

FINAL ASSIGNMENT MECHATRONICS MCT151-Spr16

Description of task



The assignment has the objective to design and build a **marble race track**.

It is possible to work in groups of 3, max 4 students per marble race track. The assignment lasts from the 7th to the 14th week of the SS. Tutorials are held to introduce the student into the task, strengthen their understanding of the requirements and support creative ideas with technical, possible solutions.

The assignment wants strongly to connect between Product Design and Mechatronics: the Design part wants to enhance the students capacity to go through the design process by keeping in mind the aesthetical necessities of a successful product. The modular approach for components , interesting evolving solutions for the marbles as well as well formed elements are crucial for the task. The Mechatronic part needs to focus on the entire system with its specifications and applications for determined automation processes, handling and applying the engineering concept of a system.

The main materials that can be used singularly or combined are metal, mdf and wood. Secondary components for connecting elements or the automation are supposed to be added.

In details and keywords:

1. Height of the track min 30, max 60 cm, ground area ca 0,25 sq. m
2. The marble need to change at least 10 direction
3. The marble need to be lifted from the ground area with electromechanical support, in an interesting mechanism. This mechanism needs to be seen as one of the main elements of the design.
4. The marble need to undertake at least one of the following tasks while running on the track:
 - a. Push a wheel
 - b. Clap down an element
 - c. Make a small loop
 - d. Make a jump in air for some centimeters.



Mechatronics Part

For Sophomore level students:

Students are asked to make the marble race track a mechatronic system where a sensor is used to detect the moving marble and then use an electrically (Dc/Servo) actuated arm to guide the marble on the track only when a marble is coming and only selected marbles continue looping on the track. The students have to use a microcontroller to control the track.

Time Line

1. Week 10: Concept+ Plan
2. Week 12: Design + Manufacturing Plan
3. Week 14: Final Demo