

UCR EE/CS 120B: Intro to Embedded Systems  
University of California, Riverside  
Spring 2011

Syllabus

Lecture: M-Th 10:10 am - 11:30 am MSE 011  
LAB: M-Th 1:10 pm - 4:00 pm ENGR2 136

Instructor: Alex Edgcomb (aedgcomb@cs.ucr.edu)  
Office Hours: Open door policy. ENGR2 464.

Teaching Assistant: Joseph Tarango (jtarango@cs.ucr.edu)  
Office Hours: During lab.

Final Exam: August 26, 2011, 10:30 am - 12:30 pm

**Basic Information**

Embedded systems include almost any computing system other than traditional computers. Examples include cell phones, set-top boxes, medical devices, alarm systems, automotive systems, portable music players, etc. Embedded systems is one of the fastest growing areas in computing, having high impact on people's lives, and with tremendous potential for innovative new products. If you think about it, many of the most exciting computing systems today are embedded systems -- iPods and iPhones, Mars rovers, Wii video game consoles, GPS-based people trackers, and more. The embedded systems landscape is one of tremendous innovation and impact -- new inventions, many from students like yourselves, come about every day.

Catalog entry: EE 120B / CS 120B. Introduction to Embedded Systems (5 units) Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): EE 120A / CS 120A. Introduction to hardware and software design of digital computing systems embedded in electronic devices (such as digital cameras or portable video games). Topics include embedded processor programming, custom processor design, standard peripherals, memories, interfacing, and hardware/software tradeoffs. Interdisciplinary laboratory involves use of synthesis tools, programmable logic, and microcontrollers and development of working embedded systems.

All students must register and participate in the online course component at <http://ilearn.ucr.edu>

## Required Items

1. Programming Embedded Systems: An Introduction to Time Oriented Programming, 2nd Ed., Frank Vahid and Tony Givargis, UniWorld Publishing, ISBN 978-0-9829626-1-9. The publisher has set up a 50%-off coupon for UCR students. Students should go to [www.programmingembeddedsystems.com](http://www.programmingembeddedsystems.com), then click on "Purchase PES e-book", and complete the purchase info.

At the bottom of the purchase page is a place to enter a coupon code. Students should enter coupon code "ucr11smr50". This coupon is valid until 8/1/11. The license for the software tools that accompany the book are valid until 10/8/11.

**The coupon code should NOT be shared with students outside UCR!**

2. The C Programming Language, Second Edition, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall, ISBN 0-13-110362-8, **OR** any other basic C programming book (not C++).

3. Lab kit, available at the UCR Campus Store.

4. Additional online reading material and/or articles handed out in class will also be required. Students will be expected to read these articles and answer questions about them on homework, quizzes, and exams. Each week's reading assignments will share a common theme relating to embedded systems. The instructor may or may not mention the week's reading assignments during lecture, but it is always expected and required that students do the reading nonetheless.

## Course Grading

Grading is based on the combination of two components:

- 40 pts: Lab component
  - 40 pts: Lab assignments, and any lab quizzes (sometimes called "lab practicals")
- 60 pts: Lecture component
  - 10 pts: Weekly Homework / online contributions / in-class exercises
  - 36 pts: Weekly quiz (4 in total)
  - 14 pts: Final

Letter grades follow the usual 90/80/70/60 scale. +/- grades will be given. Curving may be done on individual items only if it helps the class; never if it hurts the class. You are *not* competing against one another -- you can all earn As (and that has happened in the past in some courses), so work together and help each other to succeed. Students must achieve a passing grade (at least 60%) in both the lab and the lecture component to pass the course.

Lab assignments and Homeworks should be submitted on iLearn.

Late homework will be accepted with the following penalties:

- Up to 1 day late (80%)
- 1-2 days late (50%)
- 2-3 days late (20%)
- >3 days late (0% -- don't bother submitting it)

## General Course Features and Policies

- Study groups: Engineering is a social discipline, requiring good people skills. Furthermore, working with others enhances learning. Therefore, we STRONGLY encourage studying together. Students in a study group should solve each problem individually. Specifically disallowed is solving a problem as a group, dividing up problems among the group, and other non-individual approaches. Instead, a study group serves to allow for explanation of what the problem is asking and of generally how to solve the problem, to enable quick assistance when one gets stuck individually solving a problem, and to check each others' solutions. Each student's solution should look distinct -- there are typically countless variations of solutions to a problem.
- Helping others: Helping others enhances one's own learning, and also, well, helps others (remember, you can all get As). Thus, we encourage you to help others in the lab if you have the time. You should not write code for others nor show your code to other lab groups. But helping find bugs, teaching how to debug, and helping to explain concepts, are fine.
- Regrade policy: Corrections must be submitted in writing and within ONE WEEK of the distribution of the graded material. Grade-database errors should also be pointed out within ONE WEEK of posting. So stay on top of your grades.
- News forum / discussion board: Reading all posts is a required part of the course. Questions not relating to an individual grade or personal circumstance should be posted to the discussion board, not emailed directly to the instructor or TA, so that any of them can respond and so fellow students benefit from the answer.
- Academic dishonesty: Detected cases of academic dishonesty will be pursued aggressively, to protect other students. Grade sanctions and formal university incident reporting will be carried out. Copying code or deriving code for the labs from any source (current students, past students, textbooks, web, etc.) is not allowed unless explicitly authorized. Copying or deriving answers from past homework, quiz, or other solutions is not allowed. Lab partners must all contribute significantly to each lab being turned in jointly; if a partner did not contribute significantly, his/her name should not be included on the lab submission. If you suspect cheating, let the instructors know (anonymous email or notes are welcome).
- *Success* in engineering courses requires time. A typical student needs to spend about 30 hours per week on this course (including lecture and lab).

## Lab Guidelines

- All persons in lab during scheduled lab time must be formally registered in that section. No unregistered people in the lab are allowed.
- Attendance is not mandatory, however students that do not regularly attend class usually do not do well in the class. In addition, students that do not regularly attend class will have the lowest priority on office hours and email response.
- Lateness (or leaving class early) is unacceptable; it is disrespectful and disruptive to the instructor and other students. Attendance will be taken by a sign in sheet on entrance and exit, if a student is late once it will be forgiven. Any other occurrences will decrease the student's grade, however if a valid excuse exists then the occurrence will be forgiven.
- Sounds from electronic devices which result in interrupting the class will not be tolerated. The first occurrence for the entire class will be forgiven, any occurrence after that will result in a reduction of the grade for the student.
- During discussion, students will move away from their computers to the whiteboard. Students that do not comply will have a reduction in their grade.
- If you finish early, work ahead on course-related material, and/or provide appropriate help to others within academic honesty constraints.
- Do not bring your bike/scooter/skateboard/etc. into the lab. It is a safety hazard to the instructor and other students within the lab.
- The above Lab Guidelines do not apply to students taking the class remotely.
- Labs may be completed with one partner, registered in the class.
- Students are responsible for all announcements and material covered in lab.