

## CptS 421 - Software Design Project I

### **Course Information:**

CptS 421 Software Design Project I - Fall 2014

3 credit hours

Prerequisites: CptS 323, certified major in Computer Science, Computer Engineering, or Electrical Engineering.

### **Homepage:**

The home page for this course is hosted at the WSU, EECS Socialcast platform.

<https://eecs-wsu-edu.socialcast.com/>

You need an EECS email (e.g. [username@eecs.wsu.edu](mailto:username@eecs.wsu.edu)) to join Socialcast.

### **Class Meeting Times:**

We will meet as a class only a few times in CptS 421. The first class will take place on Tuesday August 26<sup>th</sup> at 13:25 PM in Sloan 233. The schedule for other classes will be announced later by the instructor. The instructor will also meet with each individual team weekly during the semester. The team mentors will join these meeting through conference calls.

### **Meeting Locations:**

The room EME 107 will be used by the CptS 421 Senior Design teams. Weekly meetings with individual project teams will take place either in EME 107 or the instructor's office (EME 102D).

### **Instructor:**

Name: Sakire Arslan Ay

Office: EME 102D

Telephone: (509)335-4089

E-mail: [arslanay@eecs.wsu.edu](mailto:arslanay@eecs.wsu.edu)

Office Hours: Tu/Th 10am-12noon

### **Text Book:**

There is no required textbook for CptS421. The **recommended** textbooks/references are:

- [Object Oriented Software Engineering Using UML, Patterns and Java](#), 3<sup>rd</sup> Edition, by Bernd Bruegge and Allen H. Dutoit, Prentice Hall, 2010.
- [Software Engineering: A Practitioner's Approach](#), 6<sup>th</sup> edition, by R. Pressman, McGraw Hill, 2005.
- IEEE Standards for Software Engineering

### **Course Overview:**

Senior design courses allow senior-level students to integrate their software engineering knowledge and produce a useful engineering artifact. Students practice major activities in software development process, including communication, planning, modeling and design, construction, and deployment. It serves as a final preparation for students entering into industry. Students get experience in working as teams, participating in project planning and scheduling, writing reports, giving presentations, and dealing with uncertainties in a professional manner.

This is a two-semester senior design sequence. The first semester (CptS 421) is a three-credit course in which the design teams are formed; mentors are interviewed; and the design process and project development are started. A series of assignments are completed that results in written documents, audio/visual presentations, and an alpha prototype implementation. The second semester (CptS 423) is a three-credit course in which the latter phases of the project is documented, project design is completed and tested, and the final software product is presented to external constituencies such as industry representatives, other students, and faculty in general.

### **Student Learning Outcomes:**

In CptS 421/423, students will engage in projects that require them to perform all steps in the software development lifecycle. Outcomes of instruction include:

- experience in large-scale software development;
- communication with clients and other stakeholders;
- gathering of project requirements;
- designing of software according to requirements;
- implementing the design;
- performing adequate verification, validation, and testing procedures;

- delivering a professional quality software that meets the client's requirements;
- writing product specifications, documenting different phases of the project;
- using software development and maintenance tools
- planning and developing project timelines;
- demonstrating an awareness of professional responsibilities;
- negotiating team dynamics;
- making presentations, using audio/visual tools, at different stages of the project.

### **Teams:**

Teams will initially consist of 3 to 5 students and the team will receive their primary technical guidance from a mentor provided by a sponsoring company. It is important that you are placed onto a project that will utilize your unique engineering skills. Similarly, it is important that you have engineering skills to bring to your team.

*Evaluation of Student Work:* Both team *process* and subsequent products will be evaluated. Process and products will be evaluated based on the team's abilities to:

1. Elicit and analyze project requirements and develop the requirements specification and analysis documents.
2. Propose a design for the software, and clearly identify the design goals.
3. Develop the software architecture, and identify the major subsystems in the architecture.
4. Clearly articulate the design of each subsystem after a thorough exploration of multiple solution paths.
5. Narrow down design choices in ways that refine concepts and lead to focusing on the most promising design solutions.
6. Analyze the proposed design for compliance with design goals.
7. Communicate in an organized and professional manner with multiple audiences.

