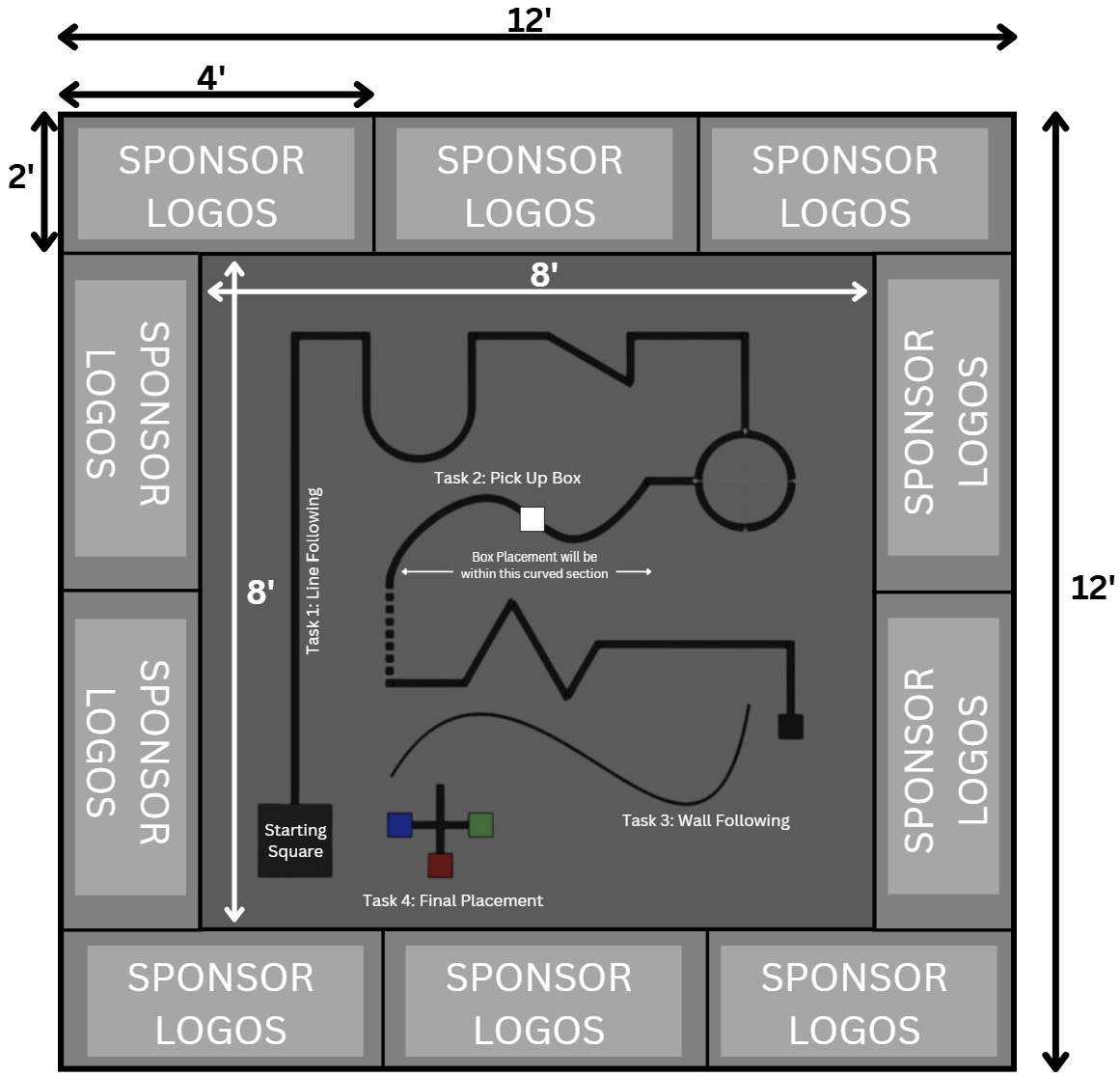

Figure 1: Arena layout schematic from the source guideline. The final printed event layout shall clearly identify the start square, line path, dotted line area, box pickup zone, wall following section, and drop zones.

