University of Florida   **EEL 4744C: Microprocessor Applications**   Dr. Eric Schwartz
Electrical & Computer Engr. Dept.   Lab Rules & Policies
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The following is the set of lab rules, policies, and guidelines which must be strictly followed by all students of *Microprocessor Applications* throughout the entirety of the semester. As a student of *Microprocessor Applications*, in your Homework 0 Quiz you will acknowledge and affirm that you have read and understood the *Lab Rules and Policies* and that you agree to abide by all lab rules, policies, and guidelines set forth within the document (and also those specified in the syllabus). Until such time as you meet this requirement, you will be subject to receiving a grade deduction on all assignments, as well as being subject to "no admittance" into any lab sessions.

Notwithstanding anything set forth herein, these lab rules, policies, and guidelines shall be subject to written revision in the sole discretion of the instructor(s), or of any Undergraduate Peer Instructor (from here on referred to as UPI, PI, or Peer Instructor) deemed qualified by the instructor(s). If at any time the student has any questions or concerns regarding the subject matter of this document, it is the responsibility of the aforementioned student to speak with the instructor(s).

Interpretation and enforcement of these lab rules, policies, and guidelines shall be at the sole discretion and determination of the instructor(s), or of any Peer Instructor(s) deemed qualified by the instructor(s). Furthermore, the rules and policies laid out in this document may extend to any and all situations relating to the lab (e.g., lab quizzes), whether or not the student is physically located within a dedicated lab room.

1. Lab safety is always of utmost importance. It is required that the student uphold any rules regarding safety imposed either as set forth in this document or as announced or otherwise noted by the instructor(s) or Peer Instructor(s) within a lab setting. Because we regularly solder in the lab, eye protection and masks must be worn while in the lab.

2. The student must not bring any food, drinks, or illegal substances into the lab (unless medically necessary).

3. **It is required that the student work individually on all lab assignments, with the exception that help may be solicited from either the instructor(s) or from any Peer Instructor(s), when deemed appropriate by an instructor or Peer Instructor. Additionally, the student may solicit help from others in regard to general concepts, although the student may <u>NOT</u> copy or use another individual's (e.g., a present or past student's) intellectual property. The term *intellectual property* as used herein shall be deemed to include, but is not limited to, hardware and software designs, in part or in whole.**

   i. **Artificial intelligence (AI) language models, such as ChatGPT, and online assignment help tools, such as Chegg®, are examples of online learning support platforms: they cannot be used for course assignments except as explicitly authorized by the instructor. The following actions are prohibited in this course:**
      - Submitting all or any part of an assignment statement to an online learning support platform;
      - Incorporating any part of an AI generated response in an assignment;
      - Using AI to summarize or contextualize source materials;
      - Submitting your own work for this class to an online learning support platform for iteration or improvement.

4. The student understands that the only valid interpretation of any lab document is from that of either the course instructor(s), or of any Peer Instructor(s) deemed qualified by the instructor(s). The instructor(s) may select any number of Peer Instructors to act on their behalf, for whatever purpose, at any point within the semester. It is the responsibility of the student to speak with the instructor(s) to confirm that their understanding of the given materials is correct.

5. **Unless given written permission by the course instructor(s), each lab assignment must be completed and submitted before the time it is due. These "pre-lab assignments" must be submitted to the *Canvas* course page dedicated to that assignment. If the student does not submit an assignment by the deadline listed on the relevant *Canvas* page, they may submit the assignment up to 24 hours late for a 25-point penalty (resulting in a maximum possible grade of 75 for the assignment). No submission will be accepted more than 24 hours past the listed deadline. If the student does not submit work for a lab assignment within 24 hours after the relevant deadline, the student will not be admitted into the relevant lab session and they will receive absolutely no credit for that lab assignment.**

   No more than two labs can be submitted late. If a third is submitted late, the student will receive absolutely no credit for that lab assignment.

   Failure to attend

   ==**For each lab assignment, the student must submit the following deliverables to the *Canvas* page dedicated to the assignment.**==

   i. ==**A computer-generated *pre-lab report* (also known as a *lab report*) submitted as a <u>single PDF file</u> `labN.pdf`, where *N* should be replaced with the relevant lab number, following the relevant lab document(s) and lab submission template provided on the course website.**== This file should be uploaded **independently** of the zip file

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(see 5. ii. below), i.e., **not** within the zip file. The provided template includes the following sections. If any of the following sections do not apply for a specific lab, the student must write "N/A" for this section.

a) **Header**. In this section, the student must put the relevant lab number and title, their name, their class number, their PI's name, and a relevant date.

b) **Requirements Not Met.** In this section, the student must briefly list any lab requirements that were not fully completed, if applicable.

c) **Problems Encountered**. In this section, the student must describe any problems that were encountered when attempting to complete the lab. For any problems resolved, the student must document their solutions and techniques attempted, including any solutions that did not resolve the initial problem. For any problems unresolved, the student must state what was tried, as well as state which aspects of the required pre-lab function and which aspects do not function.

