University of Texas at El Paso
Electrical and Computer Engineering Department

EE 4178/ ECE 5190/ ECE 4154 – Laboratory
for Microprocessors II

Fall 2023

COURSE INFORMATION:
Room: Engineering Building E340
Course Designation: EE4178
Credit Hours: 1
Catalog Description: Assembly language programming, C programming, basic computer architecture, introductory course on embedded system design.
Prerequisite: EE3176, EE3376, each with a grade of "C" or better.
Website: Please check Blackboard

INSTRUCTOR INFORMATION:
Instructor: Hector Erives, Ph.D. (herivescon@utep.edu)
Co-Instructor: Humaira Arif (harif@miners.utep.edu)
Meeting Time & Place: Thursday 10:30AM – 01:20PM
                    Friday 01:30PM – 04:20PM
Office: Engineering Building E307
Office Hours: Tuesday & Friday 11AM - 12PM or by appointment.

TEXTBOOK & REFERENCES:
ESP32 Technical Reference Manual (espressif.com)
The FreeRTOS Reference Manual (www.freertos.org)

COURSE MATERIALS:
- ESP32-WROOM-32 kit (Students must have their own)
- Lab Notebook: Composition Notebook recommended
- ECE Vectra Lab Student Computer Account (For help contact System Admin Nito)

GRADING:
There are 100 possible points total in Lab. Below are the possible scores and the equivalent letter grade:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>90 – 100</td>
<td>A</td>
</tr>
<tr>
<td>80 – 89</td>
<td>B</td>
</tr>
<tr>
<td>70 – 79</td>
<td>C</td>
</tr>
<tr>
<td>60 – 69</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>F</td>
</tr>
</tbody>
</table>
LAB GRADING ALLOCATION:

Here is how Lab Points are earned (subject to change):

<table>
<thead>
<tr>
<th>LAB POINTS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Pre Lab</td>
<td>5%</td>
</tr>
<tr>
<td>Demonstration</td>
<td>30%</td>
</tr>
<tr>
<td>Report</td>
<td>25%</td>
</tr>
<tr>
<td>Code</td>
<td>20%</td>
</tr>
<tr>
<td>Final Project</td>
<td>20%</td>
</tr>
</tbody>
</table>

DUE DATES:

Generally, **late work** will NOT be accepted. You will have until the **first hour of the following lab period** to demonstrate your completion of the lab. **Reports will be due by Sunday, 11:59PM.**

Even if you are unable to complete the lab, you will have the options to recover some points for the following scenarios:

- **Semi-functional (2 points):** Demonstrate that you were able to get the lab to function in some significant capacity. **Must demonstrate during the first hour of the following lab session.**

- **Code-Only (1 point):** Upload your code with comments in the blackboard (source files **ONLY**: main.c, along with your report in .docx format).

Do nothing: You will lose all points for the demonstration if you do nothing or are absent. See the **Extensions** section for special cases.

LAB REPORT AND CODE GUIDELINES:

- 1.5 - 2-page, single-spaced, 12 pt. font, lab report
- Student Name
- Course title, Lab title, and Date
- Brief paragraph describing purpose of the lab
- List major lab steps
- Brief description of what you learned, issues you had, and how you fixed them
- Conclusions
- Try not to swamp your report with codes. Reports will be graded based more on content than length.
MATERIAL SUBMISSION GUIDELINES:

All materials will be turned in via Blackboard, DO NOT PRINT THEM. When submitting your report or code (source files ONLY), please use the following file naming convention:

\[ \text{Student Name} - \text{Lab Number} - \text{EE3176 Meeting Day}.\text{ext} \]

For example:

\[ \text{Jose Sandoval} - \text{Lab 3} - \text{EE4178 F}.\text{docx} \]
\[ \text{Jose Sandoval} - \text{Lab 3} - \text{EE4178 F} - \text{main.c} \]
\[ \text{Jose Sandoval} - \text{EE4178 F} - \text{Lab3.zip} \]

Do not include special characters '!','?','#','$','%','&', etc).

Please submit reports in Word document formats ONLY (.docx ONLY, not .doc) along with your source file main.c The best method for submitting reports and other material is by using the Blackboard.

LAB SESSIONS:

Topics and peripherals you will be expected to demonstrate throughout the semester as well as the Final Project:

- Lab 0: LED Lightshow
- Lab 01: LED Controller
- Lab 02: Microwave – Interrupt System
- Lab 03: Introduction to FreeRTOS
- Lab 04: FreeRTOS: Semaphores
- Lab 05: FreeRTOS: Queue
- Lab 06: GPIO, Interrupts, and Queues
- Lab 07: Peripherals and Queues:ADC and PWM (LEDC)
- Lab 08: DAC Peripheral
- Lab 09: WIFI and IOT
- Lab 10: WIFI and IOT: Servo Motor Control
- Lab 11: WIFI and IOT: ADC Monitor

FINAL PROJECT:

After or around Lab 3, the Final Project design requirements will be given to you. You must demonstrate all techniques learned during the lab. You will lose points for techniques not demonstrated or ignored.

By this time, you will be expected to have a fair understanding of all concepts, and as such, will only be provided with troubleshooting assistance.

Only undergraduate students are allowed to make a team, graduate students will do individual projects. If you feel you are going to drop the lab, do not abandon your teammates at the last minute.

Please make sure you understand all topics before finishing Lab 11.
EXTENSIONS:

Generally, you will be allowed to checkout anytime during the week without loss of points; you may checkout by the end of lab time in any section, by the first half hour of your section’s next meeting, or during office hours. The first half hour of your section’s next meeting is for setting up and checkout only, not to receive help.

If you feel you might not be able to make a due date, please let me know before the due date passes. Come by during office hours or send an email so that we can make arrangements accordingly.

Should a catastrophe occur during the due date, you may notify before 24 hours has passed for the possibility of full credit.

FEEDBACK:

If you would like a critique on your reports or have general questions about your grade, you may visit during office hours or contact via email at any time.

MISCELLANEOUS:

You may attend any lab session, provided there is a room. However, you will be responsible for the due dates of your assigned meeting date.

Covid-19 and Illness: If you feel sick or have been exposed to a communicable illness, please do not attend class. You have the option of notifying as soon as possible so we can work on appropriate arrangements.

Food is NOT ALLOWED in the lab.

Reports are to be submitted via Blackboard. Be mindful NOT to submit a corrupted file as it will earn no grade.

Do NOT borrow code. Write it yourself because questions about your codes and techniques will be asked. Try to read the Lab information before coming to class. It will make the lab go by smoother.

Please read the manual thoroughly, you will find tons of useful information. Use Blackboard to keep track of due dates and other important information.

Follow the directions in the messages on Blackboard or other emails that are sent.
If you have any questions, feel free to ask at any time!

SEE YOU IN THE LAB!