

Robotics - REVISED for 2010

Division Code: 50

ADVISOR: Tom Cummings, Instructional Supervisor, Technology Education, Miami-Dade County Public Schools

SUPERINTENDENTS: William Baltazar, Melissa Fernandez, Carmen Garcia
ASSISTANT SUPERINTENDENTS: Jose Larrinaga, Jerome Siegmeister, Ron Torres-Gatherer

Entry Form Registration Deadline: Tuesday - February 2, 2010

Check-In:

Teachers and Club Leaders, Thursday March 18, 2010 from 4:00 pm to 8:00 pm, in Arnold Hall

Individuals, Saturday March 20, 2010 from 10:00 am to 4:00 pm, in Arnold Hall.

Check-Out:

Thursday April 15, 2010 from 4:00 pm to 8:00 pm, in Arnold Hall.

Competition Date:

Participants may test their robots Saturday, April 10, 2010, from 12:00 am to 2:00 pm in Arnold Hall. Competition will take place Saturday, April 10, 2010, 2:00 pm in Arnold Hall.

Division Rules:

1. Each entry must be registered with the fair prior to the February 2, 2010 registration deadline.
2. Each entry must consist of two parts, an autonomous/remote controlled (for high school) or remote controlled (for middle school) robot constructed from any material and the VEX micro-controller and the engineering notebook. The robot and notebook must be submitted and turned over to the judging committee on project check-in day for evaluation. Teams not submitting both an engineering notebook and robot on check-in day will not be allowed to compete.
3. A Fair Entry Tag must be adhered to the lower right corner of the notebook's back cover. A copy of the tag should accompany and be affixed to the robot entry.
4. An individual or team may enter only one robot.
5. Schools may have more than one team. Teams are limited to four members.

Robotic "Two-on-Two" Basketball Tournament Game Description:

Teams will be randomly paired into alliances to participate in a double elimination "two-on-two" basketball style tournament. Teams will have the task of engineering a robot with the ability to defend and move balls into a basket within a specified time limit. The alliance with the maximum number of points scored at the end of a match is the winner of that match. An overall winner will be determined at the end of the tournament. Separate awards will be given to the teams with the best documentation of the engineering process as documented in their engineering notebook.

Participants can download the latest version of these rules, field drawings and additional information from <http://teched.dadeschools.net/Resources.htm> Also located on the Miami-Dade County Technology Education website are links to this year's Fair Robotics Division Question and Answer Forum. All questions regarding this competition should be asked and will be answered on the bulletin board.

Competition Guidelines and Requirements:

The Game:

1. Each tournament match will be three minutes in length. The first 25 seconds of Class 2 matches (high school) will consist of an autonomous period. The last 10 seconds of every match will permit the use of a Human Shooter as specified below.
2. Robots must be more than 50% inside the human player area for players to load balls into the robot. The human player may only touch balls located within this zone.
3. Human players and coaches may not directly contact any robot at any time during the match with the exception of loading balls in the human player area. Repairs are not allowed during matches. Illegal contact will result in the disabling of the team's robot for the remainder of the match.