d) **Future Work/Applications.** In this section, the student must *briefly* describe how, if provided with more time, ambition, hardware, and software, the work in the pre-lab could be extended for another purpose. This section of the report, as well as all other sections listed previously, must be limited to the first page of the relevant document, and a page break should follow.

e) **Pre-lab Exercises**. Most labs will require responses to pre-lab exercises. In this section, the student must copy any of the provided exercises, and include a response for each, where the response must directly follow the copied exercise text. A page break should follow this section.

f) **Pseudocode/Flowcharts.** The student must submit either a flowchart or pseudocode for **every** (even very simple) section of the lab that requires software to be developed, where either of the aforementioned must be created **before** the software is written. A page break should follow this section.

     1) *Pseudocode.* In accordance with the *Wikipedia* definition, *pseudocode* is defined here to be a compact and informal high-level description of a computer programming algorithm that uses structural conventions of a programming language, but is intended for human reading rather than machine reading.

     2) *Flowchart.* In accordance with the *Wikipedia* definition, a *flowchart* is defined here to be a type of diagram that represents an algorithm, workflow or process. For the purposes of this course, a flowchart should be created for each routine (or function) of a given program. A list of common symbols used in flowcharts can be found in the course textbook or at the following *Wikipedia* webpage.

g) **Program Code.** In this section, the student must submit all application code created for the pre-lab. To do so, the student must directly copy code text from the relevant integrated development environment (IDE), i.e., *Microchip (Atmel) Studio*, and directly paste it into the pre-lab report. In other words, the student must not take a screenshot of the code but copy the text formatted by the relevant IDE and paste it into their pre-lab report. Additionally, the pasted code must not contain wrapping lines, and the student must organize all pasted code within the pre-lab report based on the sections defined within the lab document. A page break should follow this section.

     1) All code should be commented (using any method inherent to the relevant programming language) in a manner such that it could be understood by anyone with a similar or higher skill level.

     2) All code files must contain information at the top left of the file that describes the file and identifies the student. This information must follow the format given below. The student is expected to remove the angled brackets (<>).

```
Lab <Lab #>, Section <pertinent section # of lab>
Name: <student name>
Class #: <5-digit class id>
PI Name: <name of Peer Instructor>
Description: <description of file>
```

     3) Each subroutine, function, interrupt service routine, macro, etc., should be prefixed with text describing the routine, including a description of any parameters or return values.

h) **Appendix.** In this section, the student must include all supporting information referenced or created for the lab assignment, e.g., analysis measurements, screenshots, or anything else required by the assignment.

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1) Anything included must be either prefixed or followed by a relevant and descriptive caption.

2) All measurements taken with an oscilloscope, logic state analyzer (LSA), or anything similar must utilize a correct time base, i.e., if a non-periodic waveform is measured, the relevant waveform must be displayed on at least 75% of the measurement window, and if a periodic waveform is measured, at least two and no more than three periods of the waveform must be displayed on the entirety of the measurement window.

3) Whenever frequency (or period) measurements are of interest, only an oscilloscope, not a logic state analyzer, should be used to perform the measurements. Moreover, if a precise frequency (or period) is desired, no manual measurements of a waveform, e.g., user-defined cursors, are allowed. See the following links to GIF files published on the course website for the required method of measuring a precise frequency of a waveform within the *WaveForms* software: GIF2. A second method is available (but should generally **not** be used) since it may be more susceptible to error with noisy periodic signals: GIF1.

    ii. **A <u>single zip file</u> containing [1] all relevant *Microchip (Atmel) Studio* project folders (if any), each with the `.atsln` project file, all relevant header and source files, etc., and [2] all relevant Quartus projects (if any), each archived to a `.qar` file.** Instructions on compressing are available here with a GIF here.

        a) If a filename is explicitly specified for some pertinent file within a lab document, the student is **required** to use this exact filename; failure to follow this requirement will result in at least a ten-point deduction from the relevant lab grade.

        b) All code files must contain comments (using method[s] inherent to the relevant programming language) for all sections of the pertinent program.

        c) All code files must contain information at the top left of the file describing the file as well as identifying the student, following the format given in item two of section 5g.

        d) All code files must not be blank nor only contain comments.