*Yellow Slip:* Students in CptS421 must demonstrate competency at 1) functioning within teams and 2) understanding professional and ethical responsibilities. The yellow slip is a way for team members to draw the instructor's attention to a member who exhibits behavior that contradicts these competencies. Until semester grades are submitted to the WSU Registrar, students can issue a "yellow slip" to a team member and email it to the instructor. The result of a yellow slip can be severe enough to change the letter grade. Please see the yellow slip form posted at Socialcast.

### **Student Work Load for CptS 421:**

CptS 421 is a 3-credit course. The 3-credit designation normally implies that on average the student is expected to spend 3hrs ("lectures") + 6hrs ("homework") = 9 hours per week working on this course. The 9 hours per week will be spent in the following activities: 1) meeting with the instructor ; 2) meeting with the team, mentor, and faculty resource person; 3) completing writing/presentation assignments; 5) reading the technical literature related to your design project; 6) attending the sponsor company visits arranged by your mentor; 7) strengthening your teaming skills; 8) helping with project management; 9) engaging in the design process; 10) organizing team headquarters including obtaining pertinent hardware and software; 11) planning for and obtaining approval for a preliminary description of the demonstration prototype;

There would be four writing assignments and two presentation assignments in CptS 421. Please see Appendix A for a complete list of assignments. Much of the implementation work will be completed in Cpts 423; however, teams are expected to make significant progress on their design during CptS 421. Each team should develop a prototype of the software with basic features and present a design review to the team mentor.

### **Weekly Review Meetings:**

Each team will meet once a week with the instructor and the project mentor, where all team members will report the progress for the past week and present the plan for the upcoming week. Each team member will prepare 1 or 2 slides summarizing their progress and plan. The team liaisons should upload the slides onto Socialcast as a single file (both Power Point and PDF files are fine). The instructor will evaluate and grade the progress within the past week based on the weekly meeting presentations and the activity at Socialcast. If a team member cannot attend due to a valid excuse, she should notify the instructor and the team members and report his/her progress on Socialcast. Skipping a meeting without notification will result in a score of "0" for weekly evaluation. Students with more than three unexcused absence in weekly meetings will receive a course grade of "F".

For some teams we may occasionally skip weekly meetings. If so, you will report your progress for the weeks since your last meeting. For all the weeks you covered in your progress report you will be given the same score.

In addition to the weekly meetings, each team should meet at least once a week.

*Miscellaneous Advice:* The most successful CptS421/423 teams schedule face-to-face team meetings at least on a weekly basis and they insist on 100% team attendance at these meetings.

**Grading:**

All CptS421 material will be graded based on a scale from 1 to 5. “Score 5” means your work satisfies all the expectations. Above 5 is to recognize exceptional work. Extra credit will be given up to 0.5 points.

All graded items (including writing assignments, presentations, demonstrations, meeting reports) will be evaluated using rubrics, which would be available at the Socialcast course page. Students should use the appropriate rubric to guide their work.

**Weighting of Graded Components:**

1. <u>Writing</u> Assignment #1: Project Description and Clarification.....	10 % (Team Grade Pass/Fail)
2. <u>Writing</u> Assignment #2: Project Requirements and Technical Specifications.....	17 % (Team Grade)
3. <u>Writing</u> Assignment #3: Solution Approach .....	20 % (Team Grade)
4. <u>Presentation</u> #1: Design Review .....	3 % (Individual Grade)
5. <u>Writing</u> Assignment #4: Report of Alpha Prototype Results .....	20 % (Team Grade)
6. <u>Presentation</u> #2: Alpha Prototype Presentation to Mentor .....	10 % (Individual Grade)
7. Weekly Progress Evaluations by the Instructor.....	17 % (Individual Grade)
8. Peer Evaluations .....	3 % (Individual Grade)
	100 %

**Letter Grades:**

Total Score	Total Score Percentage	Letter Grade
4.65-5.00	93% - 110%	A
4.50-4.65	90% - 93%	A-
4.30-4.50	86% - 90%	B+
4.15-4.30	83% - 86%	B
4.00-4.15	80% - 83%	B-
3.80-4.00	76% - 80%	C+
3.65-3.80	73% - 76%	C
3.50-3.65	70% - 73%	C-
3.30-3.50	66% - 70%	D+
3.00-3.30	60% - 66%	D
0.00-3.00	0% - 60%	F

**Team vs. Individual Performance:** Each team member is expected to carry their own weight. If they do, all team members will get the same grade. However, I will be looking “into” the teams to see if some students are underperforming; if so, they will get lower scores than their teammates. Similarly, excellent work can be rewarded by providing higher grades.

