

Robofest 2006 Rules

12-21-05 v1.3.1 (Official Version)

RobofestSM is an open competition to increase young students' interest, engagement, understanding and use of science, technology, engineering, and mathematics (STEM). Robofest has two Age Divisions, Junior and Senior:

Junior Division	5-9 th grades
Senior Division	9-12 th grades

During Robofest, teams of students can compete in either Games or Exhibition Categories. (Robofest has added three new pilot program competitions to the 2006 event, please see those below.)

1. The Game Competition

The Robofest competition is quite unique, because the shape and dimension of the playing field is unknown; the brightness of the competition area is also unknown. The condition of the playing field changes during competition, and some parts of the competition problem are unknown until the day of competition. **In addition, a part of the 2006 mission may require physical cooperative interaction between two human players.**

The name of the challenge for the 2006 competition is "Toxic Waste Cleanup Challenge" (Word, PDF versions are available at www.robofest.net). Although Robofest allows up to 7 members, we recommend 4 or 5 members per team to better engage students. Both Junior and Senior game competitions use the same challenge theme, but Senior Division Mission is more difficult than that of Junior Division. We recommend a high-level programming language for the senior division teams.

Robofest teams do not compete in a predetermined order. For each round, whenever the team is ready to compete after solving the unknown missions, they line up with their official competition score sheet, which can be found in the team envelope given at the team check-in (**no computers while waiting in line**). As teams start their first round of game competition, they will have a public oral presentation. (Details on oral presentation can be found later in this document under "**10. Teams Responsibility on Robofest Day**".)

2. The Exhibition Competition

The robotics exhibition is a great way for students to show off their creativity. Each team has complete freedom to create autonomous robotics projects such as robot pets, robot artists, dancing robots, storytelling with robots, robots for scientific experiments, and practical robotics applications. Teams are composed of **one** to seven members. In general, two students are recommended per robot. Computer controlled robots may be of any size and can use any material. **Wireless host computer control is allowed.** On the day of Robofest, each exhibition team will be given a table on which to demonstrate the robots. After the opening ceremony, exhibition teams have 5 minutes to explain and demonstrate their robotics project to the public on the stage using a microphone. **They will also answer a question from the Official.** Teams must bring all the necessary materials for the exhibition. For example, if the robot performs a dance to music, the team must bring a CD or audiocassette tape. The sound system in the hosting site will be available to play your audiotape or CD.

3. The World Robofest 2006 Championship

The Robofest 2006 Competitions will take place at several regional and international locations. There will be a video competition site for teams who are not close to a competition location. Details on the video submission will be found under "**11. Rules for Video Submission Site**". Top teams from each competition site will qualify to move on to compete in the World Robofest 2006 Championship at Lawrence Technological University on Saturday, May 13, 2006. The total number of teams advancing from each site will be dependent on the number of teams registered at the site. See "**13. How teams advance to the World Robofest 2006 Championship**".

4. General Registration Rules

- Team registration is done on the web at <http://www.robofest.net>. The registration fee is \$35 per team. Please note that no refund is allowed. There may be \$20 check-in fee at the competition site, which will be used solely by the regional competition organizer. All contest sites are open to the general public and admission is free.
- A team may register for only one contest site location.
- A team may register for only one age division. (A coach can have different age category teams, but each team must select a single age division.)
- A team should register in **only one** competition category, either games or exhibition. (Registration for the pilot categories is separate and must be done via hard copy to Dr. Chung.)
- A team must have an adult "coach".
- Any organization, such as a school, home school, civic organization, club, etc. can form a team.

