

# CSE 422: Computer System Design - Spring 2005

Department of Computer Science and Engineering  
University of Notre Dame

**Description:** Integrated hardware and software development, construction and testing of embedded systems by design teams to meet specifications subject to technical, economic, and environmental constraints.

**Class:** DeBartolo 244 TBA  
M W 1:55 pm – 2:45 pm

**Lab:** 208 Cushing Hall TBA  
F 1:55 pm – 2:45 pm

**Instructor:** Dr. Aaron Striegel  
356-B Fitzpatrick Hall  
striegel@cse.nd.edu 631-6896

**Office Hours:** See course webpage

**Course Webpage:** <http://www.cse.nd.edu/courses/cse422/www/>

## Reference Texts (optional):

1. F. Vahid and T. Givargis, *Embedded System Design: A Unified Hardware/Software Approach*, John Wiley and Sons, 2001.
2. C. Roth, *Digital Systems Design Using VHDL*, PWS Publishing Company, 1998.
3. H. Michaelson, *How to Write and Publish Engineering Papers and Reports*, Oryx Press, 1990.

## Course Goals:

The primary goal of this course is for you to experience designing an embedded system and all of the various tradeoffs/considerations that go along with such design work. The secondary goals of the course are to expose you to new technologies and to enhance your teamwork skills. By the end of the course, you should be able to assist as a junior engineer with the complete design of a new system.

## Grading:

|                   |     |
|-------------------|-----|
| Assignments       | 25% |
| Exam 1            | 25% |
| Exam 2            | 10% |
| Project Proposal  | 5%  |
| Design Project    | 25% |
| Oral Presentation | 10% |

- Fixed grading scale with +/- A=90-100, B=80-89, C=70-79, D=60-69
- Grades may be adjusted up to +/- 1.5% based on class attendance/participation.
- In the event of a bad exam, I may change the scale accordingly such that letter grades will be improved
- Inquiries about graded assignments/exams must be made within **one week** after the assignments are handed back.
- Late homework will lose 33% per day beyond the due date. Homework may be turned in either during class or to my office. Homework may not be submitted directly to the TA.

## Course Objectives:

- Describe a typical composition of an embedded system and the functionalities of widely used components in such a system.
- Describe the basic steps involved in developing an embedded system, various IC technologies for implementing such a system, and factors that impact different design metrics.
- Develop simple embedded systems with both the software tools and hardware development board provided.
- Analyze and compare design alternatives such as different hardware/software partitions regarding to economics, timing performance, size, power, etc.
- Deliver quality technical reports and oral presentations.
- Work effectively in a team and know how to use effective meeting management skills.

## Course Policies:

### 1. *Lecture*

- Lecture notes will not be on-line so taking notes during class is highly encouraged. In short, anything that is written down on the board, you can write down as well.
- Attendance at lectures is required. If you must miss a lecture, please contact the instructor in advance.
- Lectures will be driven by student interaction in addition to the standard lecture material.

### 2. *Design project*

- The design project will be a semester long project on a design of your choosing. A list of example projects and previous projects will be provided.
- The design project team will consist of 3-4 students as determined by the instructor.
- The design projects will be rated by your fellow students, the TA, and the instructor.
- The design project will have several deliverables that will be listed on the webpage.

### 3. *Homework/lab*

- Homework will also be done in teams of 1-4 students. The makeup of the teams will be of your choosing.
- Assignment solutions will not be posted. The burden will be on you to find out how to solve the problem.
- No handwritten homework will be accepted. All homework must be printed using a word processor. Figures may be drawn using *xfig* or other drawing program.

### 4. *Teamwork*

- The teams will be evaluated twice during the semester, once at midterm in a written format and once at the end of the semester in a 1 on 1 session with the instructor.
- Teamwork does not mean that one person does the work one week and the other person does the work the next week. If you sign your name to the solution set, it means that you have participated in solving the problems.

### **Other Notes:**

- I will frequently use class e-mail lists to distribute important information related to the class. You will be expected to check your e-mail at least once a day for class announcements.
- This class will be a class where many of the topics build upon one another. Therefore, please try to ask questions if you do not understand the material. Feel free to ask questions in class or by e-mail.
- The topics for the course will be quite flexible. If there is a technology related to system design that you would like to know more about, please let me know.