

# **ROBOCON MALAYSIA 2011**

**THEME & RULES  
“BUNGA RAYA:  
UNITY FOR 1 NATION”**

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## THE CONTEST THEME

### “BUNGA RAYA: UNITY FOR 1 NATION”

#### History : Bunga Raya

Bunga Raya or Hibiscus Rosa Sinensis is the national flower for Malaysia. In 2010 the nation celebrated 50 years of glorification of Bunga Raya, a symbol of the Malaysian loyalty in upholding the 5 core values of the institution. The vibrant colours of the flower represent the harmony among all races in the country and its unique number of petals resembles the 5 ‘Rukunegara’.

The Bunga Raya blooms throughout the year it is commonly found in most Malaysian gardens. After achieving independence, the Ministry of Agriculture was directed to recommend an appropriate flower to be selected as the national flower.

On 28 July 1960, the flower was declared as the National Flower for the Federation of Malaya. When Singapore, Sabah and Sarawak joined Malaya to form Malaysia, the Bunga Raya continued to be the national flower till now.

#### Theme Explanation : Bunga Raya

Beginning from the year 2000, Asia-Pacific Broadcasting Union with the help of various parties in the country have organized ROBOCON, it has been proudly recognized as one of the important events in the yearly calendar for higher education sector. It is an event which promotes relationship and healthy competitiveness among students from various institutions around the region.

This year, ROBOCON 2011 will once again be the arena of dreams for young inventors from higher educational institutions to display their knowledge and creativity. The national ROBOCON 2011 theme, the Bunga Raya, is based on the concept of 'Unity for 1 Nation'. The game is centred on the construction of the Bunga Raya, which symbolizes the core essence of a strong Malaysia.

The word bunga in Malay means "flower", whilst raya in Malay means "celebration". The five petals represent the five Rukun Negara of Malaysia. They also symbolize the courage, life and rapid growth of the nation. The Sea of Challenges represents the ordeals faced by the nation during the passage of building Malaysia.

## The Concept/ Idea

In designing the game, there are 6 fundamental considerations that were taken into account, which are;

- Game adaptation of the International Theme 'Loy Krathong' by Thailand to the Malaysian cultures and traditions
- Easy to understand by the audiences
- Entertaining and exciting game
- Intelligent robots performing in dynamic environment
- Picking and placing objects in three dimensions
- Having collaboration between opponent teams

The game is designed so that all the participating teams are able to compete and enjoy the contest. Only the team with accurate strategies in building the *Bunga Raya* within the rules and regulations stipulated can be the winner.

# RULES

## 1. Outline of the Contest

Each team consists of no more than three robots: one manual and one or two automatic robots. The manual robot must complete the first task by picking up three Baskets and placing them at Common Zone before performing other tasks. After that, the manual robot will bring a Sepal and place it at Decoration Point located on Pavilion. The manual robot will collect Stamens from the Common Zone to be used again during Flower assembly.

The automatic robots will collect Petals and Stamen Bases and place them at Preparation Points. The automatic robots will decorate Flower by stacking one Petal and then one Stamen Base on the Sepal located on Pavilion. After completing this task, the manual robot will then place three Stamens into the decorated Flower. The automatic robots will carry the Completed Flower and drop it on Sea of Challenges of its own side. No part of any robots can touch or contact the Sea of Challenges.

Lastly, the automatic robots will bring and drop a Stigma on top of the Stigma Stem in the Completed Flower floating on the Sea of Challenges. No part of any robots can touch or contact the Sea of Challenges or the Completed Flower. The first team that drops the Stigma successfully is the winner of the match. This type of winning is called “Mekar”.

If neither team achieves the “Mekar” within 3 minutes, the winner shall be decided by the earning scores of the completed tasks.

Each match is contested by Red and Blue teams. A match lasts 3 minutes.

