CSE 3311: Object-Oriented Software Engineering

Spring 2018

1 Instructor

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2 Section Information

- CSE 3311, Section 2

3 Time and Place of Class Meetings

- Time: Monday and Wednesday, 1:00 pm - 2:20 pm
- Location: TH 200 (in Trimble Hall)

4 Description of Course Content from Course Catalog

Study of an agile unified methodology and its application to object-oriented software development. Topics include requirements acquisition, use case derivation, modeling and design of interaction behavior and state behavior, introduction to design patterns, derivation of design class diagrams, implementation considerations, and deployment. Team project. Prerequisite: C or better in each of the following: CSE 1325 and CSE 2320, Co-requisite: CSE 3310.

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, for example, the Unified Modelling Language, including use-cases, sequence, and class diagrams.

6 Required Textbooks and Other Course Materials

Recommended:

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

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 but attendance is a critical indicator in student success. 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 established the following attendance policy. Since this is a 3000-level course, I do not plan to take attendance directly. But attendance contributes indirectly to the final grade. Specifically, final grade components include in-class quizzes, class participation such as asking and answering questions during class, and in-class project presentations.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course". UT Arlington instructors will report when students begin attendance in a course as part of the final grading process.

Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

9 Other Requirements

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

Prerequisites: See the Description of Course Content from Course Catalog Section above. Following are additional 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. To make collaboration as easy as possible, I encourage (but not require) you to to use a free open-source project hosting service such as 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.

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 (e.g.: "go to web page ABC, click D, click E, download F, perform steps G, H, I, etc."). It may be easier to follow such a step-by-step explanation if you show how the various steps affect a concrete example project such as your class project.

To provide a better understanding of the tool, you should also explain the basic principles the tool is built on. To further understand the value of the tool, it is helpful to also include a comparison with related tools that provide similar functionality.

It is mandatory that you provide a **"hand-out"** that gives detailed step-by-step instructions on how to use the tool. The hand-out can be a sheet of paper, but preferably you instead prepare a web site or blog post that contains this information.

Feel free to remove from your hand-out any personal information. To make your hand-out easily accessible to your peers and class mates **we will post your hand-out online**. If you maintain your hand-out online (e.g., in a blog), you may just provide a link to it.

If your presentation is good it will provide your class mates with useful, insightful, and actionable information that will help them in their class projects. So to your class mates your presentation will be most useful at the beginning of the semester and thus at the start of their class projects. To

encourage early presentations, the maximum amount of extra credit will be 5% after UTA's spring vacation, but 10% before that.

I will provide a list of suitable tools, but I welcome any suggestions you may have.

10.8 Format

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

11 Make-up Exams

The academic regulations of the university's undergraduate catalog list the following two kinds of authorized absences.

- University authorized absences
- Observance of religious holy days

See the undergraduate catalog for details:

- http://wweb.uta.edu/catalog/content/general/academic_regulations.aspx#9
- http://wweb.uta.edu/catalog/content/general/academic_regulations.aspx#10

12 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 project deliverables, reading required materials, completing assignments, preparing for exams, etc.

UTA's syllabus template states these expectations as follows: "A general rule of thumb is this: for every credit hour earned, a student should spend 3 hours per week working outside of class. Hence, a 3-credit course might have a minimum expectation of 9 hours of reading, study, etc."

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 University Catalog. See:

http://catalog.uta.edu/academicregulations/grades/#undergraduatetext

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://wweb.uta.edu/aao/fao/).

15 Disability Accommodations

UT 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), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act.* 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 disability.

Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364.

Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

16 Non-Discrimination Policy

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit www.uta.edu/eos.

17 Title IX Policy

The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act).

Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

18 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 in their courses by 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. Additional information is available at https://www.uta.edu/conduct/.

19 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.

20 Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/.

21 Student Feedback Survey

At the end of each term, students enrolled in face-to-face and online classes categorized as lecture, seminar, or laboratory are 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 via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit http://www.uta.edu/sfs.

22 Final Review Week

For semester-long courses, a period of five class days prior to the first day of final examination 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.

23 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 right 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 individuals with disabilities.

Also see: https://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_TH/Evac_TH_200.pdf

24 MavAlert System

Consider subscribing to the MavAlert system. MavAlert sends information in case of an emergency to cell phones or email accounts. Anyone can subscribe at https://mavalert.uta.edu/ or https://mavalert.uta.edu/register.php.

25 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/universitycollege/resources/index.php.

26 IDEAS Center

The IDEAS Center (Central Library, 2nd floor) offers **free** tutoring to all students with a focus on transfer students, sophomores, veterans, and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

27 English Writing Center (411LIBR)

The Writing Center Offers free tutoring in 20-, 40-, or 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Our hours are 9 am to 8 pm Mon.-Thurs., 9 am-3 pm Fri. and Noon-6 pm Sat. and Sun. Register and make appointments online

at http://uta.mywconline.com. Classroom Visits, workshops, and specialized services for graduate students are also available. Please see www.uta.edu/owl for detailed information on all our programs and services.

The Library's 2nd floor Academic Plaza offers students a central hub of support services, including the IDEAS Center, University Advising Services, Transfer UTA, and various college/school advising hours. Services are available during the librarys hours of operation. http://library.uta.edu/academic-plaza.

28 Course Schedule

1. Overview and motivation
2. Inception
3. Iterative process
4. Fagan inspection and reviews
5. Requirements
6. Use-Cases
7. Domain models
8. Static and dynamic design models
9. Architecture
10. Overloading and overriding
11. Grasp principles
12. Design by Contract
13. Design patterns
14. Inheritance vs. composition
15. Testing and debugging
16. Student project presentations throughout 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.

29 UTA Library

Following are some of the library's services. All library services can be found at library.uta.edu.

- Ask us: http://ask.uta.edu/
- Tutorials, including a brief intro to IEEE's style of citing sources: library.uta.edu/how-to
- Study room reservations: openroom.uta.edu/

30 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).

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. Non-emergency number 817-272-3381.