UNITED INTERNATIONAL UNIVERSITY (UIU)

Dept. of Computer Science & Engineering

Course No: CSE 4326

Course Title: Microprocessors and Microcontrollers Laboratory

Project Details and Guidelines

Group Details: You have to form a group of 4 to 5 people in order to work for the project. Group of maximum people is preferred to complete the project task within allocated time.

Project Requirements:

1. Any Microcontroller or Raspberry pi based embedded systems or IOT systems should be designed. But if you want to use other platforms such as Raspberry Pi, you can use it to develop your system.
2. Must use at least two sensors (analog or digital) to develop the system, wireless data transferring system (depends on the problem's specification) and at least one motor (dc, stepper motors etc.).
3. Show the necessary status/output relevant to the system in an OLED Display/websites/ Mobile app etc. using wireless data transfer method, I2C data transfer method etc. The overall system should be constructed such that it is a robust system.
4. **You must use different types of communication protocols (i.e: SPI, I2C, CAN Bus, Serial Bus, etc)**
5. Every member of the group must have some contribution in hardware assembling and their respective codes to develop the overall system.
6. The project must have at least **4 major features.**
7. The project should be budget constrained and **cost effective.**
8. While building the system, do not use the same type of microcontroller or microprocessor multiple times. For example, you can use an arduino and esp32 microcontroller in the same project but do not use 2 or more arduino, 2 or more esp32 in the same project.
9. The overall project's setup, design should be neat and clean. **It should look professional** as much as possible. Also, the controlling of the different features should be efficient.

Week wise project activities and marking details:

The project work will start after the midterm exam and we will have 6 weeks to complete. The week wise tasks and marking schemes are given in the following table:

Week	Project Activities	Marking criteria	Weight
7th	**Project Proposal Report:** Students have to give a formal presentation on their project idea in detail along with a plan how you are going to implement it. You also have to submit an interim report on that day. [**Every member of the group has to participate in the presentation**.]	**Report and Q/A on the projects in details: 5 marks** (group wise marks) [In Q/A, the faculty	5 marks. **(10% of the total project marks)**

		will ask questions about the features the group wants to implement and how they intend to do that, what kind of sensors, hardware they want to use in the project. Basically, we want to see how each members of the group has done background research on the implementation of each features]	
8th	**Project update 1:** You have to implement feature no. 01. Both the software and hardware part of the feature no. 01 should be completed. You have to bring the implemented hardware system for feature no. 01 in the lab and show the corresponding results to the faculty.	Each student will be questioned individually by the faculty on their involvement in the implementation of feature no. 01. The faculty will enquire specifically about the hardware and coding parts. Each student must correctly respond to questions from the faculty regarding the software or hardware component of feature no. 01; poor responses will result in points being deducted from the total of 5 that each student receives.	5 marks. **(Individual: 10% of the total project marks)**
9th	**Project update 2:** You have to implement feature no. 02. Both the software and hardware part of the feature no. 02 should be completed. You have to bring the implemented hardware system for feature no. 03 in the lab and show the corresponding results to the faculty.	Each student will be questioned individually by the faculty on their involvement in the implementation of feature no. 02. The faculty will enquire specifically about the hardware and coding	5 marks. **(Individual: 10% of the total project marks)**

		parts. Each student must correctly respond to questions from the faculty regarding the software or hardware component of feature no. 02; poor responses will result in points being deducted from the total of 5 that each student receives.	
10th	**Project update 3:** You have to implement feature no. 03. Both the software and hardware part of the feature no. 03 should be completed. You have to bring the implemented hardware system for feature no. 03 in the lab and show the corresponding results to the faculty.	Each student will be questioned individually by the faculty on their involvement in the implementation of feature no. 03. The faculty will enquire specifically about the hardware and coding parts. Each student must correctly respond to questions from the faculty regarding the software or hardware component of feature no. 03; poor responses will result in points being deducted from the total of 5 that each student receives.	5 marks. **(Individual: 10% of the total project marks)**
11th	**Project update 4:** You have to implement feature no. 04. Both the software and hardware part of the feature no. 04 should be completed. You have to bring the implemented hardware system for feature no. 04 in the lab and show the corresponding results to the faculty.	Each student will be questioned individually by the faculty on their involvement in the implementation of feature no. 04. The faculty will enquire specifically about the hardware and coding parts. Each student must correctly	5 marks. **(Individual: 10% of the total project marks)**

