UNIVERSITY OF BRITISH COLUMBIA
MECH 423 – Mechatronic Product Design 2020W
Final Project – Handout #2/2
Project Demo, Video, and Report Specifications

Evaluation

Reiterating the previous handout, students are encouraged to be creative in their project proposal and project work. At the same time, students need to produce a working prototype that is robust enough to be used multiple times. Grading for your final project will include the components and due dates shown below.

Project component	Grade	Due date
Chat with instructor/TAs, one-page project proposal submitted	5%	10/26
Full project proposal due	10%	11/02
Project demo including: • Functional requirements and degree of completion • Overall product based on functionality, difficulty, creativity, and sensibility	55%	12/04 1-4 pm Via Zoom
Video (content, quality, and length)	15%	12/04
Final report	15%	12/11

Project Demo

All students must present and demo their project on **Dec. 4, 2020 1-4 pm on Zoom**. Each student has up to 3 minutes to present and demo their project, followed by 2 minutes of questions and discussion. The project demo will be graded by the instructor, TAs, and former students in MECH 423.

In addition to demo'ing, students are encouraged (although not required) to show presentation slides and a video of their project. Presentation materials should be copied into the link below. Please make a folder called "Last_name, First_name".

https://drive.google.com/drive/folders/11uNELD2TfCrLOfQT3YNxYdZUIX7oWlXy?usp=sharing

Video

Your video should demonstrate key features of your working prototype. Your video should be <u>short</u> and to the point. The total length should be no more than 60 seconds and the total file size should be <100 Mb. Your video should be either narrated or contain annotations that explain the hardware to the viewer. Most of the video editing functions you'll need can be found on free programs like Windows Movie Maker or iMovie.

We will upload your video to Youtube in order to promote future offerings of MECH 423, as well as UBC Mechatronics. Please let us know if you prefer not to have your video made publically available.

Deliverables

The lab kits should be returned per instructions sent by the Mech department. The course deliverables should include the following:

- Lab 1-3 files (including code and report, for accreditation purposes only)
- Project proposal
- Project report
- Project demonstration video (must be <100 Mb)

Project Report

The project report follows the structure of the proposal with some modifications. Write the project report based on the following outline. Detailed descriptions of each section are presented subsequently.

0. Title page and abstract
1. Objectives
2. Rationale
3. Summary of Functional Requirements
4. Functional Requirement #1
   4.1. Approach and Design
   4.2. Inputs and Outputs
   4.3. Parameters
   4.4. Testing and Results
5. Functional Requirement #2
   …
6. Functional Requirement #3
7. Functional Requirement #4
8. Functional Requirement #5
9. System Evaluation
10. Reflections

Detailed Description of Report

0. Title page and Abstract (Graphical and Text)
The title page should include the title of the project, <u>a representative picture of the project</u>, names of group members, permanent email addresses, and an abstract of the project (~300 words). The abstract should summarize the objectives of the project and key features of the hardware/firmware/software developed.

1. Objectives
What was the overall goal and vision of your project? What did you plan to design and build? What did you accomplish? What didn't you accomplish?

2. Rationale
What is conceptually interesting about your project? Why is it worth your time to do it? How is it different from similar work at UBC and elsewhere?

3. Summary of Functional Requirements
Briefly describe each FR and the hardware and/or software that was developed to address each FR. Describe how signals are transferred and manipulated within your system. Use graphical illustrations if appropriate. Create a table containing all your FRs.

4. Functional Requirement #1
For each functional requirement in your system create subsections that address the following.

4.1 Approach and Design

Describe the objective of the FR. Describe the hardware and/or software that were developed to address the FR. Present design material such as circuit diagrams, algorithms and pseudo-code, mechanical drawings, solid models, block diagrams, screen-shots from user-interface software, and photographs of completed hardware.

4.2 Inputs and Outputs

Describe the inputs and outputs of the hardware and/or software module developed to address the FR. Examples include voltages representing physical parameters, serial data streams, and user-interface outputs. Present details such as the transfer function and range for analog signals, the format of serial message packets, and text and graphics presented to the user.

4.3 Parameters

Identify the parameters of the hardware and/or software module developed for this FR. (*i.e.* what are the knobs that need to be adjusted on this module?) Examples include sensor bias voltage, values of key circuit components, motor operating speed, dimensions of mechanical elements. Describe how these parameters affect the operation of the module. Discuss how you optimized these parameters.

4.4 Testing and Results

Describe tests that were performed to verify hardware and/or software functionality. Present test results such as observations, data plots, and photographs.

5-8. Functional Requirement #2-5

9. System Evaluation

Describe tests that were performed to verify the functionality of your complete system. Present test results such as observations, data plots, and photographs.

10. Reflections

1. What worked and what didn't work? Why? What would you do differently if you could do it again?
2. Identify 3 things you learned in MECH 423 that you consider the most useful and why.
3. What are some limits of your knowledge and expertise as a mechatronic engineer? Identify 3 things you would like to learn going forward. What is your strategy to acquire knowledge in these areas?

Report Evaluation

The final report will be evaluated based on the completeness of your documentation and the clarity of your presentation (including written materials and figures). The following grading scheme will be used to evaluate your report.

Title page and abstract	25%
Functional requirements and system evaluation	60%
Reflections	15%