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2024

## Engineering Design Project (EDP) Competition

### Robotic arm

#### GENERAL INFORMATION:

The goal of this competition is to give students the opportunity to investigate the art, science, and therefore limitless possibilities of system design. The main objective of this project is to construct a robotic arm that can throw balls of various weights toward a target at a distance of 3 meters in the shortest amount of time, after facing obstacles that are there to increase the level of challenge.

Participation is especially welcomed by engineering students in their first and second years of study. They can have fun while showcasing their uniqueness and inventiveness.

Three judges, who will be selected by the IEEE UAE Students Day steering committee, will assess the entries to the competition. For further assessment, the regulations for the competition are shown below.

#### COMPETITION RULES:

1. Undergraduate engineering students within the UAE are eligible for this competition.
2. Each institution can submit a maximum of two teams for judging in this competition. Each competition team should have no more than four students.
3. The system will be tested indoors using **3 different types of balls (ping pong, tennis and bouncing)** to test the system's efficiency.
4. The system will include a 1-meter height and 1-meter-wide goal net and 5 obstacles, 2 are placed to redirect the ball to the precise location, and 3 to block the balls when a system fails to aim. **No ball should hit the center of the goal.**
5. The system should be completely manual, and no further programming should be used. Teams with electronic components are not permissible and **will be disqualified.**
6. All material used in the systems must be safe, harmless, and accessible to everyone in the normal market. Systems should need **no safety protection.**
7. The Design **MUST** look like a robot arm and not just a shooting mechanism.
8. The ball will be placed on the floor (by students) in any place beside the robot arm. No more than 50cm away from the centre of the arm.
9. The robot arm must pick up the ball before shooting/throwing the ball.

10. Each Round will be based on;

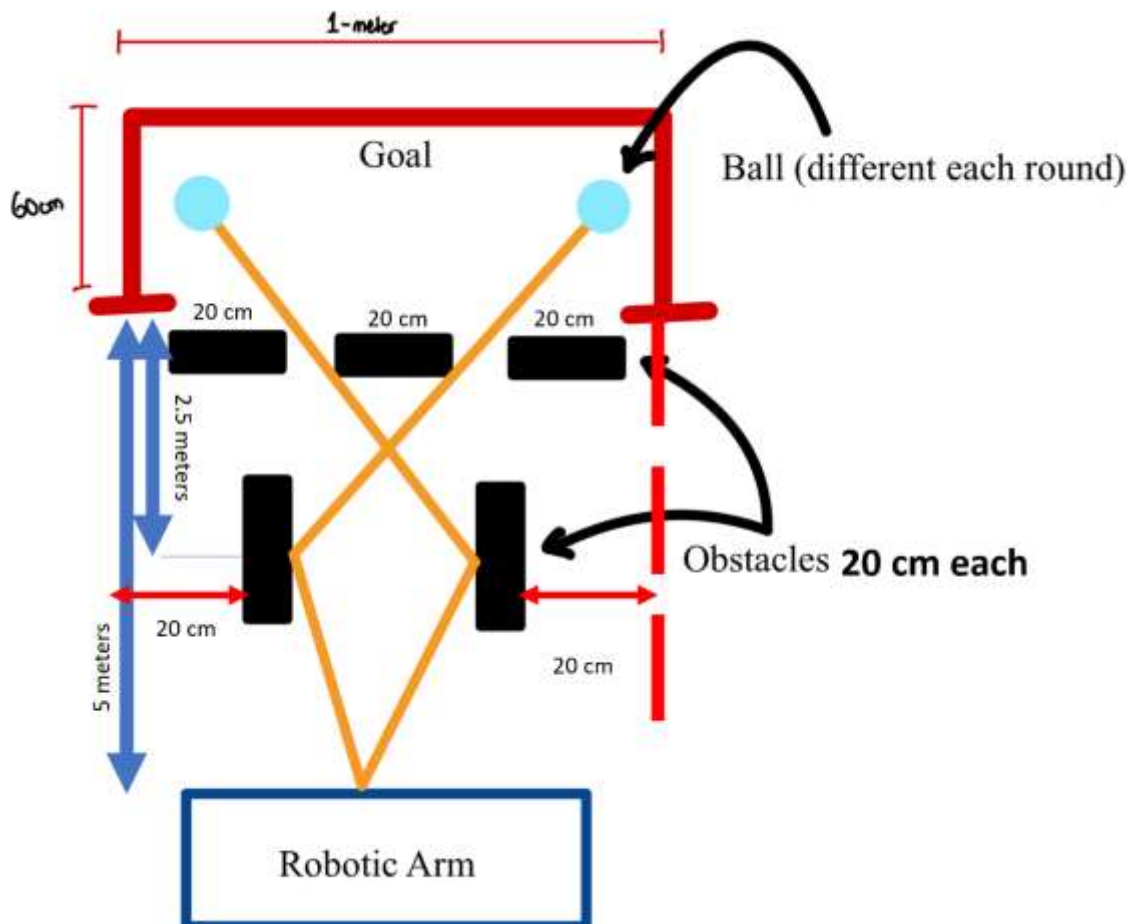
Rounds	Description	Points
Round 1	The arm should throw the ping pong ball at an angle and make it into the goal.	/30
Round 2	The arm should throw the bouncy ball at an angle and make it into the goal.	/30
Round 3	The arm should throw the tennis ball at an angle and make it to the goal.	/30
3D Printing and innovation		/10