## 2. Game Field: Structure and Specifications

- 2.1 The field consists of a Game Area having the dimension of 12,000 mm x 12,000 mm and surrounded by a wooden fence with a height of 100 mm and a thickness of 50 mm. The game field is divided equally for two teams by a wooden fence with a height of 100 mm and a thickness of 50 mm. The competing teams are Red and Blue teams. (Figures 1-4)
- 2.2 White lines with a width of 30 mm made of non-shiny sticker are drawn on the floor of the Game Area.
- 2.3 The Game Area consists of a Common Zone, a Pavilion, a Sea of Challenges, Start Zones, Preparation Points and Storage Points.
  - 2.3.1 The Common Zone has a rectangular shape with a width of 500 mm and a length of 3,500 mm painted in light green color. Six Poles are located at the middle line of the Common Zone for placing Baskets. The gap between the Poles is 500 mm. Each team can collect at most of nine Stamens from the Common Zone for Flower assembly.
  - 2.3.2 The Pavilion is a lifted up platform with a height of 300 mm, a width of 4,000 mm and a length of 5,000 mm. It is divided equally for Red and Blue teams. Each part consists of a Decoration Point, a circular shape with a diameter of 510 mm surrounded by a wooden fence with a height of 10 mm and a thickness of 10 mm. Two ramps each with a length of 1,000 mm are built at two sides of the Pavilion to facilitate the automatic robots for moving up. (Figures 5-6)
  - 2.3.3 The Sea of Challenges is located in the middle of the Pavilion. It can be swung by Flower gravity during dropping. (Figure 7)

- 2.3.3.1 The Sea of Challenges is a platform made of wood with a thickness of 4 mm, a width of 700 mm, a length of 2,400 mm. It is suspended at a level of 280 mm measured from the Pavilion to the lower surface of the platform by four wires made of stainless steel each with a diameter of 1.5 mm and a length of 350 mm. All parts and mechanisms which form the Sea of Challenges are considered as Sea of Challenges. They cannot be locked or touched by any robots.
- 2.3.3.2 The Cliff is made of a wooden fence with a height of 180 mm from Pavilion and a thickness of 10 mm. There are 4 sides surrounding the Sea of Challenges. The Cliff can be painted or decorated to represent water or sea. (Figures 8-9)
- 2.3.4 Each team has 3 Start Zones: two Automatic Start Zones, one Manual Start Zone. Each Start Zone is a square with a length of 1,000 mm each side. Start Zones of Red team are in red color, Start Zones of Blue team are in blue color.
- 2.3.5 The Storage Points and Preparation Points are made of wood, steel, or other rigid metal are Poles used to store or place some contest tools. Each Pole of the Storage Points and Preparation Points consists of two sections; lower and upper sections. The lower section has a cylindrical shape with a diameter of 100 mm and a height of 800 mm. The upper section has a total height of 100 mm. Top part of the upper section has a conical shape with the diameter varying from 40 mm measured at the topmost position until 60 mm measured at the distance of 30 mm from the topmost position. The bottom part of the upper section has a cylindrical shape with a diameter of 60 mm. However, the upper section of each Pole of the Storage Points of Stigma has only a cylindrical shape with a diameter of 60 mm and a height of 35 mm. (Figures 10-12)

### 3. Specifications of Flower and Other Contest Tools

- 3.1 Sepals, Petals, Stamen Bases, Stamens, Baskets, Stigmas used in the contest are provided by the organizer. (Figures 14-19)
  - 3.1.1 The combined weight of a Sepal and Stigma Stem is approximately 800 g.
  - 3.1.2 The weight of a Petal is approximately 250 g.
  - 3.1.3 The weight of a Stamen Base is approximately 250 g.
  - 3.1.4 The weight of a Stamen is approximately 100 g.
  - 3.1.5 The weight of a Stigma is approximately 200 g.
  
- 3.2 The total weight of the Completed Flower is approximately 1,800 g. (Figure 13)
  
- 3.3 The Upper Surface of the Sepal, the Petal, the Stamen Base or the Basket is made of rubber, plastic or cardboard paper cut in a doughnut shape with a thickness of 3 mm. Color of the Upper Surface is pink for the Red team and sky blue for the Blue team.
  
- 3.4 The Lower Surface of the Petal, the Stamen Base or the Basket is made of rubber, plastic or cardboard paper cut in a doughnut shape with a thickness of 3 mm. Color of the Lower Surface is pink for the Red team and sky blue for the Blue team.
  
- 3.5 The Flower consists of a Sepal, a Petal and a Stamen Base. The detail of each part is explained as follows:
  - 3.5.1 The Sepal consists of four parts (Figure 14):
    - (1) The Base is made of wood or plastic with a thickness of 4 mm cut in circular shape with a diameter of 500 mm.
    - (2) The Cylindrical Foam glued with the Base has an inner diameter of 70 mm and an outer diameter of 500 mm and a height of 100 mm.

- (3) The Upper Surface covers the top of the Cylindrical Foam.
- (4) The Stigma Stem fixed to the Base is made of a hollow plastic or wooden pipe with a height of 503 mm measured from the Base and a diameter of 60 mm.

