

Robust Design Award Rubric

| Points | Structural Design: | Locomotion | Manipulation | Navigation | Overall Design and Integration |
|-------------------------------|--|---|--|---|---|
| | How strong and stable is the robot? What is the strength to weight ratio? Is the design modular? Does the design handle environmental variation? | Is the robot controllable or motions repeatable? Is the speed appropriate for task. Is the drive train solid? | Are the manipulators appropriate for the tasks? Do they maintain the balance and stability of the robot. Are the manipulators precise and repeatable? | Can the robot can navigate the playing field? | Do all elements work together? Is the design consistent with the team's plan. Did the team take into the entire "system" when developing the robot? |
| 0 to 5 Poor | Students have difficulty assembling the robot or keeping it together during the demonstration. | Robot has difficulty moving at all. | Robot does not have manipulators. | Robot has difficulty navigating the playing field | Robot consists solely of "base" design as given in the kit. |
| 6 to 10 Fair | The base structure has some stability, but modules/extremities are difficult to apply or maintain. | Robot motion is jerky or is not appropriate for tasks (too fast) | Robot has one manipulator, but it has difficulty performing tasks. | Robot can perform some navigation via pre-programmed turns. No sensors are used. | Robot contains base design and additional components are well constructed. |
| 11 to 15 Good | Robot is stable at rest and are easy to install. Robot unstable during motion or had difficulty with environmental variations. | Robot motion is appropriate but is not repeatable or precise. | Robot has one or several manipulators that are mechanically capable of tasks, but are not precise or repeatable. | Robot uses the light sensor for limited navigation of the playing field. | The entire robot is solid, but sensors are not utilized to make the robot more tolerant of variations. |
| 16 to 20 Very Good | The base robot and modules are stable, but the robot has some limited difficulty with variations or is heavier than required. | Robot motion is appropriate and repeatable, but has some difficulty with precise motions. | Many of the robot manipulators are mechanically capable. Some manipulators are not reliable or repeatable. Manipulators are overly | Robot uses multiple sensors for navigation but has limited difficulty reaching extended tasks. | The entire robot is solid, sensors are well utilized, but manipulators do not reflect a consistent strategy. |
| 21 to 25 Excellent | The robot is modular, base and components are very stable, and the robot handles environmental variations well | Robot drive train is extremely solid and all motions are appropriate for task. Robot is very controllable and repeatable. | Robot has one or several manipulators that perform tasks extremely well. Manipulators are simple, robust, and very reliable. Manipulators install with ease. | Robot uses a combination of pre-programmed sequences and sensors to achieve repeatable and precise navigation | Robot is a complete system that is consistent with the strategy and team plan. All components work together and "look" as one. |