11. The students are allowed to rest their Manual Robotic Arm each round.
12. If the team fails to attempt at one round, they can continue to compete for all three rounds.
13. The use of a new manual robotic arm is **NOT ALLOWED**.
14. **Ready-made manual Robotic arms are not allowed; students** MUST design/cut their own arm system. In 3D printing utilization, students must demonstrate and provide evidence of the design steps. **(Judges have the right to disqualify TEAMS with a ready-made arm)**.
15. Besides the competition round, each team will be given 5 minutes to demonstrate all aspects of their system.

Description:

1. Three blocks (20x20) positioned at the front of the goal (100x100) act as barriers. The arm should target the ball between the two (20x20) blocks on the sides.
2. The robot arm dimensions is 1 meter high 1 meter depth and 1 meter length.
3. The robot arm is 5 meters away from the goal.
4. Direct scoring without hitting the side obstacles is not allowed.
5. The Ball has to hit the obstacles in the middle (2.5 meters away) and change direction before being scored.
6. The arm can throw the ball in the air (but must hit the obstacles 2.5 meters away) or shoot it on the floor.

Illustrations:





**PING PONG BALL SIZE & WEIGHT**

Diameter (Ø) = 40 mm/4 cm/1.57"  
 r = 20 mm/0.79"

Diameter = 40 mm/ 1.57"  
 Circumference = 12.56 cm/ 4.95"  
 Surface Area = 50.26 cm<sup>2</sup>/ 7.79 in<sup>2</sup>  
 Volume = 33.51 cm<sup>3</sup>/ 2 in<sup>3</sup>

2.67 - 2.77 gm  
 0.094 - 0.098 oz

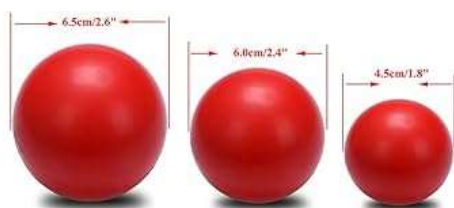
tabletennisarena.com



2.575" - 2.7" | 6.54 - 6.86 CM  
 (DIAMETER)

8.09" - 8.48" | 20.6 - 21.5 CM  
 (CIRCUMFERENCE)

56.0 - 59.4 G | 1.98 - 2.10 OZ (MASS)



Size	Diameter	Weight	Recommend Doggie
Small	4.5cm/1.8"	60g/2.1oz	Tedy,Poodle,Bichon, Shih Tzu,pug etc
Medium	6.0cm/2.4"	120g/4.2oz	Shiba Inu,Samoyed, Chou,bulldog etc
Large	6.5cm/2.6"	170g/6oz	Golden Retriever,Shepherd, Alaskan,Cane Corso etc.

**(Students can decide which size to use but it must**

**be bouncing ball )**