5. Registration process (Five Steps)

- Step 1. **Coach Registration** will begin on the web at www.robofest.net in December 2005. The exact date and time will be announced through the [Robofest mailing list](#). After the registration, a coach ID and password will be sent to the coach's email address in less than 2 minutes from admin@robofest.org. You must confirm the coach registration by clicking a link in the email; otherwise the coach registration has not been completed. If you do not receive the confirmation email, either the system/network has been down or you put the incorrect email address in the coach registration form. In either case, contact chung@LTU.edu to resolve the problem. Veteran Robofest (2003, 2004, or 2005) coaches can use their prior coach ID and password. If you forgot your password, click on "Forgot Password" link. If you forgot your ID, please contact chung@LTU.edu.
- Step 2. **Team Registration** will begin after the official Robofest 2006 rules are finalized and posted on the web in January. The exact date and time will be announced through the [Robofest mailing list](#). Using the coach ID and password, the coach can now create teams *after selecting one regional site*. **During this step, the coach must accept the Robofest 2006 Coach's Pledge as shown in Appendix 1.** All the team member names, grades, **and gender** must be entered. Each team must provide at least one volunteer who will help with regional competition site setup or cleanup. The volunteer's name and email address needs to be entered. For an exhibition team, short exhibition description must be entered in this step. It must include the theme of the exhibition, functionalities of the robots, the number and types of sensors and motors used, and any other information that describes the exhibition.
- Step 3. **Registration Fee Payment:** After creating all the teams, pay the registration fee online using a major credit card through PayPal. You will receive a payment confirmation email from Pay Pal, which can be used as a receipt. In addition, you may choose an option to send a check to LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. Make the check payable to LTU Robofest. The team registration will be completed when LTU receives the check. The registration of a site will be closed when the number of teams who have completed Step 3 is equal to the max capacity for each division and competition category of the hosting site.
- Step 4. Team Photo Uploading:** Take a team photo and upload it to the coach web account. The requirements for the photos are: (1) standard "landscape" jpg file (width: height ratio must be 4:3) (2) size should be less than 350KB (3) must show all the team members listed (4) adult coach and volunteers may be in the picture (5) must show the identifiable team ID and team name (Write down the number on a paper and hold it when taking the photo or edit the photo file to add a text). The team ID number is decided in the **Step 2** above. If no photo is uploaded before the update deadline, certificates for the team will not have team and robot photos. This step 4 must be done within 3 weeks after the team registration. **There will be a prize for Best Team Photo.**
- Step 5. **Robot Photo Uploading:** When the missions are completed or two weeks before the competition, take a photo showing the robots the team has constructed. Upload the photo using the coach web account. The robot photo requirements are the same as (1), (2), and (5) in step 4 listed above. At this step, coaches must be sure to update any information on the web. The update deadline will be 10 days before the competition date for each regional site. It is a hard deadline, since we need a time to print and ship all the participant certificates for each site.

6. Team Coaches

- The coach will register their team(s), enter/update team information. (This includes team data, uploading team and robot photographs by the update deadline to insure that the Robofest organizer can print the personalized certificate). The team coach is responsible for facilitating and overseeing team members. The coach must have a valid email address and must check the email account periodically. Email is the primary and official communication method between the team and the Robofest organizer. If their email address is changed, it is the coach's responsibility to change it by logging into the coach's Robofest account. In that case, the coach must check his/her email box to confirm the change.
- Any teacher, school administrator, parent, college student, professor, tech specialist, or scientist/engineer are eligible to be a coach. Coaches must be adults without any criminal records.
- A coach can register more than one team up to 5 teams from any one organization.
- Robofest 2006 has multiple regional competition sites. A coach must register team(s) for only one regional site. Although not recommended, it is possible for a coach to register teams in different categories. For example, a coach can register game teams and exhibition teams.
- It is recommended for coaches to recruit technical mentor(s), if necessary. The coach is responsible for entering on the web up to 5 volunteer names and their roles.
- Each coach must provide at least one volunteer for helping with either setup or cleanup at the hosting site. Each hosting site will send detailed information to the volunteers.
- The coach is responsible for entering/updating the team data. Please note that personalized certificates will be printed based on the information and the photos on the website. The Robofest organizer will not reprint certificates due to incorrect information on the web.
- Robofest has been attracting lots of media attention. Coaches must collect [Consent & Media Release Forms \(PDF file\)](#) not only for team students but also for coach him/herself and team volunteers. These must be submitted to the hosting site during check-in.
- Another important role of the coach is to find sponsors for their team(s). [Team sponsors are individuals, groups, company or other organizations that donate money, products, or in-kind services to the tem.](#) The Robofest website will list up to four sponsors per team on the web. A Certificate of Appreciation will also be given to the sponsor on the day of Robofest.
- Before and after Robofest, please contact newspapers, radio, and TV stations to recognize your teams' efforts and achievements. Let us know if your teams were introduced on any media.

