Programming For Engineers

Project Guidelines

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Project Works

You will determine a simple mechatronics system that involves real-world input output. Examples of input are sensors and switches whereas examples of outputs are motors, relays, solenoids and pumps. The “software” is expected to “manage” the mechatronics systems. The program is also expected to be using WIN32 GUI. The maximum number of students in one group is five (5).

Course Outcome:
Develop program for mechatronics system.

1. Develop a simple mechatronics system using C programming. “Simple” means using card board as mechanical elements. You cut the board and glue them. We expect the dimension of the board is proper although you cut using a knife and steel ruler. Please integrate at least two input devices and one output device that been supplied to you. The purpose of this project is to prepare you for senior design project. You must understand the connection from CAD drawing to cardboard “manufacturing”. You also understand the roles of electronics and software. We expect electronic on prototype board and GUI software. You have learn all of this – just having an opportunity to demonstrate your ability.
2. Submit a technical report on the development of a simple mechatronic system using WIN32 GUI C programming.
3. Deliver a 5-minute technical presentation on the development of a simple mechatronic system using C programming.

Project Deliverables

1. Project Report

   The report is well written in terms of language and organization. The report must also include all the three elements of the system: mechanical system, electronic system and the software. Please be professional by submitting well-formatted report – with proper (1) Title (2) Table of Contents (3) Executive Summary (4) Background (5) Mechanical System with CAD Drawing (6) Electronic System with Circuit Diagram (7) Software System with Flow Chart and (7) Discussions and Conclusions. Please do not copy paste. Use your own words!

Project Deliverables

2. Project Presentation

   The presentation must be prepared in MS Power Point of equivalent with the speaker takes turn to present the project. Video of the presenter and the working of the system must be integrated on the presentation. Each member must take part in the presentation. Marks will not be given to those who are not presenting. Please submit hardcopy of slide presentation together with report.

3. A soft copy of the program software

   We expect the software to be Windows-based GUI and functioning without any error or crash. Please submit together with presentation video on a CD.

Project Deliverables

Please submit the report and CD together with the project hardware in loose form. I will collect the components and recycle for next semester course. Failure to submit the components will result in **failure grade**.

Assessment Rubrics

Dimension	Scale 5	Scale 4	Scale 3	Scale 2	Scale 1	Scale 0
Mechanical System	The mechanical system is designed and fabricated and working in accordance with the CAD design.	The mechanical system is designed and fabricated and some working in accordance with the CAD design.	The mechanical system is designed and fabricated and working as intended but not properly design.	Mechanical is built but not working as intended.	Mechanical is built but not working.	No mechanical system.
Electrical System	The electrical system is designed and fabricated and working in accordance with the CAD design.	The electrical system is designed and fabricated and some working in accordance with the CAD design.	The electrical system is designed and fabricated and working as intended but not properly design.	Electrical system is built but not working as intended.	Electrical system is built but not working.	No electrical system.
Software System	The software system is functioning as intended and has working Windows-based GUI.	The software system is functioning as intended but not properly working Windows-based GUI.	The software system is functioning as intended but no Windows-based GUI.	The program is running but not functioning as intended.	The program is built but not working.	No software system.

Assessment Rubrics

Dimension	Scale 5	Scale 4	Scale 3	Scale 2	Scale 1	Scale 0
Report	Report is comprehensive and ideas are communicated effectively with right CAD, circuit and flow chart drawings are included.	Report is comprehensive and ideas are communicated effectively with some false CAD, circuit and flow chart drawings are included.	Report is comprehensive and ideas are communicated effectively but without CAD, circuit and flow chart drawings are included.	Report is comprehensive but ideas are not communicate effectively.	The report is not comprehensive.	No report.
Presentation	Presentation is comprehensive and ideas are communicated effectively. Prove of working project through video.	Presentation is comprehensive and ideas are communicated effectively but prove some of working project through video.	Presentation is comprehensive and ideas are communicated effectively but no prove of working project through video.	Presentation is comprehensive but ideas are not communicated effectively.	The presentation is not comprehensive.	No presentation.
Team Working	A leader for the team.	An effective member of a team.	Involve and contribute a little bit to the team but pro-active.	Involve and contribute a little bit to the team but not pro-active.	A passive member in a team.	A blocker in a team.

Assessment Rubrics

Again, we expect only **CARD BOARD** assembled with a motor (an example) and a sensor. A card board is a 2-mm thick with a color on both side usually use by architects to develop model. What you only need is a simple design in CAD, cut the board using knife and assemble using UHU glue. You can buy the card board at POPULAR or any other book store with the price of RM5 or below. A glue and a knife is less than RM10. Please invest a little bit and show proper project display. FKP engineers must demonstrate creativity and innovation.