

Product Design/Manufacturing of a Mechatronic System

In the Product Design/Manufacturing challenge teams design a mechatronic system of their own choice. For full credit the teams must bring two systems; one system that works, and the other complete with a set of building instructions that allow the judges to put the system together. An additional 50% will be added to the teams overall score if the system is autonomous.

Rules

1. Teams consist of 2-4 students.
2. Each team's mechatronic system must be student designed.
3. Teams must bring a copy of their engineering design notebook with them for the judges to review.
4. Teams can use Vex or other controllers
5. Teams may supplement the Vex parts with store bought or student fabricated parts. The cost of additional parts may not exceed \$100. A completed bill of materials with cost should accompany the student presentation.
6. Two mechatronic systems must be built for this challenge. One system must be unassembled and come with assembly instructions. The second system should be assembled and must fit into a team designed marketing box that represents the packaging that would come with the system.
7. While being judged, the system must be operable for a period of at least 2 minutes. Each team has a total of 15 minutes to explain how their system works.
8. For full credit, each team should develop marketing materials enabling them to sell their system.
9. Scoring is based upon:
 - Quality of the design
 - Safety design considerations
 - Performance/Operation
 - Workmanship
 - Proof of planning (Engineering design portfolio)
 - Packaging
 - Assembly Instructions
 - Marketing materials
 - Bill of Materials with cost
 - Team presentation
10. Decision of the judges is final and binding.

Assessment Rubric

JUDGING AREAS	Possible Points	Team Evaluation
Quality of the design	50pts	
Safety design consideration	50pts	
Performance / Operation	50pts	
Workmanship	50pts	
Proof of planning (Engineering Design Notebook)	100pts	
Packaging	50pts	
Assembly Instructions	50pts	
Marketing Materials	50pts	
Team Presentation	50pts	
Bill of Materials	50pts	
Total	550pts	
Bonus Points		
Total Team Points		

Teams competing in this event are required to perform a self evaluation before they present to the competition judges. Use the following rubric as a reference when self assessing:

- 0 - **Not attempted**
- 10 - **Incomplete:** The task was not completed
- 20 - **Needs Improvement:** Task was completed, but not done very well
- 30 - **Adequate:** Task works, but is of average quality
- 40 - **Good:** Complete, works consistently
- 50 - **Industry Standard:** Complete, excellent craftsmanship, visually appealing, marketable