7. Student Team Members

- Junior division participants must be 5th-9th grade students in April 2006, and Senior division participants must be 9th-12th grade students in April 2006. **Any exceptions, the coach must submit "Age Division Waiver Request Form" for approval. The general rule is that playing up is fine as long as the student has exceptional talent in both construction of the robot body and computer programming and has maturity to work with other team members, however, a waiver form must be submitted to Robofest. Playing down is discouraged, but if a coach has a specific reason to request playing down, it must be submitted on the "Age Division Waiver Request Form". Both playing up or playing down requires the waiver form and approvals from other team members and their parents.**
- It is recommended for each team to have technical mentors, but they must teach general concepts so that students can solve problems by themselves. In order to assist teams and students, Lawrence Technological University will provide technical workshops/resources for registered teams.
- It is highly recommended that a student should participate in only one team for a competition.

8. Team Volunteers

The team cannot work without the help of various volunteers for the jobs such as mentoring, financial sponsoring, transportation, or constructing playing fields, taking pictures, video taping, etc. The Robofest website will list up to five volunteers per team and a certificate of appreciation will be given to each team volunteer on the Robofest competition day. As mentioned before, each team must provide at least one volunteer for the setup or cleanup of the hosting site.

9. Common Sense Rules for Education

Construction of the robot body as well as all the programming should to be done by the students only. Parents, teachers, mentors, or coaches may not directly assemble the robots or directly write the program code for the team at any time during the preparation period or during the contest. Any direct participation is a violation of the rules. The offending team will become ineligible for any awards.

Only team members with badges are allowed in the pit (team table) area after the unveiling of the unknown mission. No adults are allowed to be in the pit area after the unveiling. If a team coach must enter the area, they must receive permission from one of the judging proctors. Only coaches with badges will be allowed into the area with permission. It is strongly suggested that, for security purposes, the coach must watch the team table area, especially when the team plays. There will be judges/proctors in the competition area. If any adult wants to give help to his/her team for any reason, the adult must get permission from the judges/proctors.

10. Team's Responsibility on Robofest Day

- All the teams must observe the check-in time set by the host organizer for each site.
- Things to bring to Robofest venue
 - ❑ A laptop (or PC) computer for each team. (To solve the unknown part, each team must bring a computer. It is not recommended that any teams share computers)
 - ❑ Hard copy of programs. Please refer to Resources Button at www.robofest.net for the Tips on printing your program.
 - ❑ *Only for exhibition teams:* poster boards to introduce the exhibition description and all the necessary materials for the exhibition.
 - ❑ A power strip. A power cable, if available
 - ❑ Lego robot teams only: Cardboard box to cover your robot and IR tower when downloading
 - ❑ Extra batteries
 - ❑ Robot(s) and spare parts
 - ❑ Signed Consent & Media Release forms
 - ❑ \$20 check-in fee, if host organizer requested
- Teams must use the team table assigned by the organizer. Please do not change the team tables. If you change, judges *cannot* find your team table.
- Teams must pass robot inspection before the competition begins. Submit the hard copy of your program to judges during the inspection.
- Before the start of the game competition round 1, each team member, using a microphone, must introduce name and her/his role to Judges & the public within 15 seconds. **The team will be asked to answer a question randomly chosen by the Emcee. Each team will have 45 seconds to answer the question. Sample questions can be found in the appendix.**
- Each exhibition team member must introduce name and her/his role and accomplishments using a microphone to Judges & the public, too. (Judges want to know what role each student played in the design, construction, and programming of the robot.) Teams will have 5 minutes for the presentation and demonstration of the project. After their presentation, **they will be asked to answer a question randomly chosen by the Emcee. Each team will have 45 seconds to answer the question. Sample questions can be found in the appendix.**
- For the game competition, teams need to implement new additions for the unknown missions and adjust programs to allow for the variation in the new environment. Each team is expected to check/change the light sensor values for various areas on the playing field. Another way to overcome those changes is to write programs to self-adjust light threshold values on the fly.
- It is the team's responsibility before each match to ensure the track is in satisfactory condition. Remember, we are using pieces of all-purpose shelves. There may be big cracks even if referees have checked the track. Therefore, the team members should also check the playing field before each game.

