

Texas A&M University
Department of Computer Science and Engineering

CSCE 482: Senior Capstone Design
Fall 2012

Section 501:	MW	11:30AM-12:20PM	Zach 105B (Lecture)
	MW	4:10PM-6:15PM	HRBB 203 (Lab)
Section 502:	MW	11:30AM-12:20PM	Zach 105B (Lecture)
	TR	3:55PM-6:00PM	HRBB 203 (Lab)

Instructor: Ricardo Gutierrez-Osuna, rgutier@cse.tamu.edu, 520A HRRB, 845-2942

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URL: http://courses.cse.tamu.edu/rgutier/csce482_f12/

Catalog Description

Project-based course to develop system integration skills for solving real-world problems in computer science; significant team software project that integrates advanced concepts across computer science specializations; projects require design, implementation, documentation and demonstration, as well as design methodology, management process and teamwork. Prerequisites: Senior classification; at least two CSCE courses from one track including 411.

Textbook and references

Required

- *The Five Dysfunctions of a Team: a Leadership Fable* by Patrick M. Lencioni (Jossey-Bass, 2002)

Recommended

- *Stuff You Don't Learn in Engineering School: Skills for Success in the Real World*, by Carl Selinger, (IEEE Press, 2004).
- *The Wisdom of Teams: Creating the High-Performance Organization*, by Jon R. Katzenbach and Douglas K. Smith, Collins (2003). Available on-line at TAMU Libraries.

Supplemental

- Technical material from the literature, manufacturer's datasheets and user manuals.

Detailed Course Description

CSCE 482 is a project-oriented course aimed at developing system integration skills. Students work in groups of 3-4 people to complete a significant software design project. Every project requires complete implementation, documentation and demonstration of a software system. The focus is not only on the final product but also on design methodology, management process and teamwork.

Each team is required to manage its own efforts to complete its project in a timely manner. Group members are required to keep individual lab notebooks recording their efforts and their personal impressions of the project. Students are graded based on both the quality of the group product and their individual contributions.

Every team is required to schedule a weekly meeting with the course instructor and the TAs, preferably during the official class or lab hours. These meetings must be attended by every group member. Since the projects are student-managed, the exact nature and style of these meetings is at the group's discretion. **However, every member of the group is expected to participate.**

At the end of the semester, each group makes a public presentation describing and demonstrating their work. These presentations will be open to the university community.

Course objectives

To prepare students for engineering practice with a major design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political.

Expected outcomes

It is expected that successful participation in the course will allow the student to demonstrate:

- an ability to apply knowledge of mathematics, science, and engineering (3.a)
- an ability to design and conduct experiments, as well as to analyze and interpret data (3.b)
- an ability to design a system, component, or process to meet desired needs (3.c)
- an ability to function on multi-disciplinary teams (3.d)
- an ability to identify, formulate, and solve engineering problems (3.e)
- an understanding of professional and ethical responsibility (3.f)
- an ability to communicate effectively (3.g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (3.k)

Grading Policy

The final grade you will receive in the class will be based on points accumulated during the semester. Thus, both continued progress (the process) and the quality of your product (and other deliverables) will determine your grade. Although the bulk of your grade is based on the performance of your team, individual performance will also be gauged.

- 1. Project Proposal (15%):** These points will be based on the originality, quality and feasibility of the proposed work, the analysis of alternative solutions, the consideration of economic and societal aspects, and the project management approach, as reflected on your written proposal (75%) and oral presentation (25%). *A template for the proposal report and a presentation rubric are available on the course webpage.*

Project management: each team must maintain a project webpage describing the project timeline, progress to date, task assignments, deadlines and milestones, purchases, and shared documents. The course website contains a Google Site template you may use for this purpose.