4. Autonomous period (for high school only) - the autonomous period consists of a 25-second period at the start of a match. Human control of the robot is not permitted during this time. Robots must act independently of the human players using routines and behaviors pre-programmed into the micro-controller. The use of sensor input during this time is strongly encouraged. The autonomous period ends at the conclusion of the 25-second autonomous period.
5. Human Shooter - The 20 specially colored alliance balls located on the field can only be used for scoring by the human shooter during the last 10 seconds of each match. Each robot must bring their respective colored balls to the human player area before human players can use these balls for scoring. Alliances may only use the balls corresponding to their team color to score points using the human player. Any colored balls brought into the human player area by a robot can be held by the retrieving team in order to prevent the opposing team from using them to score. In the last 10 seconds of each match, human players will be allowed to score by shooting their respective color balls into the goal one at a time without the use of the robot. Each ball that enters the goal in this manner will be counted as one point towards the total score. Alliances are limited to one human shooter who must remain in their team's human player area when shooting.
6. Robot interaction - Strategies aimed solely at the destruction, damage, tipping over, or entanglement of robots are not in the spirit of the tournament and are not allowed. In all cases involving robot-to-robot contact, the head referee may assess a 10-point penalty and/or the robot may be disqualified. However, this is a highly interactive basketball game and appropriate contact as determined by the judges is allowed.
7. Teams are responsible for following appropriate safety procedures at all times. All team members must wear appropriate closed-toe footwear. No bare feet, sandals or open-toed footwear are allowed. Each team is also responsible for providing their own safety glasses at the event. All team members, including coaches, must wear safety glasses while in the pit or on the playing field. Team members not wearing appropriate safety gear will not be allowed in the pits or on the field.
8. Wireless / radio control mode of robot operation is not permitted in any of the pit areas during competition. Teams should include telephone headset wires in their competition kit if they wish to test their robot while in the pit area.
9. The head referee has ultimate authority on the field during the competition. The head referee's rulings are final! The referee will not review recorded replays under any circumstance.
10. Goal tending, defined as remaining unmoving in the opposing alliance's two point area for more than five seconds is not permitted.

The Playing Field:

1. The playing field is 12' x 12' in dimension. (See figure.)
2. The opposite corners will be 2' x 2' human player areas. Alliance robots will begin the match in their respective human player areas.
3. The field will be divided into an inner and outer scoring area with each alliance scoring in their respective basket.
4. At the beginning of a match, there will be 60 standard yellow balls and 20 specially colored alliance balls (10 red, 10 blue) randomly placed on the playing field.
5. Balls used during competition will be foam practice golf balls

Note: See playing field drawings at <http://teched.dadeschools.net/Resources.htm>

The Engineering Notebook:

1. The engineering notebook must be a stitched back book no smaller than 9" x 7" (composition notebook).
2. The engineering notebook must include the following information:
 - a. Cover Page
 - b. Table of Contents
 - c. Build Entries
 - d. Programming Entries
3. An example engineering notebook and scoring rubric can be found at <http://teched.dadeschools.net/Resources.htm>

The Robot:

1. The robot base can not exceed 18" x 18".
2. There are no height and weight limitations for the robot.
3. No wedge - shaped robot bases that may interfere with other robots may be used.
4. The collection device for the balls must be contained within the 18" x 18" base at all times during the game.

5. If the collection device is attached to the shooting arm, the device may not be wider than the base of the robot.
6. The shooting arm must start the game enclosed within the 18" x 18" base, after which the shooting arm can extend.
7. The robot must display school's name and assigned registration number in a location that is visible during competition.
8. No devices or decorations are permitted on robots that are intended to jam or interfere with the operation of an opponent's vision system (i.e. Changing robot color to confuse opponent's vision system).
9. No light emitting devices allowed on the robot.
10. All wiring and electrical devices must be electrically isolated from the robot frame; the robot frame must not be used to carry electrical current (this isolated ground arrangement is necessary due to polarity reversals that occur under certain operating conditions such as during motor direction reversals).
11. The battery terminals and the connecting lugs must be insulated with shrink tubing and/or electrical tape.
12. If pneumatics are utilized on the robot, then the pressure can not exceed 120 psi. A gauge must be included within the robot pneumatic system.
13. All pneumatic components must be rated for the proper pressure. Each robot will be required to undergo a safety inspection prior at check-in. All robots must pass inspection for compliance with the rules herein before being allowed to compete in qualification matches. Robot safety inspection checklist can be found at <http://teched.dadeschools.net/Resources.htm>.
14. At inspection, noncompliance with any robot construction rule may result in disqualification of the robot from the competition event. The team must bring the robot into compliance before they will be allowed to compete in qualification matches. At the discretion of the lead Inspector, the robot may be allowed to participate in practice matches before passing inspection.
15. If a team makes a modification to improve performance or reliability after their robot has passed inspection, that team must have the robot re-inspected. If an observation is made that another team's robot may be in violation of the robot rules, please approach officials to review the matter in question. This is an area where "Gracious Professionalism" is very important.
16. At the time of inspection, the robot must be presented with all mechanisms (including all components of each mechanism) and configurations that will be used on the robot during the entire competition event. It is acceptable, however, for a robot to play matches with a subset of the mechanisms that were present during inspection. Only mechanisms that were present during the inspection may be added, removed or reconfigured between matches. If subsets of mechanisms are changed between matches, the reconfigured robot must still meet all inspection criteria.
17. Robots may not intentionally detach parts or leave multiple mechanisms on the field. Violations will result in a 10-point penalty per incident. If an intentionally detached component or mechanism significantly impedes access to the basket, the offending robot will be disqualified from the match.
18. At the competition, teams are allowed to repair modify and/or upgrade their robot while participating in the tournament. To support this, teams may bring spare replacement and upgrade parts. Once a match begins, you can not stop or delay the match for repairs.

