CS8313 Object-Oriented Analysis & Design

1. Instructor Information

Dr. LiGuo Huang

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Office: Caruth Hall 421
Office Hours: to be announced in class
Email communication: I strive to respond to course-related emails within 24 hours on weekdays. Inevitably I may overlook some messages; if more than 24 hours has passed during the week days, feel free to send me a reminder.

2. Course Description

Explicit focus on design and analysis issues has shown tremendous potential to improve the current state-of-the-art in software development and alleviate many of its problems. Object-oriented analysis and design is essential in developing high-quality object-oriented and service-oriented software systems. CS8313 provides an overview of object-oriented analysis and design by integrating the work of Booch, Rumbaugh, Jacobson and Wirfs-Brock, which includes use-case analysis, responsibility-driven design, object modeling, entity-relationship modeling and the design notation of the Unified Modeling Language (UML). This course also introduces various design patterns widely reusable in object-oriented as well as in service-oriented software system development. CS8313 can be considered as a good companion course of the required software engineering track course CS5/7319 (Software Architecture and Design), while it specifically addresses the “low-level” software design and modulation.

This course assumes that you have a good background in software technology such as data structures and programming languages (Java, C++, etc.), and concentrates on the object-oriented software design issues. A few homework assignments require simple Java programming skills. However, there is no specific pre-requisite required for enrollment. CS8313 will be organized as a research seminar, with active student participation. This course attempts to enhance the advanced research and practice component in the SMU’s software engineering program. It is particularly suited for students interested in pursuing a Ph.D. degree or Doctor of Engineering in software engineering/computer science/other engineering disciplines, and for MS/SE students who want to get a firsthand knowledge and cutting-edge techniques of the software design research and practice affecting their field of study and work. It comprises the core curriculum of SMU Master of Science majoring in Software Engineering.

3. Course Topics

The course covers the following topics on software design:

- An overview of basic concepts of object-oriented design and analysis
- Introduction to basic design principles and UML
- Software modulation
- Design Patterns

4. SACS Learning Outcomes:

- SACS (III) ability to analyze and solve problems
5. **Selected Student Learning Outcomes**

- understand and apply key concepts of object-oriented design and analysis
- understand roles of software design in software engineering process
- master software design patterns
- identify key design problems and select the optimal design
- recognize and apply software system design and modeling techniques
- implement software system based on design

6. **Textbooks and Course Material**

- **Required:** Lecture notes and papers
- **Required:** Erich Gamma, Richard Helm, Ralph Johnson, John M. Vlissides, Design Patterns: Elements of Reusable Object Oriented Software, Addison Wesley. *(DP)*

7. **Workload and Grading**

The course grade each student receives will reflect the weighted average of 3-4 homework assignments, two exams, a paper outline and final paper with student in-class presentations.

**The tentative weights of assignment grading are as follows (Please note that the weights may be subject to change.):**

- Homework (36%)
- Final Paper and Presentation (24%)
- Exam 1 (20%)
- Exam 2 (20%)

Homework and Term Paper/Project assignments will be posted on the course webpage and submitted onto Canvas. Exams must be submitted in hardcopy. Grades for course assignments (i.e., homework, term paper/project, exams) will be posted on Canvas. Final letter grades will be based on the curve (grade distribution) of the entire class and posted on my.smu.

**Final Paper:**

Please refer to **Final Research Paper Guideline** for details.

**Assignment Submission:** Please put your Name, SMU ID, Class Section #, Email Address on your title page. In addition, Canvas tends to become slow or unavailable right before the deadline time (depends on your connection speed and traffic to Canvas system). **We will not be able to help you if you cannot get your assignment in on time, so submit early. It is you own risk to submit right before the deadline time.**

- On-campus students: Homework is due by 11:59pm on the specified due date for on-campus students, unless otherwise noticed.
- Off-campus students: Homework is due by 11:59pm on the specified due date for off-campus students, unless otherwise noticed.

**Late Assignment Submission Policy:** Late homework will receive a 25% penalty per day. In case of emergencies, please talk to me to make special arrangements. If you are out of town for a non-emergency (e.g., an interview), you should arrange to turn in the assignment early, rather than late, to avoid a penalty.
Collaboration and Attribution: Collaboration is an essential skill for software engineering. I encourage student collaboration on discussing and studying the course materials. **Please do not, however, share answers, code, designs that solve an assignment directly with other students.** Solutions to homework should be written or typed from scratch and must not be pieced together from other students.