Top end of the Stigma Stem is closed with a circular plate made of rubber, wood, plastic or cardboard paper with a thickness of 4 mm and half black and half white pattern. Bottom end of the Stigma Stem is inserted into a plastic cap with an outer diameter of 70 mm and a height of 70 mm and a thickness of 5 mm. The cap is fixed to the Base by screws.

3.5.2 The Petal is made of a cylindrical foam with an inner diameter of 76 mm and an outer diameter of 400 mm and a height of 100 mm. A hollow plastic tube with an outer diameter of 76 mm and a thickness of 2 mm and a height of 100 mm is fixed at the center of the foam to facilitate insertion. Top surface of the Petal is covered with the Upper Surface. Bottom surface of the Petal is covered with the Lower Surface. (Figure 15)

3.5.3 The Stamen Base is made of a cylindrical foam that has an inner diameter of 76 mm and an outer diameter of 280 mm and a height of 100 mm. A hollow plastic tube with an outer diameter of 76 mm and a thickness of 2 mm and a height of 100 mm is fixed at the center of the foam to facilitate insertion. Three holes for placing Stamens each locating 85 mm from the center of the Stamen Base with 120 degrees apart are made on the Stamen Base. Each hole has an inside diameter of 42 mm. A hollow plastic tube with an outer diameter of 42 mm and a thickness of 2 mm and a height of 100 mm is fixed at the center of each Stamen hole to facilitate insertion. Top surface of the Stamen Base is covered with Upper Surface. The decorated Stamen Bases can only be used for decoration purpose and

cannot be used strategically for the contest. Bottom surface of the Stamen Base is covered with the Lower Surface. (Figure 16)

- 3.6 The Stamen is made of a hollow plastic or wooden pipe with a height of 250 mm and a diameter of 34 mm. Both ends of the Stamen are closed with circular plates made of rubber, wood, plastic or cardboard paper each with a thickness of 3 mm. Top part of the Stamen is painted in Red for Red team and Blue for Blue team with a height of 50 mm. (Figure 17)
- 3.7 The Basket is made of a cylindrical foam with an inner diameter of 76 mm and an outer diameter of 280 mm and a height of 100 mm. A hollow plastic tube with an outer diameter of 76 mm and a thickness of 2 mm and a height of 100 mm is fixed at the center of the foam to facilitate insertion. Three holes for placing Stamens each locating 85 mm from the center of the Basket with 120 degree apart are made on Basket. Each hole has an inside diameter of 42 mm. A hollow plastic tube with an outer diameter of 42 mm and a thickness of 2 mm and a height of 100 mm is fixed at the center of each Stamen hole to facilitate insertion. Top surface of the Basket is covered with the Upper Surface. Bottom surface of the Basket is covered with the Lower Surface. Its weight is approximately 250 g. (Figure 18)
- 3.8 The Stigma consists of two sections (Figure 19):
- 3.8.1 The Base is a cap in cylindrical shape made of a hollow plastic tube with an outer diameter of 76 mm and a height of 55 mm and a thickness of 2 mm. Top end of the plastic tube is closed with a circular plate made of plastic with a thickness of 3 mm.
- 3.8.2 The Stigma is formed by foam, plastic, rubber, paper, fibreglass or metal in ball shape with a height of 100 mm.

## 4. Game Procedure

### 4.1 Length of a game

4.1.1 Each match lasts three minutes at most.

4.1.2 In any of the following cases, the match ends immediately (even before three minutes).

4.1.2.1 When “*Mekar*” is achieved.

4.1.2.2 Disqualification is announced in the game.

4.1.2.3 When the referee judges that the game cannot continue.

### 4.2 Setting of robots

4.2.1 One minute is given for setting of robots before the game starts.

4.2.2 At most three members of each team can engage in setting of robots.

4.2.3 Any teams that fail to complete setting of the robots within one minute can resume the setting again once the game starts.

### 4.3 Deployment of the robots and team members at the start of the game

4.3.1 Manual Robot must be started in Manual Start Zone.

4.3.2 Automatic Robot 1 must be started in Automatic 1 Start Zone.

4.3.3 Automatic Robot 2 must be started in Automatic 2 Start Zone.

4.3.4 After starting automatic robots, the team members who perform the starting action must leave the game field immediately.