Judging and Scoring Criteria:

Tournament Game — Total Game Duration: 3 minutes

Autonomous Period (Class 2 Duration: 25 seconds, Class 1 Duration: Not Applicable)

1. Balls brought and maintained in possession of the robot during autonomous mode: 1 point each
 2. Balls scored from the inner scoring area: 3 points each.
 3. Balls scored from the outer scoring area: 5 points each
- Remote Controlled Period (Class 2 Duration: 2 minutes & 15 seconds, Class 1 Duration: 3 minutes)
1. Balls scored from the inner scoring area: 2 points each
 2. Balls scored from the outer scoring area: 3 points each.

Additional Notes:

1. For the last 10 seconds of any match each basket scored by a human player without the use of the robot will count for 1 point. See Human Player Guidelines above for more information.
2. A robot will be considered 'behind' a given line if the leading edge of the robot chassis has not crossed the line.
3. A team will be eliminated from the tournament after incurring two losses.

Engineering Notebook - Total Possible Points: 80 for high school, 60 for middle school

5 points — Title page including name of event, team fair registration number, student names, teacher name and school

5 points — Table of contents

50 points — Teams should identify the 10 entries that best highlight the team's build process. Each entry will be eligible for a maximum of five points.

20 points — Class 2 Only - Teams should identify the five entries that best highlight the team's programming work. Each entry will be eligible for a maximum of 4 points.

**An engineering notebook rubric is available at
<http://teched.dadeschools.net/Resources.htm>**

Classes:

Class 1 — Middle School Robotic Tournament

Class 2 — High School Robotic Tournament

Premiums:

Ribbons and premiums will be awarded for the notebooks. The notebook points will also be used to identify the top 3 teams in each class.

Purple Ribbon	\$5.00 and Special Award Rosette
Blue Ribbon	4.00
Red Ribbon	3.00
White Ribbon	2.00
Yellow Ribbon	Ribbon Only

Robotic Division Trophies:

Class 1 — Middle School Robotic Tournament

Robotics Tournament Trophies: The top 3 middle school teams in the tournament competition will be awarded first, second and third place team trophies.

Robotics Engineering Notebook Trophies: The top 3 scoring middle school team notebooks will be awarded first, second and third place team trophies.

Class 2 — High School Robotic Tournament

Robotics Tournament Trophies: The top 3 high school teams in the tournament competition will be awarded first, second and third place team trophies.

Robotics Engineering Notebook Trophies: The top 3 scoring high school team notebooks will be awarded first, second and third place team trophies.

Judge's Trophies

Most Innovative Design

Most Points Scored in Any One Heat — Class 1

Most Points Scored in Any One Heat — Class 2

If you have any further questions, contact Carmen Garcia at clgarcia@dadeschools.net or William Baltazar at wbaltazar@dadeschools.net.

Important Note:

If you are unable to pick up your exhibits on Thursday, April 15, 2010, please make arrangements to have someone else pick them up for you.

Exhibits not picked up during check-out WILL BE discarded on Friday, April 16, 2010 at 8:00 am.

If there are no entries meeting the quality standards for any special awards, no award will be given.