- 2. Weekly Progress (10%):** This grade will be based on your team's ability to maintain the project on schedule. The weekly report should be incremental, and should

specifically address the following:

- a. Agenda for the weekly meeting with the instructor and the TA
- b. Any major accomplishments during this period, including figures and results. Accomplishments need to be measurable, e.g. “did more research on such and such” is not an accomplishment, it is an activity (and a loosely defined one).
- c. Plan of work for the following week. The more specific, the better.
- d. An update on project management, including teamwork, purchases, schedule and milestone status
- e. Minutes of the previous meeting

Weekly progress reports are due at 8AM on the day of the weekly meeting. The responsibility of preparing these reports will be rotated among team members. The team member preparing the report will also be in charge of facilitating the discussions during that weekly meeting; s/he will also be responsible for preparing an *action list* for the following week (based on input from the team). This action list will contain the set of specific goals that each team member has agreed to complete.

- 3. Critical Design Review (10%):** The CDR is a mid-semester evaluation of your project. The CDR grade will be based on the quality of your design (75%) –as reflected on your oral presentation and written report, and on the degree to which you have a complete design (25%). *A template for the CDR report and a presentation rubric are available on the course webpage.*
- 4. Final Communication (10%):** This grade will be based on the quality of the final presentation (25%), as well as the contents and professional finish of the documentation (75%). *A template for the final report and a presentation rubric are available on the course webpage.*
- 5. Project Grade (20%):** A final grade will be assigned to your project based on the completion of all the objectives stated in the proposal, as well as on a live demonstration in front of the class. The complexity of your project and the size of your team will be factored in.

Due date: Project demonstrations will take place the last day of class of the week prior to final presentations. This earlier deadline ensures that teams have time to (i) thoroughly test and validate their systems after the demo, and (ii) prepare the final presentation.

- 6. Team work (5%);** It is very important to understand that accomplishing the technical objectives of the project is not sufficient. These accomplishments should not come at the expense of destroying relationships among team members. Thus, a grade will be assigned based on the ability of the group to function as a team. Is there evidence that the group engaged in team building activities? Were contributions to the project evenly distributed? Were members equally engaged in discussions during meetings? Was there an effective division of responsibilities?

Note: the work should be done primarily in the lab (HRBB 203) and as a group, regardless of whether you can perform your task assignments individually elsewhere. Being physically present in the same room encourages collaboration and equal distribution of workload. A regular work schedule should be included in the proposal, showing the times when the team will meet in the lab to work on the project (in addition to meeting times).

7. Individual Performance (30%): Points in this category are awarded based on assessments of your personal contribution to the team efforts:

- a. Notebook (10%): You are required to use a laboratory notebook to record what YOU do as a member of the project. Entries in the book should be made during or shortly after every work session. Each entry should include (1) the date, (2) the objectives for that session, and (3) record of what was done.

A grade will be assigned to your personal design notebook based on:

- i. The regularity of your entries throughout the semester.
- ii. The evidence of an engineering design process, including but not limited to schematics, block diagrams, circuits, pseudo-code, tables of experimental results, and mathematical derivations.
- iii. The clarity, legibility and organization of your annotations.

Notebooks must have permanent binding (e.g., composition pads); spiral-bound notebooks will not be accepted. Samples of good, average and poor notebooks from previous years will be made available at the beginning of the semester. Each student is expected to review these notebook samples with the TA prior to the proposal presentation; failure to do so will result in a 5% penalty on the final grade.

Participation (10%): The instructor and TAs will evaluate your attendance to meetings, participation in the discussions, and contributions to the team. Team leaders will instead be evaluated by their ability to make the group operate as a team, i.e., item (6) above. Each student is also required to pass a teamwork quiz with a score of 75 or higher (see tentative schedule); failure to do so will result in a 5% penalty on the final grade.

- b. Peer Review (10%): Your performance will be evaluated by each of your team members throughout the semester. Peer reviews should be submitted to the TA no later than 5PM of the due date. Late submissions will NOT be accepted.

NOTE: Grades will not be assigned until all project deliverables have been turned in (see below), all borrowed items (e.g., keys, books, equipment) have been returned to their proper location or their owner, and the workstations in HRRB 203 have been thoroughly cleaned up. All team members are required to be present at the time of the final delivery.

