# CSE 4316
# Senior Design I

Fall 2014 - TTh 9:30 - 10:50, Lab: F 10:00 - 10:50
Instructor: Manfred Huber ( huber@cse.uta.edu )

# 1   Course Description

**Course Overview:**
This course is the first part of the two semester capstone class. The purpose of this class is to provide a "close to real world" experience in developing real products, the right way. Students in this course will learn a lot about the development process and discover some interesting things about themselves as a member of a development team along the way! This is the CSE capstone course, where many of the things learned in previous courses are put together before students tackle the real world. The course will study the product development environment used in the computer industry, and practice a phased system/software development process, often called the modified-Waterfall system development life cycle, as applied to computer hardware and software design projects. Throughout this course sequence, students will work on teams of 4-5 students. In this first course in the sequence (CSE 4316) students will identify their team and their project and start the planning process. Within this first semester, students will prepare and present planning and requirements documentation for their design project, and begin architecture/design of their product. The project will be continued and completed, through demonstration of a working prototype, by the same team in CSE 4317, Senior Design II, the following semester.

**Specific Course Objectives:**
At the conclusion of the course sequence, the student will have developed the necessary skills to work on a design team by substantially completing a working prototype of a complete product. The skills required to do this include all of the technical skills that should have been accumulated thus far in the student's program of work, as well as soft skills that will be learned and/or honed during the project. The primary objective of this course is the final preparation of the student for entrance into the workplace with the ability to be productive almost immediately.

More specifically, the student will have met the following ABET (Accrediting Board for Engineering and Technology) Critical Assessment outcomes:

(c) Ability to design a system, component, or process to meet desired needs This outcome will be evaluated based on your performance on the key deliverables for this course: system requirements document, architectural design specification, detailed design specification, system test plan, and your final product prototype.

(d) Ability to function on multi-disciplinary teams This outcome will be evaluated using peer evaluations and instructor assessments at the end of each semester.

Other ABET outcomes that are very relevant to this class, although not specifically evaluated, are:

(f) Understanding of professional and ethical responsibility

(g) Ability to communicate effectively

**Class Preparation:**
This class is interaction intensive, meaning that students are expected to participate in class discussion and contribute to the learning experience. Each student is responsible for carefully reviewing all specified lecture/discussion material before each class session and being prepared for class discussion. The majority of readings are from the course textbook. Additional reading may be assigned and class handouts may be distributed, typically via the website, to supplement text readings. Presentation materials to be used for discussion of each topic in class are provided on the class website. Students will receive a grade on their participation in classroom discussions as indicated below. Topics for classroom discussions each week are as indicated on the class website, and will be updated as necessary throughout the semester. Please note that the dates indicated for discussion of a topic are for planning purposes only the actual discussion dates may vary depending on class learning pace and other factors. Students should come to class prepared to discuss the topic during the week indicated in the reading schedule, or on a later date if deferral is necessary. This is a common occurrence in the work force. Stay flexible!

**Prerequisites:**

All students are responsible for mastery of the material taught in ALL prerequisite courses, including both those listed here and their prerequisites.

- CSE 3310 - FUNDAMENTALS OF SOFTWARE ENGINEERING. Software engineering principles, processes, and techniques; software development approaches focusing on functional analysis and functional design methods. Configuration management, implementation strategies, and testing (co-requisite)
- CSE 3320 - OPERATING SYSTEMS. Functions and components of an operating system, including process synchronization, job scheduling, memory management, file systems protection, and deadlocks. Related system software, such as loaders, linkers, assemblers, and windowing systems.
- CSE 3442 - EMBEDDED COMPUTER SYSTEMS. Design of microcomputer based systems: microcomputer programming, component and system architectures, memory interfacing, parallel and serial I/O interfacing, A/D and D/A conversion, and typical applications. Required for CpE majors only.
- IE 3312 - ECONOMICS FOR ENGINEERS. Methods used for determining the comparative financial desirability of engineering alternatives.
- SPCH 3302 - PROFESSIONAL AND TECHNICAL COMMUNICATION. Theory and practice in written and oral presentations with an emphasis on business and technical professions.

**Course Materials:**

- Primary Text (Required): *Rapid Development*, by Steve McConnell. Available in the UTA bookstore or most online book vendors.
- Engineering Notebook (Required): Standard Engineering Notebook as printed by BookFactory of Redwood Shores, CA. This notebook is available in the UTA bookstore or directly from BookFactory.com

Other course material and information, such as handouts, assignments, etc., will be available from the course web site. All handouts may be retrieved from the class website. You will need a PDF reader and Office applications such as Word and PowerPoint, and selected other readily available applications for your system to make use of some of these files. Readers are available for all common operating systems and environments. You are responsible for the information in these files.

