ME 6705 / AE 6705 - Introduction to Mechatronics

Final Project

Due: December 8th

1 Objective

The main objective of the final project is to apply knowledge and skills from the prior labs and lectures to produce a new mechatronic system of their choosing. Additionally, students must choose one or more advanced concept(s) to learn.

2 Project requirements

Your project must satisfy the following:

- Use LabVIEW and the myRIO.

- Use 2+ actors to perform meaningful real-world actions.

- Use 2+ sensors to recognize real-world state and act intelligently based on sensor data.

- Project must be unique (eg. not found as examples from a brief Google search).

- Explore at least 1 advanced mechatronics concept, such as: FPGA programming, WiFi communication and internet accessibility, machine vision, advanced control systems, etc. This advanced concept must not have been covered in class. The advanced concept must be approved by the instructor.

3 Deliverables and Grading

The final project is worth 200 points. This lab is done in a team of two. To get credit for the final project the team must complete the following:

1. The team has a brief meeting with the instructor once per week during lecture hours, with the exception of the week of Nov 20-Nov 24. (10 points deducted for each meeting not met)

2. A technical requirements list, in Excel format. These requirements will be discussed and approved with the instructor, and will form the basis of the project grading. A preliminary requirements list is due Nov 3 (10 points). A final requirements list is due Dec 8 (10 points). These can be submitted as separate Excel sheets, or a single Excel sheet with multiple tabs, and must be submitted to Canvas. Requirements may be adjusted in between the preliminary and final list, but **must be approved by the instructor.** (20 points total).

3. The team must submit a state machine diagram that details the program, in PDF format. Proper syntax and formatting must be used, as covered in class. The PDF must be submitted to Canvas. (20 points)

4. A final demonstration of the working project. This demonstration will be scheduled during lecture hours. The demonstration must highlight how each function accomplishes the technical requirements list. Demo's will occur on Dec 5 and Dec 7. (100 points)

5. A Wiki page detailing the project. See section 7 for details on Wiki requirements. The Wiki link must be submitted on Canvas as a PDF, or as a comment. Due Dec 8. (60 points)

6. Submit your code to Canvas (in addition to your Github page). Your code should be a zip file of your LabVIEW project (not just the VI's!) **The code must be working!** If the code does not run, points will be deducted. TA's will be checking if the code runs. No submission will result in a zero for the lab.

7. Submit your peer review evaluation to Canvas.

4 Purchasing

The mechatronics lab can purchase certain items on a case-by-case basis. If the item would provide value to future mechatronics courses, then the item will be considered. Seek scrap material and machining tools at the various makerspaces around campus, or at the machining mall in the ME department.

5 Weekly meeting plan and deadlines

Week	Weekly Meeting Task	Deadlines
Oct 23 - Oct 27	Project brainstorming, project approval by instructor.	Oct 27: Final project selection.
Oct 30 - Nov 3	Project requirements brainstorming, requirements approval by instructor.	Nov 3: Prelim. project requirements due.
Nov 6 - Nov 10	Project development. Check-in meeting with instructor and TAs.	None.
Nov 13 - Nov 17	Project development. Check-in meeting with instructor and TAs.	None.
Nov 20 - Nov 24	No meetings (Thanksgiving break)	None.
Nov 27 - Dec 1	No meetings.	None.
Dec 4 - Dec 8	Final in-class demos.	Nov 5, 7: In-class demos. Dec 8: All deliverables due.

6 In class demonstration

Students must demonstrate their mechatronic system to the class in a 5-10 minute presentation. The students must use PowerPoint to discuss the goal and requirements of the project. The demo can be done live, or with a recorded video.

7 Github Page

A Github page will be created for your project, in lieu of a final report. This will allow students to post videos. Details on creating the Github has been provided by the TAs. Your Github should contain the following:

1. An introduction of your project, detailing the overarching goals.

2. A table of your requirements.

3. A discussion of why the team chose those requirements.

4. A video demonstration of your project.

5. A discussion of challenges encountered.

6. A conclusion, discussing lessons-learned and potential next steps.

7. All of your project files, code, presentation, and state machine.