## 5. Competition Tasks and General Restrictions

Once the game has begun, each team shall complete the tasks:

- 5.1 The Manual Robot picks up three Baskets and places them at any Pole in the Common Zone. The three Baskets include two Baskets which belong to its team and one Basket which belongs to the other team. Without completing this task, the manual robot is not allowed to do other tasks, likewise, the automatic robots are not allowed to start.
- 5.2 The Manual Robot brings the Sepal and places it at the Decoration Point on the Pavilion.
- 5.3 The Automatic Robots collect Petals and Stamen Bases from the Storage Points and place them at the Preparation Points only from the ground field.
- 5.4 The Automatic Robots move up the Pavilion and bring a Petal and a Stamen Base from the Preparation Points. The automatic robots stack a Petal on the Sepal at the Decoration Point, and then stack a Stamen Base on the Petal.
- 5.5 The Manual Robot collects any Stamen that belong to its team which are considered from color of the Stamens from the Common Zone and places three Stamens at the three holes of the decorated Flower on the Pavilion. During placing the Stamens, the Manual Robot is allowed to touch the decorated Flower at the Decoration Point.
- 5.6 The Automatic Robots carry the Completed Flower and drop it on the Sea of Challenges. No part of the robots is allowed to touch the Sea of Challenges either directly or indirectly.

- 5.7 Only the Automatic Robots can bring a Stigma and drop it on top of the Stigma Stem in the Completed Flower floating on the Sea of Challenges. No part of the robot is allowed to touch the Completed Flower or the Sea of Challenges directly or indirectly.

Some restrictions are enforced in the game as follows.

- 5.8 In any case of dropping the Stigma on the Game Area, the dropped Stigma cannot be reused any further in the match.
- 5.9 In the case of dropping the Baskets, the Stamens or the Sepal, the Manual Robot can pick up the dropped Baskets, the Stamens or the Sepals if they are inside its own Game Area including the space above. The dropped Baskets, the Stamens and the Sepals can then be reused again.
- 5.10 The Automatic Robots can do any tasks of the Manual Robot.
- 5.11 The Manual Robot can be switched to become an Automatic Robot after placing three Baskets at the Common Zone with permission from the referee. The switching process must be done in any Automatic Starting Zones. Once the Manual Robot is switched and become the Automatic Robot, it cannot be reversed back to become the Manual Robot again.
- 5.12 If a Flower is not completed, no score for dropping that Flower on the Sea of Challenges is given. Likewise, no score for dropping the Stigma on the Stigma Stem of the Incomplete Flower is given.
- 5.13 In the case of dropping the Petals, Stamen Bases, Stamens, Baskets, or the Sepals, they will be returned to their respective Storage Points.

## 6. Retries of Robots

- 6.1 A retry can be made only after the referee permission.
- 6.2 Team members are allowed to touch the robots while preparing for a retry.
- 6.3 Retries of a robot or several robots at the same time can be made as many times as necessary.
- 6.4 A retry of Manual Robot is made at Manual Start Zone only.
- 6.5 A retry of Automatic Robot is made at either Automatic 1 Start Zone or Automatic 2 Start Zone.
- 6.6 During a retry, the team can request the referee to bring the dropped Petal or Stamen Base back to their previous locations; back to the Storage Points or back to the Preparation Points if they are successfully placed earlier. The earned score still remains.
- 6.7 During a retry, the team can request the referee to bring the Completed Flower that was dropped on the way to the Sea of Challenges back to the Decoration Point. The earned score still remains.
- 6.8 During a retry, the team can bring all the objects which are held by the robots during asking for the retry back to the Start Zones. However, the dimension of each robot and its objects in the Start Zone must follow the rule on starting the robots written in 8.5 and 8.6. Otherwise the objects will be considered as the dropped objects.

- 6.9 During carrying Baskets to the Common Zone if the Manual Robot drops the Baskets, the team members are allowed to bring the Baskets back to the Storage Points of the Baskets. In this case a retry is compulsory.
- 6.10 The Automatic Robots are not allowed to place Petals or Stamen Bases to the Preparation Points while they are on the Pavilion. This action causes violation and a retry is compulsory. The Petals and Stamen Bases which were placed to the Preparation Points by this action will be brought back to the Storage Points.
- 6.11 During dropping the Completed Flower on the Sea of Challenges, if any parts of the Automatic Robots or the Flower held by the robots physically touch the Sea of Challenges either directly or indirectly, this action causes violation and a retry is compulsory. The team has to restart the Automatic Robots that made the violation at the Automatic Start Zones. The referee will remove the dropped Flower out of the Game Area. That Flower cannot be reused any further in the match.
- 6.12 During dropping the Stigma on top of the Stigma Stem in the Completed Flower floating on the Sea of Challenges, if any parts of the Automatic Robot or the Stigma held by the robot physically touch the Stigma Stem, any parts of the Flower , or the Sea of Challenges either directly or indirectly, this action causes violation and a retry is compulsory. The team has to restart the Automatic Robot that made the violation and the other Automatic Robot that holds the Stigma, if any, at the Automatic Start Zones. The Automatic Robots that still hold the Stigmas during this action are allowed to bring the Stigmas to the Automatic Start Zones. However the dimension in the Automatic Start Zones must follow the rule on starting the Automatic robots written in 8.5,

otherwise the Stigmas must be brought back to the Storage Points of the Stigma.