**Course Web Page:**

Access to all materials and general information for this class is via the instructors class website at: *http://ranger.uta.edu/~huber/cse4316* . This website is the focal point for class information, notes and lecture materials. You should check this site for announcements, handouts, assignments, updated presentations, etc.

**Tentative Office Hours:**

Office hours for the course will be held by the instructor in ERB 522 or in ERB 128, TTh 11:00 - 12:00, and W 2:00 - 3:00. Times are subject to change and will be posted. If for some reason you can not make it to any of these office hours, please inform the instructor.

e-mail: huber@cse.uta.edu

All course related email should contain the course number *"CSE 4316"* in the beginning of the Subject.

There will be a GTA for this course, both of whom will hold office hours in the Senior Design Lab (ERB 208) during their posted office hours. The GTA will be:

- TBD

**Electronic Communication:**

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

# 2 Course Work and Grading

**Attendance and Participation:**

At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I expect attendance in all class and lab sessions. Since success in life, and especially your job, often begins with simply showing up (on time), and your teammates will depend on you being available as expected every day. The attendance grade will be reduced by 10% for every unexcused absence above 2.

Evaluation of class participation is based on contribution to class discussion and participation in in-class exercises throughout the term. Your participation will be recorded in class, as participation opportunities are made available, for the entire term. Your participation will be evaluated at the end of the term as follows:

100  Regular (almost daily) participation, almost always asks good questions and answers questions well

90  Frequent participation, but does not ask questions or answer questions on a regular basis

80  Average participation, and questions and answers do not reflect adequate preparation

70  Infrequent participation, and answers reflect inadequate preparation

0  points Rare participation, with little or no evidence of preparation

**Group Deliverables:**

The grade on team deliverables is based on the ability of the team to deliver an adequate deliverable on time. If multiple reviews of the deliverable are required, the grade on the deliverable will be lowered one grade level for each additional review. In general, an adequate deliverable passing review the first time will be given a grade of 90-100, depending on the number of changes required; passing on the second review will receive a grade from 80-89; etc. The overall team grade is based on the deliverable grades and the team's overall productivity. Performance on weekly team status reviews and all other assigned team deliverables will also be used as components of this grade.

**Grading of Group Deliverables:** Grading of group deliverables is complex. Because of the nature of our business, grades are based on the effective and timely delivery of adequate deliverables. For this reason, the major team deliverables (charter/project plan, requirements, architecture, design and test documents) must be judged adequate before a team can proceed, which may mean multiple reviews to reach that state. After a review is completed and passed, the team must submit a revised document within one week to retain the grade assigned. Delays beyond this time limit are penalized. In general, grades are assigned based on the following matrix:

| Review | Result | Max Score | Update Completion Delay | | |
|--------|--------|-----------|--------|--------|--------|
| | | | >1 Week | 1 - 2 Weeks | 2 - 3 Weeks |
| 1st Review | Pass without change | 100 | | | |
| | Pass with minor changes | 95 | 85 | 75 | 65 |
| 2nd Review | Pass without change | 90 | | | |
| | Pass with minor changes | 85 | 75 | 65 | 55 |
| 3rd Review | Pass without change | 80 | | | |
| | Pass with minor changes | 75 | 65 | 55 | 45 |

**Individual Deliverables:**

All other individual assignments made throughout the semester will be used in the calculation of this grade. These include homework assignments, individual status reports, class exercises and others as specified in class. Individual Engineering Notebooks will be evaluated on an intermittent, unannounced basis and used as a component of this grade. Additionally, individual performance on your team project is determined based on the value that an individual contributes toward project deliverables by use of the concept of "earned value." By nature of the tasks in Senior Design I this calculation will be somewhat more subjective than for Senior Design II. The details of this are explained in one of the early lectures in Senior Design I. Individual earned value will be calculated on a weekly basis and reported in the individual's status report.

**Final Exam:**

The Senior Design I Final Exam is the architecture gate review at the end of the Senior Design I semester.

