



University of Jordan
School of Engineering
Department of Mechatronics Engineering
Microprocessor and Microcontroller Laboratory
0908435
Project Specifications



Objectives

- 1- To become familiar with the basic design process of an embedded systems.
- 2- To demonstrate your ability and understanding of the concepts of **software and hardware** design.
- 3- To demonstrate your ability to write and present a complete project.

Procedure:

The requirement is that **each group (3 Students only)** should design and build (**Simulate**) their own project. Utilize the main project idea (**Greenhouse intelligent control system**) and develop it to design a meaningful project around it.

The main objective of this project is to design a **Greenhouse intelligent control system** using a PIC microcontroller. **Greenhouse intelligent control system** is designed to protect the plants from more cool and hot weather and an additional control system is included to save power by making fans and lights automatically turn on and off.

Greenhouse system has a very important use now a days in the agriculture field. Some plants need the specific amount of water for their proper growth and more productivity; therefore, farmer should provide them the proper quantity of water. But it is difficult for the farmer to get an estimation for quantity of moisture in soil. But in this project moisture sensor is used to provide this facility with an intelligent control system.

You are required to design and build a **Greenhouse intelligent control system** with the following core specification:

1. The temperature must be maintained between 20-25 C°: - you can do this using a **Fan** and **Heating coil** that controlled by a temperature sensor. (an example LM35 Temperature sensor)
2. The light intensity must be at a certain value (Assume your needed value): - you can do this using a **Light source** that controlled by light sensor. (an example LDR (Light dependent resistor))
3. The moisture level in soil must be maintained greater than 20% or " Humid soil ": - you can do this using a **Water pump** that controlled by moisture sensor. (an example Moisture Sensor (SKU: SEN0114) [datasheet](#))
4. -Display all sensors reading on an LCD.

Project requirements:

- I. For the Greenhouse intelligent control system write an **assembly code** using **PIC 16F877A** with a crystal oscillator of frequency **4MHz**.
- II. Specify the type of your equipment (Fan, Heating coil, Light source, Water pump) to determine required drive circuit for it.
- III. Draw a complete **circuit diagram** of greenhouse intelligent control system. (Include a drive circuits for all equipment connecting with PIC)
- IV. Simulate you project using any software doing this. (an example Proteus)

Report Preparation:

You should submit your soft copy of project report before starting the Discussion, your lab project report should include:

- a- Cover page contain (University logo, School logo, Project title, Student group names and registration numbers).
- b- Table of content + list of figures + list of tables.
- c- Abstract contains a description of the project and what it accomplishes.
- d- A block diagram that represents the signal flow of the project with clearly identified inputs and outputs.
- e- A flowchart for the program used. **It is highly suggested that you use subroutines for your different parts of the program.**
- f- Conclusion.
- g- The PIC code
- h- **References.**

Submission and Evaluation:

- 1- The absolute final deadline for submission of the project including **Simulation video***, **Report and presentation** is **Monday 24/05/2021.**

*Simulation videos include simulation of PIC code and hardware run.

- 2- The project will be evaluated based on effort, idea, report, demonstration, and knowledge of contents. The marks for the project will be **15 marks** distrusted as:

Report + Presentation** **60%**

Hardware design + discussion **40%**

** Discuss of your simulation video.