WORLD ROBOT OLYMPIAD 2019

Advanced Robotics Challenge

Game Description, Rules and Scoring

SMART GREENHOUSE

Introduction

Robotics is a wonderful platform for learning 21st century skills, solving robotic challenges encourages, innovation and develops creativity and problem-solving skills in students. Because Robotics crosses multiple curricular subjects, students must learn and apply their knowledge of science, technology, engineering, math, and computer programming.

The most rewarding part of designing robots is that students have fun. They work together as a team, discovering their own solutions. Coaches guide them along the way, then step back to allow them their own victories and losses. Students thrive in this supportive and immersive environment, and learning occurs as naturally as breathing air.

At the end of the day, at the end of a fair competition, students can say they did their best, they learned, and they had fun

GENERAL RULES

Advanced Robotics Challenge

Important note: The General rules mentioned below applicable only for WRO 2019 India. There is no kit & controller restriction for the National Championship. Participants can use any of the kit they want. However for International Championship as per the norms of WORLD ROBOT OLYMPIAD Council, the teams has to use Tetrix/Matrix kits and WRO council prescribed controller which will be provided by India STEM Foundation.

1. **Qualification for participation and team composition**

    1.1. Age of participants – (17-25) years old in the year of competition

    1.2. Team composition– 2-10 participants(**for WRO international championship teams have to nominate 3 members who will represent team at WRO 2019 internationa**l)

    1.3. Team coach – The minimum age of a coach in an international WRO is age 20 at the time of registration for the WRO final. Coaches may offer students advice and guidance prior to the competition, however during the actual Olympiad competition, **all work and preparation** must be performed by the student members of the team

2. **Materials**

    2.1. Autonomous robot can be built using any controller (like Myrio, Arduino, raspberry pi etc.)There must be only one main controller. All decision making, manipulation of sensor data and control must take place on this main controller. Other controllers can be used in a supportive role, but only to provide a means of control to the main controller to drive motors. Supportive controllers can also be used to provide a means of increasing the number of inputs and/or outputs to the main controller. The manipulation of the information sensed by the sensors should take place on the main controller and not on the supportive controller. Teams that are using supportive controllers must provide information (access to source code, circuit diagrams, etc.) to the judges to prove that the supportive controllers are only used to drive motors or are used as a device to increase the number of inputs/outputs for use with sensors

    2.2. Team can use any number of sub controller in passive mode i.e. sub controller should not work independently for processing. it can collect data from sensor or control motor on demand from main controller

    2.3. Control software may be LabVIEW from National Instruments or any text-based language (like C, C++, C#, Robot C, Java, python etc.)

    2.4. Team can execute the program only by pressing the button once on call of judge.

    2.5. Robot can be built using any building system

    2.6. Teams are not allowed to use hydraulic pressure, barometric pressure or pneumatics system.

    2.7. Teams can use any electrical motors and servos of their choice –there are no restrictions on brand or number of motors and servos used

2.8.   Teams can use any sensors of their choice – there are no restrictions on brand, function or number of sensors used. Cameras are considered sensors

2.9.   Teams can use any battery of their choice – there are no restrictions on brand, function or number of batteries used

2.10.   Teams should prepare and bring all the equipment, software and portable computers, they need during the tournament

2.11.   Teams should bring enough spare parts. Even in the case of any accidents or equipment malfunction, the council (and/or organizing committee) is not responsible for their maintenance or replacement

2.12.   Coaches are not allowed to enter the court to provide any instructions and guidance during the competition

2.13.   Robots may be assembled before the tournament

2.14.   Contestants may make the program beforehand

3.   Regulations about the robot

3.1.   The maximum dimensions of the robot before it starts the "mission" must be within 450mm × 450mm × 450mm. After the robot starts, the dimensions of the robot are not restricted maximum dimensions of the robot before it starts the "mission" must be within 450mm × 450mm × 450mm. After the robot starts, the dimensions of the robot are not restricted

3.2.   Robots are autonomous. Participants are not allowed to interfere or assist the robot while it is running (performing the "mission"). This includes entering data to a program by giving visual, audio or any other signals to the robot during the match. Teams that violate this rule will be disqualified at that match

3.3.   The playmat is vinyl sticker which will be pasted on wooden playfield. So only Non spike tyres are allowed**. Tyres or movement of robot must not damage the playmat at any cost otherwise team will be disqualified**

3.4.   The weight of the robot must not greater than 20 kg.

3.5.   Robot action must not damage the playfield & playmat otherwise it will be disqualified from the match.

3.6.   A robot must be autonomous and finish the "missions" by itself. Any radio communication, remote control and wired control systems are not allowed while the robot is running. Teams in violation of this rule will be disqualified

3.7.   Any Bluetooth or Wi-Fi function on the controller must be switched off at all times

4. COMPETITION

4.1. Each team must prepare for the match in their specified place until the "checked Time", when the team's robot must be placed in a designated area.