**Grading Policy:**

The final grade will be calculated using the following policy:

| | |
|---|---|
| Attendance and Class Participation | 10 % |
| Group Deliverables | 30 % |
| Individual Deliverables | 30 % |
| Final Exam / Architecture Gate Review | 30 % |

**Additional Grading Considerations:**

In addition to the percentage grade calculated as above, the following additional requirements must be met to pass the course, regardless of the percentage grade earned:

(1) Completion of the course in an ethical fashion. Attempting to cheat in any manner whatsoever, falsifying reports, etc. are all violations and will result in failure.

(2) Satisfactory participation as a member of the team for the whole semester. Failure to participate satisfactorily will result in a failing grade. Satisfactory participation includes attendance at team meetings and completion of individual assignments in a timely manner.

(3) Final grades for Senior Design II will be assigned only after a team has completed project wrap-up. Project wrap-up requires, at a minimum: producing a project read me file that describes any special instructions and other information that might be required to restart/resume/recover the project from where you leave it; archival of all source code, make files, detailed design documents and other soft materials, including the aforementioned read me on a CD/DVD; and returning the teams cubicle space and surrounding area in the lab to a clean and unused condition such that it can be immediately occupied by another team at the beginning of the next semester. Specific, detailed wrap-up instructions are posted on the class website.

**ABET Critical Assessments and their effect on grades:**

As indicated above, Senior Design is used to measure your performance against two of the ABET Outcomes for your particular program (CS, CpE or SwEng). The evaluation of your performance as measured against these outcomes is a simple Pass/Fail. Please note that you must achieve a Pass grade on each of the outcomes in each semester. If you fail, or do not complete, any individual outcome you will fail the course regardless of your performance in other areas. Additionally, the several graded class exercises and/or assignments will be used to evaluate these outcomes. These assignments are scored as individual or group deliverables as discussed below and in class lecture notes.

**Course Sequence Pass Requirement:**

A student must successfully complete (i.e., pass with a C or better) both Senior Design I and Senior Design II in two sequential semesters (i.e., same project, same team). Any student who fails to successfully complete, or withdraws from either Senior Design I or Senior Design II for any reason must restart the sequence with Senior Design I.

**Withdrawals:**

The university withdrawal policy will be strictly adhered to. Up to the initial withdrawal date, all students will receive a W. After that date, the grade will be determined by the student's current average, and a WF or WP assigned as appropriate. Note, as stated above, that withdrawal from CSE 4317 Senior Design 2 will necessitate repeat of Senior Design 1 as well as Senior Design 2.

**Drop Policy:**

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

# 3 Ethics, Conduct, and Special Accomodations

**Academic Integrity:**

Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

- I pledge, on my honor, to uphold UT Arlingtons tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
- I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents Rule 50101, 2.2, suspected violations of universitys standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the students suspension or expulsion from the University.

**Ethics:**

As your instructor, I expect you to be completely honest. Industry experience proves that many projects, and even businesses, have failed due to the dishonesty and poor ethical behavior of individuals and/or groups of individuals. As a result, I will not tolerate any hint of dishonesty among my students. The UTA College of Engineering ethics policy will be strictly enforced. One of the ABET outcomes involves ethical behavior. This means that you should not do anything that raises any question of violating our ethics policy. This includes, but is not limited to, the following:

**Cheating:** This includes looking at others' tests, attempts to communicate with others during an exam, use of unauthorized reference materials, etc.

**Plagiarism:** Copying of code or assignments, or failure to acknowledge the actual sources of information in a paper. Copying anothers code also constitutes plagiarism.

**Collusion:** Sharing code or assignments with another student, even temporarily.

All cases of suspected academic dishonesty will be dealt with appropriately: because of the effect on the academic community, all cases of suspected academic dishonesty will be referred to the Vice President for Student Affairs for disposition. Punishment may result in failure of the individual assignment or exam, failure of the course, or expulsion from the university. Last, but not least, if you are aware of academic dishonesty, you should report it to me. I regard knowing about cheating and not doing anything about it the same as being academically dishonest yourself.

**Class Conduct:**

It is important that you refrain from disrupting the class with discussions with your fellow students; you can talk with them after class. Bottom line: unless otherwise specifically encouraged, as in a class exercise or open discussion session, if you're not talking with the instructor, don't talk.

Any disruptive behavior that continues after the instructor has warned against this behavior will result in expulsion from the classroom. If you have a laptop/portable computer, you may not use it for anything other than note-taking during classroom lectures and lab sessions. If I suspect that you are using it to do your email, chat, play games, or any other such activity, I will ask you to turn it off. If you are running late, do not skip class to avoid coming in late. Simply enter the room as unobtrusively as possible. You will gain more information from attending the last five minutes of class in person than you will by skipping it. However, remember that being excessively late is considered to be the same as an unexcused absence when it comes time to grade.