- 6.13 The Automatic Robot is not allowed to hold the Stigma and the Completed Flower at the same time. This action causes violation and a retry is compulsory. The Stigma will be brought back to the Storage Point of the Stigma and the Completed Flower will be brought back to the Decoration Point.
- 6.14 Strategies premised on the use of retries are allowed.

## 7. Deciding the Winner

- 7.1 The first team that an Automatic Robot successfully drops a Stigma on the Completed Flower floating on the Sea of Challenges is the winner of the game and the match ends. This is the achievement of the game goal and so called “*Mekar*”.
- 7.2 If neither team achieves “*Mekar*” at the end of the 3 minutes match, the winner is decided based on the earning scores. The team that earns higher score is the winner. The score of each task is described as follows:
- 7.2.1 Manual Robot successfully picks 3 Baskets and places them at 3 Poles in the Common Zone. [18 points] (2 points for each Stamen)
  - 7.2.2 Manual Robot successfully places a Sepal at the Decoration Point. [12 points]
  - 7.2.3 Automatic robots successfully collect 2 Petals and 2 Stamen Bases and place them at 4 Preparation Points. [40 points] (10 points for each object)
  - 7.2.4 Automatic Robots successfully stack a Petal from the Preparation Point on the Stigma Stem at the Decoration Point. [10 points]
  - 7.2.5 Automatic Robots successfully stack a Stamen Base from the Preparation Point on the Petal at the Decoration Point. [10 points]
  - 7.2.6 Manual robot successfully places 3 Stamens into the holes of the decorated Flower at the Decoration Point. [30 points] (10 points for each Stamen)
  - 7.2.7 Automatic Robots successfully drop the Completed Flower on the Sea of Challenges. [30 points]
  - 7.2.8 An Automatic Robot successfully brings Stigma and drops it on top of the Stigma Stem in the Completed Flower floating on the Sea of

Challenges and the Stigma remains on top of the Stigma Stem at least 3 seconds.

[50 points]

### 7.3 The game result

7.3.1 The game result is announced after the end of the 3 minutes match and the referee already checks and confirms the completed tasks and the faulty actions of the robots.

7.3.2 The Match will end when

7.3.2.1 End of 3 minutes.

7.3.2.2 One of the teams is disqualified.

7.3.2.3 One of the teams achieves the goal, “Mekar”.

7.3.3 A total score of 300 points is given to the team that achieves “Mekar”.

7.3.4 Before achieving “Mekar”, more than one set of Flower can be made and dropped.

## 8. Cautions in Robot Design and Development

- 8.1 Each team is recommended to build 3 robots: 1 Manual Robot and 2 Automatic Robots.
- 8.2 Each robot must not be split into sub-units or connected by flexible cords.
- 8.3 Only the communication between Automatic Robots is allowed, however, wireless radio frequency is prohibited.
- 8.4 The robots in the contest must be built by the team members from the same university/college.
- 8.5 Automatic Robots
  - 8.5.1 Each Automatic Robot must perform its tasks automatically after it is started by a team member.
  - 8.5.2 In the Automatic Start Zone, the Automatic Robot must have its dimension no larger than 1,000 mm in width, 1,000 mm in length and 1,400 mm in height. There is no limitation on the dimensions of the Automatic Robot after the game starts.
- 8.6 Manual Robot
  - 8.6.1 The manual robot is operated by a team member through a connected cable, an infrared remote control, visible ray or sound control. Wireless radio frequency control is prohibited. The operator is not allowed to ride on the robot.

8.6.2 In the case of operation through cable, the length of cable must be in between 1,000 mm and 3,000 mm. The cable connection on the robot must be placed at a height of no less than 1,000 mm above the floor.

8.6.3 In the Manual Start Zone, the Manual Robot must have its dimension no larger than 1,000 mm in length, 1,000 mm in width and 1,400 mm in height. The robot can expand, stretch or extend within a cylinder of 2,000 mm in diameter considered from top view.

