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ECE 395 - MICROPROCESSOR LABORATORY

Ahmad ALBarqawi

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Course number and name: ECE 395 Section 101 Microprocessor Laboratory (CRN: 92473) 2024 Fall

Credits: 2
Contact hours: 4 hours (Tuesdays 6:00pm – 10:05pm)

Name(s) of instructor(s) or course coordinator(s): Ahmad ALBarqawi
Instructional Materials: https://ecelabs.njit.edu/ece395/

Specific course information (Brief description of the content of the course (catalog description)):
In this laboratory the students are expected to learn to apply their theoretical knowledge of both the hardware and software aspects of microprocessors. To attain this objective the students are required to construct a microprocessor based single board computer (SBC), with adequate interfacing capabilities to be able to perform some useful control tasks. Programming of the device is done in assembly language. Some of the experiments that follow the construction project deal with software while others deal with the problems of interfacing of microprocessors.

Prerequisites or corequisites: Electrical & Computer Engr   252   Undergraduate
And   Electrical & Computer Engr   291   Undergraduate

Educational objectives for the course (e.g. The student will be able to explain the significance of current   research
about   a   particular   topic.):
Familiarizing   the   students   with   the microprocessor board Hifive1 Rev B. Students deal with C, C++, and assembly
languages.

Brief list of topics to be covered:

1. Lab 1 – Microprocessor Operation: 5
    percent of the total grade Lab Objective:
    • To learn to create a Platform IO project and write, assemble and debug code
    • To observe and document operation of microprocessor core as it executes code

2. Lab 2 – General Purpose Inputs and
    Outputs: 5 percent of the total grade Lab
    Objective:
    • To learn how to configure MCU internal peripherals
    • To learn how to operate the GPIO pins

3. Lab 3 – Annunciator (GPIO application):
    10 percent of the total grade Lab Objective:
    • To apply the knowledge learned in lab 2 to a real-world application

4. Lab 4 – UART Serial Port: 5 percent of the
    total grade Lab Objective:
    • To learn how to setup and operate MCU serial ports
    • To create functions for serial port initialization and utilization
5. Lab 5 – Calculator (UART Application): 5
    percent of the total grade Lab Objective:
    • To apply knowledge on the use of serial ports gained in lab 4 to solve a design problem.

6. Project (Chosen by the students and approved by the instructor). The presentation will be on December 6, 2024. The project (and the stuff associated with it) will be 35 percent of the total grade. Each group must choose a unique project that is not like the projects of Spring 2024 semester.

Additionally, students will take several in-class/take-home quizzes that are usually more complex than the above 5 Labs to ensure a good understanding. Because of how important the quizzes are, they will be 35 percent of the total grade.

The 5 Labs combined will be 30 percent of the total grade.

There are only two ways that the students from the same group may get different final grades:
1- One/two members of the group work considerably more than the other member(s) on the completion of the tasks/project.
2- One/two members are absent often (unless they provide a valid reason) or come late almost all the time. Even if they claim that they can be as productive as the other member(s) during their presence.

There will be a presence grade, this grade won't affect the final grade if and only if you keep it at 100%, otherwise, it will affect the final grade negatively. Everyone will start with 100% of the presence grade, and a percentage will be deducted with each absence and/or several late arrivals (unless you provide a valid reason).

As soon as you complete all the tasks for a particular lab, you can leave and don't have to stay until 10:05pm.