**Lab Safety Training:**

Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

**Disabilities and Special Accommodations:**

> If you require an accommodation based on disability, please see me in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated. If you need to take exams at the ARC, you must schedule them to overlap with the normal exam time. You may not take the exam before or after the normal exam time except under extremely exceptional circumstances. Please note that this will require you to schedule exams as soon as they are announced.

**Americans with Disabilities Act:**

> The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:**

> The University of Texas at Arlington is committed to upholding U.S. Federal Law Title IX such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit http://www.uta.edu/titleIX.

# 4 Student Services and Emergency Procedures

**Student Feedback Survey:**

At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

**Final Review Week:**

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:**

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located to the left down the hallway. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Student Support Services:**

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/resources.

# 5   Tentative Class Schedule

| Class | Date | Readings | Lecture Topics | Assignments |
|---|---|---|---|---|
| | | | **CSE 4316 - Senior Design I**<br>Fall Semester 2014 - TTh 9:30 - 10:50, F 10:00 - 10:50 | |
| 1 | 08/21 | | Getting Organized | |
| 2 | 08/22 | | Getting Organized | |
| 3 | 08/26 | Ch 12 | Building a Team | |
| 4 | 08/28 | Ch 13 | Building a Team | Homework 1 due |
| 5 | 08/29 | | Lessons from previous projects | |
| 6 | 09/02 | Ch 7 | Building a Plan | Team Proposals due |
| 7 | 09/04 | | Building a Plan | |
| 8 | 09/05 | | Individual and Team Assessments | Individual Assessments due |
| 9 | 09/09 | Ch 8, 9 | Estimating | |
| 10 | 09/11 | | Estimating | |
| 11 | 09/12 | | Team Status Reports | Interim Individual Report due |
| 12 | 09/16 | | Earned Value | |
| 13 | 09/18 | | Earned Value | |
| 14 | 09/19 | | Engineering Notebook and MS Project Tutorial | |
| 15 | 09/23 | Ch 3, 4 | Classic Mistakes | |
| 16 | 09/25 | | Classic Mistakes | |
| 17 | 09/26 | | Team Status Reports | Team Status Report due |
| 18 | 09/30 | Ch 5 | Risk Management | |
| 19 | 10/02 | | Risk Management | |
| 20 | 10/03 | | Open Lab Day | Engineering Notebook due |
| 21 | 10/07 | Ch 14 | Feature Set Control | |
| 22 | 10/09 | | Feature Set Control | SRD Draft due |
| 23 | 10/10 | | Engineering Notebook Review | Notebook and Individual Status Report due |
| 24 | 10/14 | Ch 16 | Project Recovery | |
| 25 | 10/16 | | Project Recovery | Charter & Project Plans due |
| 26 | 10/17 | | Team Status Reports | Engineering Notebook due |
| 27 | 10/21 | | Charter Reviews | |
| 28 | 10/23 | | Charter Reviews | |
| 29 | 10/24 | | Charter Reviews | Individual Status Report due |
| 30 | 10/28 | | SRD Gate Reviews | |
| 31 | 10/30 | | SRD Gate Reviews | |
| 32 | 10/31 | | SRD Gate Reviews | Engineering Notebook due |
| 33 | 11/04 | | SRD Gate Reviews | |
| 34 | 11/06 | | SRD Gate Reviews | |
| 35 | 11/07 | | SRD Gate Reviews | Individual Status Report due |
| 36 | 11/11 | Ch 15 | System Architecture | |
| 37 | 11/ 13 | | System Architecture | |
| 38 | 11/14 | | Team Status Reports | Team Status Report and Notebook due |
| 39 | 11/18 | | System Architecture | |
| 40 | 11/20 | | System Architecture | |
| 41 | 11/21 | | Architecture Discussion | |
| 42 | 11/25 | | System Architecture | |
| | *11/27 - 11/28* | | *Thanksgiving Holiday* | |
| 43 | 12/02 | | Wrap-up and Peer Evaluations | Baseline Plan and ADS draft due |
| | *TBD* | | Attend SD II Presentations | |
| 44 | TBD | | **Final Exam / Architecture Review** | |

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[2]All information is tentative and subject to change.