**Socialcast Platform:**

We will use the Socialcast enterprise social networking platform for easy communication between the instructor, students, and mentors. In addition, all course material (instructor prompts and student work) will be posted and managed on Socialcast. The instructor will communicate with the class primarily via announcements posted at the Socialcast course group page. Each individual team will also have a private group on Socialcast, where members of that team can discuss their ideas and ask questions to their mentor. The instructor and the industry mentor will peer in and monitor the team’s progress through the team’s Socialcast stream.

**Email Address:**

For the duration of CptS 421/423, your email address will appear on professional correspondence that will be circulated at the sponsoring company. Please use only professional sounding email addresses (e.g. your EECS address).

**EECS Faculty and Graduate Student Resource Persons:**

Each team is encouraged to have a volunteer EECS faculty resource person. This volunteer’s time commitment to the project will normally be small compared to the sponsoring mentor’s time commitment. After teams are formed, pick a

EECS faculty that can consult your project. Please introduce your team to your faculty resource person and, inform the instructor. If you can't find a faculty resource person, send an email to the instructor.

Graduate student resource persons are also invited to participate and their contributions to the design process will be similar to the faculty resource person's contributions.

**Protecting Intellectual Property (IP):**

Teams have an obligation to protect IP they develop and IP that the mentor and sponsor share with them. WSU employees, including faculty, staff and graduate students are legally bound to protect intellectual property. Do not post IP at non-password-protected websites. Questions about IP should be directed to your mentor or directed to WSU attorneys trained in IP issues. Similar comments apply to information that government and military entities label as "sensitive" or "classified". Ask the instructor if you need contact information for WSU professionals working with these issues.

**Academic Integrity:**

Academic integrity will be strongly enforced in this course. All work submitted for grading is to be original. Material submitted that is not original must be cited as described in technical writing text books. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions."

**Students with Disabilities:**

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus:

Pullman or WSU Online: 509-335-3417

<http://accesscenter.wsu.edu>, [Access.Center@wsu.edu](mailto:Access.Center@wsu.edu)

**Campus Safety:**

Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.

## Appendix –A : ASSIGNMENTS

Assignment Generic Name	Assignment Descriptor	Tentative Deadline	Average number of pages	Terse summary of the assignment:
Writing Assignment 1	Project Description and Clarification	Sep 26	2 pages + appendices and images as needed	Within 2 pages give an overview of your project and provide a literature review. Show that your team understands the problem that your project will address. Identify your clients and stakeholders and briefly summarize their needs.
Writing Assignment 2	Project Requirements and Technical Specifications	draft – Oct 10 1st revision –Nov 17 2nd revision – Jan 26*	3 pages + appendices and images as needed	Within 3+ pages summarize the project requirements. You should focus on what your project should do rather than how it should do it. Perform requirements analysis (i.e. gather, analyze and record the project requirements). Explain how these requirements will be met in your project and identify the target technical specifications.
Writing Assignment 3	Solution Approach	draft – Oct 31 1st revision – Nov 17 2nd revision – Jan 26*	5 pages + appendices and images as needed	Within 5+ pages, describe how the project requirements were used to generate a design for your software. Explain the architecture that you built and provide an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design. Clearly outline all parts of the software and how they work. If you are planning to adopt any design patterns, briefly explain how you would utilize them in your software.
Presentation Assignment 1	Design Review (in class)	Nov 18	< 15 slides (~15 minutes)	With no more than 15 slides, present your project and describe your design.
Presentation Assignment 2	Design Review and Prototype Demonstration to Mentor	Dec 1 through Dec 12	25 slides (~30 minutes)	Present your design and prototype to your mentor and discuss your preliminary results. You will supplement the demonstration with presentation slides.
Writing Assignment 4	Report of Alpha Prototype	Dec 12	5 pages + appendices and images as needed	Within 5+ pages provide a detailed description of the prototype system you developed. Briefly describe how you tested your prototype system. Explain the modifications or revisions that you made on your design after testing. Include a summary of your prototype presentation to your project mentor.

\* Second revisions for Requirements Specifications and Solution Approach documents will be done in CptS 423 (spring semester)