Critical Thinkers, Inc.

A Wholly owned Subsidiary of Leaflet Engineering

ENGR 107 F08 Design Challenge

Design a device that strikes a tennis ball and propels it so that it hits a target 30 feet away from a Zero Distance Line (ZDL).

Specifications:

- The object that strikes the tennis ball will travel in a three-dimensional path (ΔX, ΔY, ΔZ)
- The device will utilize mechanical or gravitational potential energy only (no chemical or electrical energy)
- Biological input may only create and release the potential energy
- No part of the device may extend closer to the target than the ZDL at setup
- The tennis ball may be struck behind the ZDL
- The device must be able to fit through a standard door (36"x80" opening)
- An 8" high obstacle will be placed 15 feet between the ZDL and the target
- The device will be demonstrated in the hallway outside of the classroom or similar venue
- The target will be placed centered in the venue, 30 feet from the ZDL

Deliverables

- A preliminary report
  - Documenting the Engineering Design Process
    - Problem definition (Draft completed by 9/18)
    - Developing constraints (Draft completed by 9/18)
    - Brainstorming lists including concept sketches (Draft completed by 10/1)
    - Justification for selection of design (Draft completed by 10/1)
    - Initial isometric or orthographic sketches of the design, including a Materials List (Draft completed by 10/1)
    - Written test procedure, with data sheet, for testing to be completed before the final demonstration (Draft completed by 10/8)
- A working device
- A final report that adds to the preliminary report
  - Documentation of testing
    - Table of results
    - Discussion of results and corrective action that must be taken to be successful at the final demonstration
  - Documentation of results at the final demonstration
    - What went wrong
    - Why it went wrong
    - What you would do differently if you had the opportunity and why you would do it
  - Final (As Built) design sketches

  - Final (As Built) Material List
- A 4 minute +/– 15 second oral presentation (each team member speaks approximately the same length of time
  - Why you did what you did
  - Documentation of results at the final demonstration
  - What went wrong
  - Why it went wrong
  - What you would do differently if you had the opportunity and why you would do it

This is a competition. Winners will be selected based on success and originality of design:

- 10 points scored for each hit of the target on three (3) attempts
- Up to 70 points awarded for the design. Factors include:
  - Uniqueness of concept (20)
  - Calibration/Repeatability (10)
  - Non-standard use of materials (20)
  - Quality of manufacture (10)
  - Safety (10)

NOTE: In evaluating specifications, if they don't specifically say you can't, then you can. You decide. Evaluation will be made at the final demonstration.