- Lego robot teams only: whenever new programs are downloaded, both your robot and the IR tower MUST be covered by a box. If not, you may damage other robots and/or your program may be corrupted. Do not forget to bring an IR opaque cardboard garage to house your robots to prevent interference from another RCX while downloading programs.
- See also attached "Typical Regional Robofest Program Schedule"
- General Rules During the Robofest Competition:
 - ✓ No food or drink are allowed inside the contest area
 - ✓ Cameras with flash are not allowed inside the competition area
 - ✓ Do not make unnecessary noise which might disturb other teams in the pit area

11. Rules for Video Submission Site

Unknown game competition missions will be e-mailed to the coaches registered in the video submission site one week before the deadline. The coach must submit the signed Robofest Video Submission Form when sending the video to: LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. It must be postmarked by the deadline, April 29, 2006. The video itself can be made by adults and the following is the suggested video format:

- Start with the team and team member introduction, within 15 seconds.
- Select one question from the list of sample questions attached, and answer within 45 seconds.
- The video should not be edited, once the game or demo started.
- Include two games. One game should be less than or equal to 2 minutes.
- Rolling credit and/or acknowledgement (recommended)
- The exhibition should not exceed 5 minutes. Just one demo is fine in the exhibition division.
- Acceptable video media: VHS, CD with video file, Video CD, or DVD

12. Judging and Prizes

About 30% of the total number of teams at each site will win big trophies and possibly prizes that will be presented during the award ceremony. Game competition winners will be decided by the average of their best two scores. (Note that teams competing in the final round will have three scores, we take their best two rounds.) Judge's Award winners are decided by several categories including, but not limited to: performance (reliability), originality, creativity, functionality, programming, construction, teamwork, presentation, and new technology used. (Robofest Judges work off of Judging Rubrics that are not made public.) Every officially registered team member will receive a framed certificate of achievement and medal during the award ceremony. All teams must stay for the closing ceremony.

13. How teams advance to the World Robofest 2006 Championship

Lawrence Technological University is planning to invite [22 competition teams and 12 exhibition teams](#) for the World Robofest 2006 Championship.

The total number of teams advancing from each site will be decided in proportion to the number of teams registered at the site. The exact number will be determined by Robofest after registration closes.

For game competition divisions, teams to advance to World Robofest are determined based on the following data:

Average performance score	80% *
Team public presentation and answer of question	10%
Robot & Code inspection and team interview	10%

(* note that finalists will use the average of best two)

For exhibition divisions, teams to advance to World Robofest are determined based on the following data:

Public demonstration performance (reliability)	35%
Originality (creativity)	25%
Team public presentation and answer of question	10%
Source code inspection	10%

Complexity and number of functions	7%
Usefulness	7%
New technologies used & other factors	6%

14. The Pilot Program Competitions for 2006

As a pilot program, to investigate future possibility to expand opportunities for students to learn other computer related technologies, the following three new competition categories have been added to Robofest 2006. These categories will only be offered through Lawrence Tech University, not a regional site.

