



Department of Computer Science and Engineering  
CPE 301: Microprocessor System Design  
**Laboratory**  
Fall 2014

**Instructors:** Dwight Egbert and Andy Olson

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**Course Objective:**

Provide students with the opportunity to gain experience in microprocessor-based system design, assembly language programming, and I/O interfacing to microprocessors.

**Course Outline:**

The course is broken into individual labs which will illustrate the principles covered in the lecture. Each student will design, build, test and troubleshoot (if necessary) interface circuits to a Arduino Mega Board (AMB) and write programs to execute on the same AMB. Each student will also design and implement hardware circuits for a Xilinx FPGA (Field Programmable Gate Array).

**Academic Success Services:**

Your student fees cover usage of the Math Center (784-4433 or [www.unr.edu/mathcenter/](http://www.unr.edu/mathcenter/)), Tutoring Center (784-6801 or [www.unr.edu/tutoring/](http://www.unr.edu/tutoring/)), and University Writing Center (784-6030 or [www.unr.edu/writing\\_center/](http://www.unr.edu/writing_center/)). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

If you have a disability for which you will need to request accommodations, please contact me or Mary Zabel at the Disability Resource Center (Thompson Student Services – room 100, 784-6000, or [www.unr.edu/drc/](http://www.unr.edu/drc/)), as soon as possible to arrange for appropriate accommodations.

**Course Format:**

Show up ready to work. You should be comfortable with the material and know how to complete the lab objectives. If schematic diagrams are required, have them ready. If you will be required to design a given circuit, thoroughly understand the fundamentals involved in the design, and be ready to sit down and design it. Have questions ready for the current week's lab, and if you feel uncomfortable about the next following week's material, talk with the lab instructor or the lecture instructor before the next lab. At the beginning of each lab session there will be a brief discussion covering details specific to that lab and to answer any questions you might have. The bulk of the three hour period is for the lab work.

This is a hands-on course and each student must build his or her own circuits and write his or her own programs. Circuit parts will be provided, but you are expected to have your own basic tools to assemble them. The following tools will be needed and must be purchased by each student:

**You will need the following items prior to Lab 1.**

- JE24 Breadboard
  - JE10 Wire Jumper Kit
  - Wire cutters or heavy scissors
  - Thumb Drive
  - Lab Notebook (**MUST BE BOUND**) plus loose leaf binder for handouts.
- Read the **Safety Issues and Guidelines** document and answer all questions on the safety quiz.
- **Your completed safety quiz will be collected at the beginning of the first Lab session.**

**Students without these items will not be admitted to lab**

Each student must purchase and maintain a **BOUND** lab notebook. The lab instructor will ask to review your lab notebook **each lab session**. The exact type of notebook is unimportant, but the **pages must be permanently bound**. The lab notebook should be used to record your laboratory experiences, observations, setup details, and anything else that occurs. The Lab handouts should be kept in a loose leaf binder to accompany your lab notebook. The notebook should provide a permanent, chronological record of lab work and analysis. The use of such lab notebooks is required by most companies as a way of documenting "intellectual property" and providing legal proof of when something occurred. It's also a very **GOOD** habit to develop.

**The above items can be purchased at the UNR Bookstore or ordered from a catalog.**

At the end of each lab section all work will be cleared from the computer. The lab computers include floppy drives, CD burners, USB ports, and an internet connection. It is highly recommended that these devices be used to regularly back up your work.

**Grading:**

*Each student must build his or her own circuits and write his or her own programs.* The resulting circuits or programs must be demonstrated to one of the course instructors in order to obtain a grade for each lab. The instructors will also examine each student's lab notebook and ask questions to make sure each student understands the completed work.

**Grading policies for the lab:**

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| 1. Lab demonstration   | 80% |
| - If the lab demonstration is incomplete, you will be given another chance to fix the problem or receive partial credit. |     |
| 2. Questions and answers   | 20% |
| - Each member of a group will be asked 2 questions. Each question is 10%.  |     |

For incomplete labs, you will be given a 1 week grace period. If the lab demonstration is not satisfied and the questions not answered during the grace period, there will be a penalty.

**Unacceptable Lab Activities: Multiple occurrences may result in grade penalties for a lab:**

1. Coming in during other scheduled lab times to ask for help on homework or tests.
2. Working on different projects or class homework during scheduled lab time.
3. Unfinished lab after first week grace period.
4. Working in a group larger than 3
5. Unexcused lab absences or walking out without demonstration and answering questions.
6. Asking the lab instructor or other group members to write code for you.

**Totally Unacceptable Lab Activity which will always result in a zero grade for the lab**

1. Copying or using another student's code.

Students are encouraged to work and study together, but each person must prepare his or her solutions and have a firm understanding of any work turned in. When you put your name on your Lab you are stating that it is your own work and not the work of another person. As a reminder of UNR academic standards, please read from the *UNR on-line Catalog, University Code of Conduct and Policies, POLICIES AND GUIDELINES, ACADEMIC STANDARDS* [http://www.cis.unr.edu/ecatalog/Default.aspx?article\\_list\\_id=29351](http://www.cis.unr.edu/ecatalog/Default.aspx?article_list_id=29351) defining these standards. Specifically, the following: "*Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one's own; or assisting in the act of plagiarism by allowing one's work to be used in this fashion.*" This means that if another student asks to borrow your work to copy - JUST SAY NO - or you are participating in plagiarism.

Labs will be graded from 0 - 100 points based on correctness and completeness, notebooks, and answers to questions. Receiving **3 or more 0's for a lab will cause you to automatically fail the lab.**

**Students must pass both the lecture and lab components of this course independently in order to pass the course.**

Assuming you have a passing grade in both the lecture and lab, then your course grade will be calculated as defined in the lecture syllabus.