4.2. On the day of the competition, there will be a minimum of 60 minutes of practice time before the start of the first round

4.3. The contestants may use this time to perform Practices in their places, or may queue with their robots to have one practice game, or may take measurements in the competition site in so far as this does not interfere with other teams' practice

4.4. Teams cannot touch the designated competition lanes before the start of the practice time is announced

4.5. All robots must be placed on the reviewing table for preparatory review after the end of the Practice period. No mechanisms or programs may be modified after this time

4.6. Robots may take part in the competition only after they have passed review by the judges

4.7. If the robot does not pass the review by the judges, the robot may not be used in the competition

4.8. The competition consists of a number of rounds and testing time

4.9. Preparation time before each game may not exceed 90 seconds, and, once started, individual games may not exceed the match time specified in the Game Rules

4.10. Starting conditions:

4.10.1. Robot is placed in the starting block totally SWITCHED OFF!!

4.10.2. The position of the robot in the starting area must be so the projection of the robot on the game mat is completely within the start area.

4.10.3. Physical adjustments can be made (This is part of the preparation time). However, it is not allowed to enter data to a program by changing positions or orientation of the robot parts or to make any sensor calibrations on the robot. If a team do enter data through physical adjustments, the team will be disqualified for that round.

4.10.4. Robot is then switched on. Order of switching on. All sub system controllers is switched on first through one switch, then main controller from a second switch. (Only two switches allowed for turning on the robot).

4.10.5. Robot should then be in a waiting state. Waiting for a Start button to be pressed. The Start button could be on the main controller or a separately installed Push Button. (Teams could easily add a Push Button and program it accordingly)Judge gives signal to start robot. Starting button is then pressed and the time for the attempt is started. The robot will have the amount of time to Rules complete the challenge that is mentioned in the Game.

4.10.6.   Pressing of the start button will start the robot action to attempt the competition run and robot should start moving

4.11. Once physical adjustments have been made to the satisfaction of the participants, the judge will ask the team about the way to run the robot. There are two possible cases

4.11.1. The robot starts moving immediately after turning on the power;

4.11.2. If the robot starts moving after pressing a button on the controller

If option a.) is used the judge provides a signal to start and the team member switches on the robot.

If option b.) is used the team member is allowed to turn on the power for the main controller and motor drivers. No changes in position of the robot or its parts are allowed. Then the judge provides the signal to start as well and the team member presses the button to start the robot.

4.12. If there is any uncertainty during the task, the judge makes the final decision. They will bias their decision to the worst outcome available for the context of the situation

4.13. The match will end as described in the Game Rules

4.14. The score calculation is done by the judges at the conclusion of each round. The team must verify and sign the score sheet after the round, if they have no fair complaints

4.15. The ranking of a team is decided depending on the overall competition format as described in the Game Rules. If teams still remain tied, ranking will be determined by consistency of performance by examining which team achieved the next highest score during previous rounds.

5. COURT

5.1. People, other than competing students are not allowed to enter the competition area, apart from authorized WRO Organizing Committee staff and special personnel

5.2. The standard of all competition materials and courts are according to what are provided by the committee on the competition days

6. PROHIBITED

6.1. Destruction or tampering with competition courts/tables, materials or robots of other teams

6.2. Use of dangerous items or behaviors that may create or cause interference with the competition

6.3. Inappropriate words and/or behavior toward other team members, other teams, audience, judges or staff

6.4. Bringing a cellular/mobile phone or a medium of wire/wireless communication into the designated competition area

6.5. Bringing food or drink into the designated competition area

6.6. Competitors using any communication devices and methods while the competition is in process. Anyone outside the competition area is also banned from talking to or communicating with competing students. Teams violating this rule will be considered as disqualified and should quit the competition immediately. If communication is necessary, the committee may allow team members to communicate with others under supervision by tournament staff or by exchanging a note under permission by judges

6.7. Any other situation which judges might consider as interference or violation of the spirit of the competition.

7. If any of the rules mentioned in the document are broken or violated then referee can decide on one or more of the following consequences

7.1.   A team may not be allowed to participate in one or more runs.

7.2.   A team may get up to a 50% reduced score in one or more runs.

7.3.   A team may not qualify for the next round (e.g. in case you have a competition mode with TOP 16, TOP 8 etc.).

7.4.   A team may not qualify for the international final.

7.5.   A team may be disqualified completely from the competition

8. Internet solutions / Duplicate models and programs

8.1.   If a team is identified as having a solution that is too similar to solutions sold or posted online, and clearly not their own, the team will be subject for investigation and possible Disqualification.

8.2.   If a team is identified as having a solution that is too similar to another solution at the competition, and clearly not their own, the team will be subject for investigation and possible disqualification.

9. Fairness

9.1. By competing in WRO, teams and coaches accept the WRO Guiding Principles that can be found at: https://WRO-association.org/competition/WRO-ethics-code/

9.2. Every team needs to bring a signed copy of the WRO Ethics Code to the competition and hand it to the judges before the start of the competition.