- **Digital Animation:** participants will animate the Robofest 2006 game competition. 3D animation is recommended. Maximum 5 minutes including (rolling) credits and acknowledgement. Submit files on a CD-ROM. It must contain "README" file to describe software tools used and technical details how to play the animation using commonly used media players/browsers. Send the CD together with "Digital Animation Competition Video Submission Form" attached to LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. Max. 10 teams. Deadline: March 31.
- **Digital Video Editing and Production:** teams will videotape and submit a digitally edited video journal of their team while it was preparing to compete at Robofest 2006. Maximum 12 minutes including rolling credits, acknowledgement, and software tools used. Submit DVD, CD, or VHS-tape LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. It must include signed "Digital Video Editing and Production Competition Submission Form" attached. Max 10 teams. Deadline: April 29.
- **Team Website Design:** must be a *live* website for Robofest team(s). Each team must find team's own live web server. The website must contain information such as software tools used. Do not put students' full name on the web. Send the "Robofest Team Website Design Competition Submission Form" attached to LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. You may fax it to 248-204-3518 or email to chung@LTU.edu. Max 10 teams. Deadline is April 22, 2006.

In order to participate in the above 3 pilot programs, it is required for an adult coach to submit the "Robofest 2006 Pilot Program Registration Form" attached by email to chung@LTU.edu by Feb. 28, 2006.

For these pilot programs, we also recommend small team size (max 7 students) with 9-12th grade students. Note that this pilot program is also for students only, the adult coach should not give direct help. There is no registration fee. Details including prizes will be announced later. Winners will be announced and their works will be presented on a big screen on May 13 during the World Robofest.

It is strongly recommended that current Robofest competition teams not be directly involved with the pilot competitions above. Robofest team members are encouraged to focus on robotics only. These pilot programs are intended for new teams with other disciplines. Robofest teams' participation in the pilot program does not affect Robofest award decisions.

Attachments:

- Appendix 1: Robofest Coach's Pledge
- Appendix 2: Consent, Release and Media Authorization Form
- Appendix 3: Typical Regional Robofest Program Schedule
- Appendix 4: List of Sample Questions for the Answer of Question during Public Oral Presentation
- Appendix 5: Age Division Waiver Request Form
- Appendix 6: Robofest Video Submission Form
- Appendix 7: Robofest 2006 Pilot Program Registration Form
- Appendix 8: Digital Animation Competition Video Submission Form
- Appendix 9: Digital Video Editing and Production Competition Submission Form
- Appendix 10: Robofest Team Website Design Competition Submission Form

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Robofest 2006 Coach's Pledge

As a Robofest coach, I have read and agree to abide by the Robofest 2006 rules (<http://www.robofest.net/robofest06rules.pdf>) as they exist now and as they may be set forth during the Robofest season.

As a coach, I am responsible for communicating and enforcing the Robofest rules to team members, team volunteers, and others affiliated with my team.

I understand that any rule updates, guidelines, additional information, and announcements will be communicated to me, primarily via emails. I am responsible for reading the information and I will relay them to all the people affiliated with my team. If any changes in my email account, I will notify Robofest administrators as well as I will update my coach profile.

As a Robofest Coach, I understand that the young students come first. Robofest is about the students learning the computer technologies, science, engineering, and mathematics. Everything my team does starts and ends with the principle: the students do all of the work. My team members will do the designing and building of the robot, problem solving and programming. Adults can help them find the answers, but cannot give them the answers or make the decisions in detail.

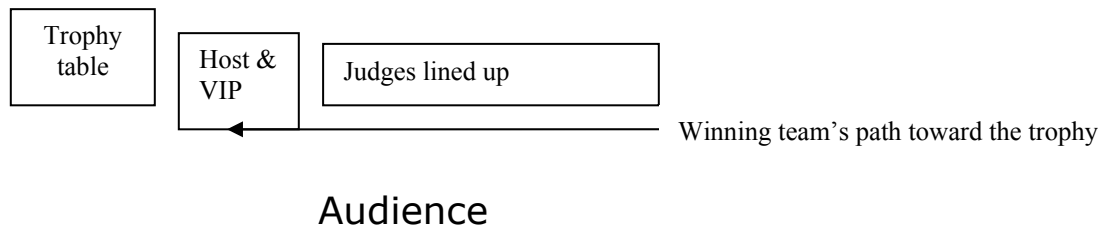
The acceptance of this code signifies my intent to uphold and maintain the Robofest spirit.

