

CSE 5324 - Software Engineering: Analysis, Design, and Testing

Spring 2015

1 Instructor

- Christoph Csallner
- Office Number: ERB 554 (in the Engineering Research Building)
- Office Telephone Number: 817-272-3334
- Email Address: csallner@uta.edu
- Faculty Profile: <https://www.uta.edu/mentis/public/#profile/profile/view/id/2395/>
- Faculty Web Site: <http://ranger.uta.edu/~csallner/>
- Office Hours: Monday and Wednesday, 2:45 pm - 3:45 pm

2 Section Information

- CSE 5324, Section 001
- Class Web Site: [https://wiki.uta.edu/display/serc/CSE+5324+\(Spring+2015\)](https://wiki.uta.edu/display/serc/CSE+5324+(Spring+2015))

3 Time and Place of Class Meetings

- Time: Monday and Wednesday, 5:30 pm - 6:50 pm
- Location: ERB 103 (in the Engineering Research Building)

4 Description of Course Content from Course Catalog

Motivations, principles, and goals of software engineering; technical aspects of software projects, including: review of structured analysis and structured design, emphasis on object-oriented methods of requirements analysis and specification, design, and implementation; software testing concepts; team project.

5 Student Learning Outcomes

Students will be able to create, explain, and critique software products. In order to reach these outcomes, students will

- specify, design, implement, and test an object-oriented application
- present deliverables
- review deliverables of other teams

For each of the above tasks, students will use a language, tool, or technique that is being widely used in industry, i.e.,

- the Unified Modelling Language, including use-case, sequence, and class diagrams
- the programming language Java
- the integrated development environment Eclipse
- the test automation framework JUnit

6 Required Textbooks and Other Course Materials

Required:

1. Craig Larman: Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development. 3rd edition. Prentice Hall, 2004. Available on the UTA network at <http://proquestcombo.safaribooksonline.com.ezproxy.uta.edu/0131489062>
2. James Gosling, Bill Joy, Guy Steele, and Gilad Bracha: Java Language Specification. 3rd edition. Addison Wesley, 2005. Also available online at <http://docs.oracle.com/javase/specs/>

Recommended:

1. David Kung: Object-Oriented Software Engineering: An Agile Unified Methodology. McGraw-Hill, 2013.
2. Barbara Liskov and John Guttag: Program Development in Java: Abstraction, Specification, and Object-Oriented Design. Addison Wesley, 2001.
3. Steve McConnell: Code Complete: A Practical Handbook of Software Construction. 2nd edition. Microsoft Press, 2004.
4. Shari Lawrence Pfleeger and Joanne M. Atlee: Software Engineering: Theory and Practice. 4th edition. Prentice Hall, 2009.
5. Hans van Vliet: Software Engineering: Principles and Practice. 3rd edition. John Wiley & Sons, 2008.
6. Frederick P. Brooks: The Mythical Man-Month: Essays on Software Engineering. 2nd edition. Addison-Wesley, 1995.
7. Kenneth H. Rosen: Discrete Mathematics and its Applications. 6th edition. McGraw-Hill, 2007.
8. Bertrand Meyer: Object-Oriented Software Construction. 2nd edition. Prentice Hall, 2000.
9. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides: Design Patterns: Elements of Reusable Object-Oriented Software. Addison-Wesley, 1995.
10. Joshua Bloch: Effective Java. 2nd edition. Prentice Hall, 2008.
11. Grady Booch, James Rumbaugh, and Ivar Jacobson: The Unified Modeling Language User Guide. 2nd edition. Addison-Wesley, 2005. Available on the UTA network at <http://proquestcombo.safaribooksonline.com.ezproxy.uta.edu/0321267974>

7 Descriptions of Major Assignments and Examinations

Following is the tentative outline. I will announce concrete dates in class.

- Homework: Throughout the course.
- Quizzes: Throughout the course.
- Project: Throughout the course.

8 Attendance

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 have decided that attendance at class meetings is not required but strongly encouraged.

9 Other Requirements

Student team meetings in addition to regular class meetings, as scheduled by the team members.

Prerequisites:

- Undergraduate algorithms and data structures.
- Undergraduate discrete mathematics (set, relation, function, graph) and first-order logic.
- Undergraduate programming in Java or a similar language.

10 Grading

- 10% homework
- 20% quizzes
- 10% class participation, such as asking and answering questions
- 30% project specifications, designs, code, tests, reports, etc. (written)
- 10% project reviews (written)
- 20% project presentations (oral)

10.1 Grade Distribution

A from 85%, B from 70%, C from 60%, D from 50%, else F.

10.2 Deadline for Homework and Written Project Deliverables

Monday at 9am. The concrete dates will be announced in class.

10.3 Late Policy

Late submissions will be accepted until we discuss results. For being late up to one day the penalty is 10%, for up to two days it is 20%, etc.

10.4 Homework

Goal: Individually practice using a tool that will later be used in the project.

We will have two or three homework assignments. Each will focus on applying a software engineering tool discussed in class. I will provide instructions on how to use the tools.

