ECE 4330/7330 Robot Competition Rules 2013

These are the official rules for the ECE 4330/7330 Robot Competition. They are released by the Robot Competition Technical Committee. It is highly recommended to the participants to read this document very carefully, as it contains useful information that may affect their code.

1. TEAM

1.1 Regulations

A team consists of two members. Each team must have a captain. The captain is the person responsible for communication with the referee. The team can replace its captain during the competition, but only between the games.

1.2 Violations

Teams that do not abide by the rules will be disqualified.

2. PREPARATION

Each team is allowed to calibrate the cameras before the competition starts. They are also allowed to share the calibration files with other teams. When the competition starts, the teams may not calibrate the cameras anymore unless an unexpected event occurs during the competition (e.g. one of the cameras is hit by the robot). The referee will allow all teams to calibrate the cameras again in such cases.

3. LAWS OF THE GAME

3.1 Game procedure and length of a game

The objective of the game is to use the PUMA 260 robotic arm to pick up the cylinders and throw them to the scoring zone of the opponent team’s robot. The duration of each game is 8 minutes. If a game is tied after the regular time, the teams will play 3 minutes of overtime. After
that, the game will be finished even if the tie persists. The game clock will run for the duration of the game without stopping (except if the referee wants to consult an official). The game clock will be run by the referee or an assistant. Teams are supposed to be ready 2 minutes before the game starts. Teams can be penalized one goal per minute at the referee's discretion if they are not ready in time. If a team is not ready within 5 minutes, it forfeits the game and the winning team is awarded a 3-0 win.

3.2 Pre-match meeting

At the start of the game, the referee will toss a coin. The team mentioned first in the draw shall call the coin. The winner of the toss can choose which robot to use. The draw which determine the order of the games and the teams will be held in EBE E1425, 15 minutes before the competition starts in the presence of the members of the Technical Committee and all the participants.

3.3 Kick-off

The game begins with a dropping of 3 cylinders into the boxes. The referee and his/her assistant will drop the cylinders at the same time. No one can adjust the position of the cylinders by hand.

On the referee's command, the robots will be started immediately by each captain. The robots must start the game from the Ready position.

3.4 Human interference

Except for the kick-off, human interference (e.g. touching the keyboard, mouse, cylinders, etc.) during the game is not allowed unless explicitly permitted by the referee or using Leap Motion device. Violators can be disqualified from the game. The rules for using Leap Motion device will be discussed in the next section.

3.5 Leap Motion

In addition of a Matlab/C/C++ program, all the teams are allowed to use the Leap Motion device. However, in order to switch from Matlab to Leap Motion or vice versa, the robot cannot be moved or repositioned manually. The teams can only terminate the Matlab program and run their leap motion codes or vice versa. Violators can be disqualified from the game.
3.6 Attacking and Scoring

A goal is scored when a cylinder thrown by a team’s robot falls inside the other team’s box. If the cylinder bounces off and lands outside the box, it will not be counted as a goal. If the cylinder hits other objects in the field like the robot, the window, the table, etc. and then lands inside the box, it will be counted as a goal.

3.7 Defending

The robot cannot defend exclusively. If the referee understands that the robot does not have any intention to attack even if it would be possible to do so (i.e., there is at least one cylinder inside the team’s box), the team can be penalized one goal per minute at the referee's discretion.

3.8 Moving the Box

The teams are allowed to move or shake the box during the game, but they have to return the box to the initial position after a few seconds. If the other team attempts a goal and the box is not in place, the goal will be assigned automatically to the attacking team. If a team is not able to return the box to its original position, the referee will do it manually. There will not be a penalization the first time this happens. Each time this happens again, the team will be penalized with one goal.

3.9 Lack of progress

Lack of progress occurs when the game is not played – attacking or defending – for one minute (the referee announces when the minute starts) and the situation is not likely to change. Typical lack of progress situations are when both boxes are out of cylinders or both robots are stuck in one situation. The referee will call “lack of progress” and will drop one to three new cylinders into each box so that each team will have three cylinders inside of the box.

3.10 Damaged robot

If a robot is damaged or stops working, for example by hitting the table and turning off the arm motor power, the opponent can continue the game until the time ends. The team with the damaged robot cannot move the robot manually.
The technical committee will fix and recalibrate the robot after the game in order to start the next game. This process will affect the schedule of the games competition.

3.11 Interruption of Game

In principle, a game will not be interrupted. The referee can stop the game if there is a situation on or around the field which the referee wants to discuss with the technical committee. When the referee has stopped the game, both robots must be stopped and remain on the field untouched. The referee will decide whether the game will be resumed from the state in which the game was stopped or from Ready position.

3.12 Ending the game

At the end of the game, each team must return the robot to the Ready position. This step can be done manually by the user.

4. RANKING SYSTEM

The competition starts with a Group Tournament Ranking System. All the competitors are ranked according to the results of all the matches played in the tournament. Points are awarded for each fixture, with teams ranked based on total number of points. Each team will play 5 matches and will be awarded 3 points for a win, 1 for a draw, and 0 for a loss.

In the case of equal points, the head to head game will be considered. If the result of the head to head game is a draw, the scoring differential (the difference between goals scored and those conceded) will be taken into the account. If two teams are equal in all the above mentioned factors, then the number of goals scored will be used as a tie-break criterion. After all, if the tie persists then the teams will play a final game to declare the champion. That final game continues until one team wins.

The table of the points is shown next.
After this step, the two best teams are identified and there is a final match between them. The winner of this game is the CHAMPION of 2013 competitions.

5. CODE OF CONDUCT

5.1 Fair Play

It is expected that the aim of all teams is to play a fair and ethic game. It is expected that all the codes and programs are written only by the two members of the team.

Participants are not allowed to change the position of the cameras or the boxes during the whole competition.

Nobody is allowed to cause deliberate interference with robots or damage to the field or the cylinders.

5.2 Sharing

An understanding that has been a part of the ECE 4330/7330 Robot Competition is that technological and curricular developments should be shared with other participants during and after the competition.

5.3 Spirit

It is expected that all participants will respect the ECE 4330/7330 Robot Competition mission.
Even though you should try your best to win the competition, the main goal is to achieve a good performance and to have a good learning experience overall.

6. CONFLICT RESOLUTION

6.1 Referee and referee assistant

All decisions during the game are made by the referee with consultations to the assistant referee. The referee is in charge of the scoring table, the field, and the persons and objects surrounding it. During game play, the referees’ decisions are final.

Any argument with a referee or the assistant can result in a warning. If the argument continues or another argument occurs, this may result in immediate disqualification from the game.

At the conclusion of the game, the referee will ask the captains to sign the score sheet. By signing the score sheet the captains accept the final score on behalf of the entire team.

6.2 Rule clarification

Rule clarification may be made by members of the ECE 4330/7330 Robot Competition Technical Committee during the competition, if necessary.

6.3 Rule modification

If special circumstances, such as unforeseen problems of a robot occur, rules may be modified by the ECE 4330/7330 Robot Competition Technical Committee during a game, if necessary.