Final deliverables

- 1) Bound hardcopy of the final documentation
- 2) CDROM including the following (please organize into folders, e.g., Docs, Source, Hardware, Media, References, Freeware, etc.)
 - a) Designs: code, schematics, data, data sheets, freeware software tools, etc.
 - b) Reports: proposal, CDR, weekly reports, final report, and ALL presentations
 - c) Audiovisual media: close-up pictures of your system *AND* a high-quality movie demo of the system working, for posterity (see gallery in the course webpage for movie samples)
- 3) Final prototype, as well as any spare parts and supplies
- 4) Software install, to be demonstrated on several machines
- 5) Peer reviews
- 6) Notebooks

Purchases and Reimbursements

Please ensure that purchase order (PO) forms submitted to the department are accurate. Submitting a PO with incomplete specifications or backordered items increases the workload for our accounting staff and causes unnecessary delays to your team. Submitting an incomplete PO will result in the team being prevented from submitting additional POs; from that point on, all additional purchases will have to be made by team members themselves and will be reimbursed at the end of the semester.

Please verify that items are in stock before submitting a PO, and provide alternative vendors if an item is likely to go out of stock (e.g., if the vendor only has a few units left). If you suspect that a critical item may become backordered, it may be better if you purchase it directly since POs may take several days to go through.

Finally, please do not submit POs for small purchases (less than \$50); for small orders, it is better you make the purchase upfront and then submit a reimbursement to the department.

Reimbursement requests are due at the time of final deliverables. To minimize overhead on our accounting staff, we will only reimburse up to five purchase orders (of your choice); this policy also encourages teams to plan their purchases in advance. Overnight or express delivery will not be reimbursed, unless approved in advance by the instructor. Reimbursement of sales taxes is not allowed by the university; please make sure to bring tax-exempt forms with you whenever you make local purchases (or purchases within the state).

Document preparation

All major documents (proposal, CDR, and final documentation) should be submitted in a professional format (e.g., spiral-binding), and should contain a title page, an outline, as well as clear section and subsection headings, etc. Please use the templates available in the course website. Please run a spell check before submitting.

Attendance Policy

Not attending weekly meetings harms the other members of your group and makes it much more difficult for the instructor to assess your contributions to the group effort. Therefore, attendance, punctuality and active participation in the weekly meetings are required. Failure to attend a meeting or late arrivals (more than 10 minutes late) will be reflected in your individual grade. Emergencies, however, do happen. Lateness or absence can be excused if there is a valid reason. Illness, job interviews out of town, death in the family, inclement weather or accidents for commuters, etc., are valid reasons. Oversleeping, a term paper due, an exam to cram for, etc., are not valid reasons. Ultimately, the instructor reserves the right to determine what constitutes a "valid reason" on a case-by-case basis. If you know you are going to be late or miss a class, please let the instructor *and* your teammates know, so that they may plan for your absence and make the best use of their time.

Scholastic Dishonesty

Please review Section 20 of the TAMU Student Rules (<http://student-rules.tamu.edu/>) for a list of examples of scholastic dishonesty. In particular, be aware of the issues of *plagiarism* and *fabrication of information*. The use of existing software implementations or hardware designs should be discussed with the instructor prior to being incorporated into the project. Proper credit must be given to the original source of concepts, designs, software, technical documents, scientific literature, etc.

Course Schedule and Milestones

Week	Date	Classroom meeting	Materials due
1	8/27	Course intro / Pre & entrance tests	
	8/29	Kick-off lectures / The deep dive	Resumes Teams are formed
2	9/3	Kick-off lectures / Teamwork quiz	
	9/5	Kick-off lectures / Brainstorming	
3	9/10		
	9/12		
4	9/17	Proposal presentations	Proposal; PR1
	9/19	Proposal presentations	
5	9/24		
	9/26		
6	10/1		
	10/3		
7	10/8		
	10/10		
8	10/15	CDR presentation	CDR; PR2
	10/17	CDR presentation	
9	10/22	Team assessment workshop	
	10/24		
10	10/29		
	10/31		
11	11/5		
	11/7		
12	11/12		PR3
	11/14		
13	11/19		
	11/21		
14	11/26		
	11/28	Project demos / Post test	Demo
15	12/3		
	12/5	Final presentation	Final presentation
16	12/10		
	12/12	Check out (10:30AM - 12:30PM)	PR4 Final report All deliverables

NOTE: Lab sessions are cancelled until after the first lecture session.