10.5 Quizzes

Goal: Learn basic software engineering techniques and principles that should later be applied in the project.

Quizzes will be announced in class one week in advance. Each quiz will take place in the first 20 minutes of class. Quizzes are closed-book, but you can use a one-page cheat sheet that you have written yourself.

10.6 Project

Goal: Create, explain, and critique software products.

This is a team project. A team consists of three to five students. To make collaboration as easy as possible, I encourage (but not require) you to use a free open-source project hosting service such as Google Code, GitHub, or Bitbucket.

The project consists of, most likely, three iterations. After each iteration, each team will present some aspects of their project, both in writing and by oral presentation.

After each iteration, you will formally review the deliverables of another team. Each review should be probing but always constructive and helpful. To facilitate this review, you will submit your written project deliverables to both me and your review team, by the due date of the respective deliverables.

You should distribute project work fairly among yourselves, but I leave the detailed project management to you. The oral presentations are an exception. Here I expect that each team member presents a similar amount of material.

For each project-related deliverable, written or oral, each team will receive a team score. The sum of these team scores will determine the majority of your project-related grade. In addition, for the entire project, each team member will receive an overall individual score. The individual score is derived from peer evaluations, your feedback to other teams during presentations, and your handling of questions.

For the deliverables, I will use the following general grading guidelines, which I copied from Professor Kung.

- 100–90: The proposed solution is adequate and valid and significantly exceeds expectations, the solution is well-organized and clearly described, assumptions are clearly stated.
- 89–80: The proposed solution is definitely adequate and valid, the solution is organized and described, assumptions are stated.
- 79–70: The proposed solution is somewhat adequate and valid, the solution is somewhat organized and partially described, some but not all assumptions are stated.
- 69–60: The proposed solution is only marginally adequate or valid, the solution is poorly organized or difficult to understand, important assumptions are not stated.
- 59–0: The proposed solution is incorrect or far from adequate and valid, the solution is impossible to comprehend.

10.7 Extra Credit: Tool Presentation

Goal: Teach your fellow students how to use a software engineering tool. The tool should be useful for the project or a related software engineering problem.

Pick a software engineering tool and explain how to use it step by step. To provide a better understanding of the tool, you should also explain the basic principles the tool is built on. You may add a comparison with related tools. You should also provide a hand-out that gives detailed

instructions on how to use the tool. After your presentation, email me your hand-out (mandatory) and slides (optional). I will post them online. You may also maintain this material elsewhere and just email me a link to it.

Since most of the tools can be used in the project, the presentations are most useful at the beginning of the semester. To encourage early presentations, the maximum amount of extra credit will be 5% after Spring Vacation but 10% before Spring Vacation.

I will provide a list of suitable tools, but I welcome any suggestions you may have. Following is the web site for the tool presentations: <https://wiki.uta.edu/display/serc/CSE-5324+Tools>

10.8 Format

All written deliverables (homework, hand-outs, project reports, etc.) should be in plain text, HTML, or PDF, unless I announce otherwise.

11 Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 9 hours per week of their own time in course-related activities, including work on the class project, reading required materials, completing assignments, preparing for exams, etc.

12 Make-up Exams

The university's graduate catalog lists the following kinds of excused absences.

- University authorized absences
- Absence for military service
- Observance of religious holy days

See the graduate catalog for details:

- <http://grad.pci.uta.edu/about/catalog/current/general/regulations/#absences>

13 Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current graduate catalog. See:

http://grad.pci.uta.edu/about/catalog/current/general/regulations/#grade_grievances

14 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://www.uta.edu/aao/fao/>).

15 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 <http://www.uta.edu/disability> or by calling the Office for Students with Disabilities at (817) 272-3364.

16 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 www.uta.edu/titleIX.

17 Academic Integrity

Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

“I pledge, on my honor, to uphold UT Arlington’s 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 university’s 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 student’s suspension or expulsion from the University.

18 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>.

19 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 student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's 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>.

20 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.

21 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 towards the left as you exit the room. 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 handicapped individuals.

22 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>.

23 Writing Center

The Writing Center, 411 Central Library, offers individual 40 minute sessions to review assignments, Quick Hits (5-10 minute quick answers to questions), and workshops on grammar and specific writing projects. Visit <https://uta.mywconline.com/> to register and make appointments. For hours, information about the writing workshops we offer, scheduling a classroom visit, and descriptions of the services we offer undergraduates, graduate students, and faculty members, please visit our website at www.uta.edu/owl/.

24 Course Schedule

1. Overview and motivation
2. Iterative process
3. Inception
4. Use-Cases
5. Fagan inspection and reviews
6. Domain models
7. Architecture
8. Static and dynamic design models
9. Grasp principles
10. Design by Contract
11. Overloading and overriding
12. Design patterns
13. Testing and debugging
14. Student team project presentations throughout the semester
15. Student team project final presentations in the last week of the semester

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

The latest version of this course schedule is available on the class web site.

25 About This Syllabus

This syllabus is based on the syllabus template and the “Tips for developing Student Learning Outcomes”, both provided by the provost (<http://www.uta.edu/provost/administrative-forms/index.php>).

26 Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911.