Typical Regional Robofest Program Schedule

Last updated: 11-22-05

(Assumption: 20 game competition teams, 5 exhibition teams, and 2 official playing fields. There is no official lunch time, but concession stand can be open)

08:00 am	Doors Open and Check-In begins. Find your team table after check-in. Practice fields & official playing fields open for practice.
08:10 – 9:00am	Inspection (only for game teams): Bring your robots to Inspection Judge’s table for robot inspection. Submit hard copies of programs to judges. 3 judge’s table recommended. Exhibition judges will visit exhibition team tables for inspection.
9:00am	Opening Ceremonies National Anthem Opening Remarks Introduction of Judges Explanation of Robofest rules and unveiling of unknown missions
9:20am	Official presentation and demonstration of exhibitions
9:50am - Noon	Exhibition judges will visit exhibition team tables for interviews
9:50am – 11am	First Round of Competition Begins: First come first serve basis. Teams will get extra points, if they compete in 1 st and 2 nd matches. Each team member must introduce her/his name, grade, and role using a microphone to Game Judges & the public within 15 seconds. Emcee will ask a question selected at random. The team needs to answer the question within 45 seconds. Each match will be seven minutes in length, which includes move-in, introduction, competition, and move-out. (10 x 7min =70min) Inspection judges may visit the team tables at this time.
11:00am	Last call for First Round: teams who has not yet competed will be called. If they are not ready, they will lose the chance.
11:10am	Second Round of Competition Begins: First come first serve basis. No presentations – the only exception will be teams who did not compete in the first round. (10 x 5min =50min) Each match will be five minutes in length, which includes move-in, competition, and move-out. Inspection judges may visit the team tables at this time.
Noon	Last call for Second Round: teams who have not yet competed will be called. If they are not ready, they will lose the chance.
12:10pm	Final (1x5min=5min)
12:15pm	Recognition of Coaches, Teams, & Team Members: Coaches and team volunteers are given a bag of framed certificates and medals (*) in advance. Ask the audience to give them applause. Students are called to come down and stand in front of their coach. Coaches present Medals (*) and Certificates in parallel. Ask students to face audience and sit down. Take a group photo with everyone. Playing music is recommended.
12:30pm	Awards and Closing Ceremony: Judges should line up and congratulate winning teams. See figure below. Also, announce the teams to advance to World Robofest. Number of teams to advance for each site will be decided after registration closes. How to select teams to advance is described in Robofest 2006 rules. In general, performance score is more important than judging score.
12:45pm	Recognition of Volunteers Volunteer Group Photo / Cleanup



List of Sample Questions for the Answer of Question

For both games and exhibition teams

1. What have you learned?
2. Why do we work as a team?
3. What are main features of your robot kit?
4. Introduce major features of your programming language used
5. Introduce all the sensors used. What are their purposes?
6. Specify your robot's gearing mechanisms and gear ratio
7. List types of gears
8. What was the most difficult problem to solve? How did you solve/overcome it?
9. Do you use any new technology that other teams might not be using?
10. Any creative ideas that other teams might not be using?
11. How did you resolve conflict between team members, if you had different ideas?
12. Difference between remote controlled robots and autonomous Robofest robots
13. If you are using two independent motors to drive, why the robot does not move straight
14. How do you find timer values in your program?
15. What is the problem of robotics without using sensors?
16. How does your program know the current location of your robot?
17. Why friction is needed? Why friction is bad? Tell us examples
18. How can you make the robot go faster?
19. How did you test your robots?
20. Methods to improve reliability of your robots. Did you introduce them?
21. Any unfinished works?
22. Rooms and ideas to improve, if you have more time and resources
23. Anything you would have done differently
24. How did you do to make your programs more readable and understandable by others
25. How do you solve the inherent problems in dynamic and uncertain environments? (Senior Division only)
26. ...

Game Competition team only

27. Explain how to communicate with the 2nd robot and how to let it start? Whose idea was it?
28. How to detect the bottle objects
29. Strategies to search for all the bottles
30. How to remove the gate bar
31. How to follow the line
32. How to detect the bright aluminum foil
33. How to detect the edge of the board
34. ...