## 8.7 Weights of the robots

8.7.1 The total weight of all robots, equipments and other devices used in the entire contest must not exceed 50 kg. However, the back-up set of batteries of the same type, weight and voltage as the primary set of batteries, is exempted.

## 8.8 Power sources of the robots

8.8.1 Each team must prepare its own power sources.

8.8.2 The voltage of the power sources used by each robot must not exceed DC24V + 10% .

8.8.3 The pressure of the compressed air power must be less than 6 bars.

8.8.4 The organizer has the right to declare and prohibit any dangerous and inappropriate power sources.

## 8.9 Safety rules

8.9.1 The use of explosives, fire or dangerous chemicals is prohibited.

8.9.2 If a laser is used, it must be of class 2 or less. In designing and preparing the laser, full care must be taken to protect all persons at the venue from harm during all procedures. In particular, the beams must be so oriented that they cannot shine into the eyes of the spectators.

#### 8.10 Examination of the robots

8.10.1 Participating robots are examined prior to the test run on the day before the contest and again on the day of the contest before it begins. The team that fails the examination is not allowed to participate in the test run or contest.

8.10.2 Details of what to be examined and how will be provided at a later date.

### 9. Violations

If a violation occurs, 20 points will be immediately deducted and if the violation still continues, 20 points will be deducted for every 3 seconds. Each time of deduction is considered as the number of violations. The team with three violations in a match will be disqualified. The violations are categorized as follows:

- 9.1 Any parts of any robots or the objects held by any robots move out of the game field or the space above it.
- 9.2 Any parts of any robots or the objects held by any robots enter the opposing team area or the space above it.
- 9.3 Any parts of the Manual Robot or the objects held by the Manual Robot enter the Sea of Challenges or the space above it.
- 9.4 Any parts of the Manual Robot physically touch any Automatic Robots either directly or indirectly.

- 9.5 Any parts of any robots or the objects held by the robots cause obstruction in the Common Zone.
- 9.6 The operator of the Manual Robot uses the Manual Robot to hinder or cause difficulty for the opponent team while placing Baskets in the Common Zone.
- 9.7 Any parts of any Automatic Robots physically touch the Sea of Challenges, especially during dropping the Completed Flower, either directly or indirectly.
- 9.8 Any parts of any Automatic Robots physically touch any parts of the Flower floating in the Sea of Challenges, especially during placing a Stigma, either directly or indirectly.
- 9.9 The Automatic Robot holds any Stigma and the Completed Flower at the same time.
- 9.10 The Automatic Robot places any Petals to the Preparation Points while it is on the Pavilion.
- 9.11 Other actions that infringe on the rules without mentioning in the disqualification are considered as violations.

## 10. Disqualification

A team will be disqualified if it commits any of the following actions during the match:

- 10.1 The team damages or tries to damage the field, facilities, equipments or opponent's robots.
- 10.2 The team performs any acts that are not in the spirit of fair play.
- 10.3 The team fails to obey instructions or warnings issued by the referees.
- 10.4 The team has made a false start for three times in the same match.
- 10.5 The team has made three violations in the same match.

## 11. Safety issues of the robots

- 11.1 All robots must be designed and manufactured as to pose no danger of any kinds to any persons in the venue.
- 11.2 All robots must be designed and manufactured as to cause no damage to any robots of the opposing team or the field.

## 12. Teams

- 12.1 A team consists of three students and one instructor who all belong to the same college, university or polytechnic. The three students of the team are entitled to participate in the match.
  
- 12.2 In addition, three members of pit crews can adjust the robots in the pit area and can help to carry the robots to the field, but cannot participate in the match. The members of the pit crews must be students of the same college, university or polytechnic as the team.
  
- 12.3 Participation by post-graduate students is not permitted.

### 13. Others

- 13.1 The legitimacy of any actions not provided in this rule book will be subject to discretion of the referees.
- 13.2 The dimensions, weights, etc. of the field, facilities and equipments described in this rule book have a margin of error of plus or minus 5% unless otherwise stated. However the dimensions and weights of the robots as shown in the rule book are the maximum and cannot be tolerated.
- 13.3 All questions should be addressed to the official website of the Malaysia Robot Contest 2011, <http://www.robofest.org.my/index.asp> FAQ section will be provided on the site.
- 13.4 Notification of any additions and/or corrections to this rule book will be made on the official web site.
- 13.5 The referees may demand additional explanations on safety issues when the safety of a robot is deemed to be in question.