6. **The student should only ask questions regarding a lab assignment outside of a lab session – no feedback for such questions will be given during a lab session.**

7. The student must come to the lab ***prepared***. More specifically,

    i. The student must understand all content related to the relevant pre-lab to the best of their abilities, where the instructor(s) and/or any relevant Peer Instructor(s) shall be the pertinent judge(s) of whether or not this requirement is upheld by the student.

    ii. The student must have already submitted their pre-lab report through *Canvas*, and if appropriate, have any required hardware and software constructed. Unless given advance permission by the instructor(s) or by a Peer Instructor, the student may **NOT** use another student's hardware for demonstrations.

    iii. The student must bring their entire lab kit, a **D**igilent **A**nalog **D**iscovery (**DAD**), a toolbox, and a laptop computer, to all lab sessions. Moreover, there shall be no acceptable excuse for not bringing the aforementioned items; if the student cannot bring one or more of their own materials, it is their responsibility to find a temporary replacement, as well as alert their PI of the situation. Ultimately, the course instructor(s), or the Peer Instructor(s) responsible for the student, have complete authority to decide whether or not a student meets the aforementioned criteria; if the materials brought by the student are deemed unsatisfactory, the course instructor(s) or the relevant Peer Instructor(s) have discretion to either deduct points from the relevant lab grade or to choose not to admit the student into (or remove the student from) the pertinent lab session.

8. The instructor(s) and relevant Peer Instructor(s) reserve the right to assign a grade of zero to any lab assignment that earns less than 50% if they believe that the student did not put forth sufficient effort in completing the assignment.

9. The student must attend labs during their assigned time; failure to do so, even if your lab deliverables were submitted on time, will result in your earning a zero for that lab.

    a) Each student will have **ONE** single-lab exception to this rule (if, for example, they just forget about their lab demo time) as long as they reach out to their PI by email or slack within 24 hours of their scheduled lab. In this case, the message from the student to their PI must specify all of their available times over the next four days for a makeup demo. There will be a 10 point (out of 100) penalty for this occurrence.

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b) In a few rare cases, labs can be made up when a conflict is known in advance. For more information regarding these situations, see the course syllabus.

10. Since there is limited time allotted for each student to demonstrate their lab, you **MUST** have the following ready prior to coming to lab:

   a) Have *Microchip (Atmel) Studio* already open, (but don't have a project open at this point, see item c below).

   b) Have your µPad (and other necessary PCBs) and the USB cable nearby and ready for emulation.

   c) Have Canvas open, as you will download your submitted zip file and will run that project solution.

   d) Have any other materials specified in the "Required Materials" section of the lab document nearby and ready (e.g., DAD board), just in case.

   e) Prior to Lab 1, you will select or be assigned a fixed 10-minute time for your subsequent lab demonstrations. You must arrive to your session window at least 10 minutes prior to your demo to do any necessary setup. A table outside the lab will be reserved for this setup.

   Coming to lab prepared will reduce any chances of you losing credit from not being able to demonstrate everything in your given time interval.

11. **After most lab assignments, a "lab quiz" will be given. This type of quiz will be used to assess the student's understanding of material related to some lab(s) and will be graded separately from a lab assignment. An overall combined weighted lab average and weighted lab quiz average of at least 65% must be achieved by the student in order for the student to be eligible to pass the course.**

12. It is the responsibility of the student to return all lab equipment and clean any pertinent work areas before leaving the lab. Failure to do so will result in at least a ten-point deduction from the relevant lab grade.

13. If the student is to perform any hardware construction with any equipment not provided within the lab, it is the responsibility of the student to verify with the course instructor(s) that the chosen equipment is appropriate. Moreover, the use of the soldering iron and solder provided by the *Introduction to ECE* course within the Electrical & Computer Engineering Department at the University of Florida is **prohibited**, since it is inadequate for our purposes and may damage our circuit boards.

14. In the event of a broken part, it is the student's responsibility to find an equivalent part. The *Lab Engineer*, Eric Liebner (whose office is located in NEB 236), or the *Engineering Supervisor*, Michael Stapleton (whose office is located in NEB 239), can help the student with replacement parts, but the student must always **consult with your PI first (and then, if necessary, Dr. Schwartz)**. Dr. Schwartz may direct you to contact the local manufacturer to either repair or replace the part(s). If a replacement part is given to the student, the student may need to purchase the same (or similar) component, as to replace the one provided.

15. Whenever writing software with the "C" programming language, the student must additionally adhere to the following guidelines.

   i. Wherever applicable, the use of directives, group configurations, bitmasks, and macros defined within "AVR" library files is required, unless otherwise noted by the course instructor(s).

   ii. Usage of the functions `_delay_ms`, `_delay_us`, *sprintf*, *printf*, or anything similar, is **strictly prohibited**.

   iii. All software should be compiled with no optimization, unless otherwise noted in a lab document.

16. It is **required** that the student read this entire document before submitting any pre-lab assignment and before attending any lab session. Failure to follow or correctly understand any of the above rules and policies may result in a point deduction of any amount from a lab grade, where this point deduction may be determined by either the course instructor(s) or any Peer Instructor(s) deemed qualified by the course instructor(s).

In the Homework 0 Quiz you will acknowledge and affirm that you have read and understood the *Lab Rules and Policies* and that you agree to abide by all lab rules, policies, and guidelines set forth within the document (and also those specified in the syllabus).