Line Specifications

Item	Specification
Line width	2 to 3 cm
Line color	Black, with high contrast against the surface
Dotted segments	Gaps and lengths between 2 to 5 cm

Box Specifications

Item	Specification
Size	Approximately 5 cm x 5 cm x 5 cm, length x width x height
Colors	Red, Green, or Blue

Wall Section

Item	Specification
Height	10 to 20 cm
Material	Wood or PVC
Surface	Non reflective

Drop Zones

Item	Specification
Zone marking	Clearly marked colored zones: Red, Green, and Blue
Minimum size	Approximately 10 cm x 10 cm
Surface	Non reflective

6. Competition Format

a. A maximum of 3 attempts are allowed in the competition. The best scoring attempt counts.

b. A team shall place the robot entirely inside the starting square at the start of each run.

c. When the judges give the signal, the robot may be switched on using onboard switch or switches.

d. The robot shall start from the designated starting square and perform all required actions in sequence within the given time limit.

e. Each run will have a fixed time limit, typically 5 to 10 minutes. The exact time shall be announced by the organizers before the competition begins.

f. All runs shall be judged based on task completion, accuracy, and time efficiency according to the predefined scoring criteria.

g. Entrants shall follow the verbal instructions of the competition officials at all times.

h. Circumstances beyond the scope of these rules shall be decided by the judges, and the judges decision shall be final.

7. Scoring Criteria

a. The scoring system below retains the original point values and clarifies how the score applies to each category.

Scoring Item	School Category	University Category
Line following completion	50 points	50 points
Dotted line handling	30 points	30 points
Box pickup	100 points	100 points
Wall following completion	80 points	80 points
Color identification	Not required	100 points
Box Placement (For the University Category, **incorrect color placement** will result in a 50% reduction of the box placement score)	Center of drop zone: 150 points Inside drop zone but outside center area: 100 points Partially outside drop zone: 80 points	Center of drop zone: 150 points Inside drop zone but outside center area: 100 points Partially outside drop zone: 80 points
Partial task completion	Variable points	Variable points
Maximum task score	410 points	510 points

b. Partial task completion shall be awarded by the judges based on the portion of the task successfully completed, provided the action is clearly observable and does not violate the rules.

c. A time bonus will be awarded for faster completion.

d. An accuracy bonus may be awarded for smooth and stable performance.

The following table shows the penalties and deduction of points.

Penalty Event	Penalty
Damages to the arena, pathway or box	20 point deduction
Hitting the box without proper detection	20 point deduction
Collision with wall	10 point deduction
Following a memorized path without using sensors, hard coded movement	10 point deduction
External interference (Use of wireless control, Bluetooth, Wi-Fi, phone, or laptop **during the run**)	Disqualification

The following additional records shall be maintained for each team:

Record Event	Description
Number of attempts	The total number of attempts used by the team.
Time of completion	The completion time for the 1st, 2nd, and 3rd attempts shall be recorded separately.
Total score per attempt	The total score for each attempt shall be recorded. The highest scoring attempt will be considered as the final score.
Judge remarks	Judges may record remarks regarding task completion, penalties, bonuses, rule violations, or any other important observations.

8. Technical and Safety Inspection

a. All robots shall pass a technical and safety inspection before competing. Robots failing inspection shall be corrected before participation.

   i. Compliance with rules and guidelines

   ii. Size verification

   iii. Safety and structural stability

   iv. Electrical safety and voltage limits

   v. Basic functionality test

   vi. Confirmation that all external communication systems are disconnected before the robot is placed on the arena.

b. Organizers are not responsible for any damage during the competition.

9. Team Composition

a. A maximum of 5 members will be allowed per team.

b. All members shall belong to the same school or institution. Verification is required.

c. One person can participate in only one team.

d. Each team shall have a team name and a designated team leader.

10. Rules and Regulations

a. Robots shall not damage the arena under any circumstances.

b. No human intervention is allowed after the robot starts.

c. Judges' decisions are final.

d. All participants shall follow instructions given by officials.

11. Winning Criteria

a. The winner will be determined based on the highest final score.

b. In case of a tie, the fastest completion time, number of penalties, and higher box placement score will be considered.

c. If the tie remains unresolved, the judges' final decision will determine the winner.