8. Class Attendance and Participation Policy

On campus students: I expect all on-campus students to attend classes and participate in class discussions. I understand that occasionally circumstances may arise to prevent you from attending class. This is fine, but I would appreciate if you send me an email in advance letting me know the reason that you won’t be able to attend class. Chronically missing class is not acceptable, and I reserve the right to penalize the course grade in the event of persistent absence.

Off campus students: I expect all off-campus students to first watch the class video for the latest course announcements and lectures before delivering your questions. If questions asked have been clearly announced or addressed in the lecture video, I reserve the right to penalize the course grade due to the missing class attendance.

9. University Policies

Academic Dishonesty. Academic dishonesty may be defined broadly as a student's misrepresentation of his or her academic work or of the circumstances under which the work is done. This includes plagiarism in all papers, projects, take-home exams, or any other assignments in which the student represents work as being his or her own. It also includes cheating on examinations, unauthorized access to test materials, and aiding another student to cheat or participate in an act of academic dishonesty. Failure to prevent cheating by another may be considered as participation in the dishonest act.

Honor Code. Intellectual integrity and academic honesty are fundamental to the processes of learning and evaluating academic performance; maintaining them is the responsibility of all members of an educational institution. The inculcation of personal standards of honesty and integrity is a goal of education in all the disciplines of the University. The faculty has the responsibility of encouraging and maintaining an atmosphere of academic honesty by being certain that students are aware of the value of it, that they understand the regulations defining it, and that they know the penalties for departing from it. The faculty should, as far as is reasonably possible, assist students in avoiding the temptation to cheat. Faculty must be aware that permitting dishonesty is not open to personal choice. A professor or instructor who is unwilling to act upon offenses is an accessory with the student offender in deteriorating the integrity of the University. Students must share the responsibility for creating and maintaining an atmosphere of academic honesty. Students should be aware that personal experience in completing assigned work is essential to learning. Permitting others to prepare their work, using published or unpublished summaries as a substitute for studying required materials, or giving or receiving unauthorized assistance in the preparation of work to be submitted are directly contrary to the honest process of learning. Students who are aware that others in a course are cheating or otherwise acting dishonestly have the responsibility to inform the professor and/or bring an accusation to the Honor Council. Students and faculty must mutually share the knowledge that any dishonest practices permitted will make it more difficult for the honest students to be evaluated and graded fairly, and will damage the integrity of the whole University. Students should recognize that their own interest, and their integrity as individuals, suffer if they condone dishonesty in others.

The Honor System. All undergraduate students at SMU are under the jurisdiction of the Honor Code, and as such will be required to sign a pledge to uphold the Honor Code. The Honor Council is composed of 22 students appointed by the Student Senate to represent the undergraduate schools and classes of the University. The Council’s responsibility is to maintain and promote academic honesty. Students are required to warn or to report to the Honor Council or faculty any student suspected of violating the Honor Code, and to inform the instructor of a course in which violations are suspected that he or she may not be achieving an atmosphere conducive to
academic honesty. Suspected violations reported to the Honor Council by a student or by an instructor will be investigated and, if the evidence warrants it, a hearing will be held by a Board composed of five members of the Honor Council. Suspected cases of academic dishonesty may be either handled privately by the appropriate faculty member in whose class the alleged infraction occurred, or referred to the Honor Council. Appeals of actions by the Honor Council shall be submitted to the All-University Judicial Council in writing no later than three class days after the hearing. Appeals of actions taken by instructors independently of the Honor Council may be made through the traditional academic routes.

**Disability Accommodations:** Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit [http://www.smu.edu/Provost/SASP/DASS](http://www.smu.edu/Provost/SASP/DASS) to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal DASS Link and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

**Religious Observance:** Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. ([https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays](https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays)).

**Excused Absences for University Extracurricular Activities:** Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See [2020-2021 SMU Undergraduate Catalog](https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays) under “Enrollment and Academic Records/Excused Absences.”)

10. **Disclaimer**

Please note that this syllabus is subject to change based on the learning progress in class during the semester.