		respond to questions from the faculty regarding the software or hardware component of feature no. 04; poor responses will result in points being deducted from the total of 5 that each student receives.	
12th	**Final Presentation and Project showing:** i) You have to give a formal presentation on the project work and show your completed project including all the features mentioned in the initial project proposal report. ii) You also have to submit a final report(soft copy) of your project on that day. The final project report format is attached in this pdf below) iii) You have to submit the github links containing all the project codes with necessary descriptions and make a 2-3 minute video which shows all the features of your project. Upload the video to anyone from the group's youtube channel. You must attach the github link and youtube link of the video in the soft copy of the report. [**Every member of the group has to participate in the presentation**.]	**a)Presentation and Q/A:** 10 (individual marks) **b)Report:** 10 (group wise marks) **c)Overall Project Status and Project show performance:** 10(Overall Project Status and project show performance wise marks) **Note:** **i)** In presentation and Q/A, each student will be asked thoroughly about various parts of the software and hardware parts of the projects. **ii)** Overall project status will be considered as satisfactory if all the features are implemented neatly.	30 marks. **(60% of the total project marks = 33.33% individual + 66.67% groupwise)**

Project Marks Distribution:

Out of 100% marks for the course, 50% are allocated in the project. The detailed marks distributions are as follows,

Project proposal (5 marks) and Final Project Report (10 marks) = 15 (group wise)
Project Development (Individual) = 15 (Based on the viva which will be taken on the 8th-11th week.)

Project Development (Overall) = 20 (individual contribution + group work)

CO Distribution in Project:

CO2	Design a basic embedded hardware group project.	A	c *Design of solutions*	*Project proposal (5 marks) and Overall Project Status and project show performance wise (10 marks) = 15 marks*	*15/100 = 15%*
CO3	Work in a team and communicate effectively.	A	i *Individual work and teamwork* *j* *Communication*	*Continuous Individual Project Development (15 marks) + Final Individual update (10 marks) + Final Groupwise Project Report (10 marks) = 35 marks*	*35/100 = 35%*

The overall project development (individual) marks breakdown,

Week 8	Week 9	Week 10	Week 11	Week 12
5	5	5	5	15

Best three individual marks from week 8 to week 11 will be counted. Then, we can see
Total week wise individual project marks= 30 (for 5 weeks)

As we have 4 weeks starting from week 8 to week 11, the best 3 weeks updates will be counted. Therefore, missing any one project update for any group won't affect the marks. Therefore, as you have one week extra, no issues will be entertained if you miss more updates. You must attend the 12th week update.

Remember in each update, individual contribution and project status both will be checked.

Notes:

1. You can take help from the Internet as much as you want. However, **directly copying from any source and using their hardware system or code without understanding is highly discouraged** as you will be asked questions based on your implementation.
2. In order to show your project updates, please bring your project on every week and set it in your lab PC. You may also bring your own laptop.
3. Distribute the work according to the features of your project and give the task to build a complete feature to a single person in order to ensure the proper distribution of work to your group members.
4. **Don't consider making slides and reports as your project contribution** in the group project work. They have very separate marks which have no effect on the project marks.
5. Final Project report is very important and contains 10 marks. The group has to write this report in detail (add more sections to the report if you want). You must add images of your projects indicating important parts and features of the project. You also should discuss the hardware connection elaborately and a diagram of the connections would greatly enhance the quality of your project reports.
6. Always make proper videos of your projects. This will help you in emergency situations in the project show as well as while submitting your final project report.

Project Report Format:

You must use the following link, make a copy of the latex file and edit it to write the project report. Your final project report has 10 marks, so please write it carefully. Make sure to include your projects' different images (images should be carefully described and indicated) in the project report.

CSE 4326 Final Project Format (UIU)