

CSE 4321: Software Testing and Maintenance
Summer 2018

Instructor(s): Jeff Lei

Office Number: ERB 531

Email Address: ylel@cse.uta.edu

Office Hours: 12:00 – 1:00pm, Mon and Wed

Section Information: 001

Time and Place of Class Meetings: 1:00 - 3:00pm, Mon, Tue, Wed, and Thu, NH 202

Description of Course Content:

Software testing and maintenance play a critical role in ensuring the quality, and thus success, of a software product. Software testing is one of the most widely used approaches to ensuring software quality, and often consumes more than 50% of the total cost of a software project. Software maintenance is key to provide continuity of service, and is mainly concerned with how to control and manage software changes and evolution after the major features are released.

This course is designed to cover the fundamental concepts, principles, methods, and techniques for performing effective software testing and maintenance. Examples of the topics to be covered include the notion of test adequacy, combinatorial testing, control flow testing, data flow testing, security testing, regression testing, code review, configuration management and software refactoring.

Student Learning Outcomes:

- Understand the significance of software quality assurance and the role of software testing and maintenance in ensuring software quality.
- Understand the concepts, principles, methods, and techniques for effective software testing and maintenance.
- Demonstrate the ability to apply the concepts, principles, methods and techniques that are covered in this course to solve software testing and maintenance problems.

Requirements:

CSE 3310: Fundamentals of Software Engineering. A good knowledge of data structure, algorithms, and software engineering is essential to follow the course material.

Textbooks and Other Course Materials (Strongly Recommended):

Textbook

- Paul Ammann and Jeff Offutt, Introduction to Software Testing, ISBN 978-1-107-17201-2, Cambridge University Press, 2016.

References

- Aditya P. Mathur, [Foundations of Software Testing](#) (2nd edition), ISBN 81-317-9476-8, Addison-Wesley Professional, 2014.
- David C. Kung, Object-Oriented Software Engineering, ISBN 978-0-07-337625-7, 2013.
- Martin Fowler, Refactoring: Improving the Design of Existing Code, ISBN 0-201-48567-2, Addison-Wesley, 1999.

- Penny Grubb and Armstrong A. Takang, *Software Maintenance: Concepts and Practice* (2nd Edition), ISBN 981-238-425-1, 2003.

Descriptions of major assignments and examinations:

There will be several homework assignments, two exams and a team project. The final exam will be comprehensive.

Attendance: Strongly encouraged. The instructor reserves the right to change this policy as needed.

Grading:

Tentatively, the final grade will be determined according to the following percentages:

Homework Assignments: 15%

Midterm Exam: 30%

Final Exam: 40%

Project: 15%

Make-up Exams: No make-up exam will be given.

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/>).

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 www.uta.edu/titleIX.

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 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.

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>.

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>.

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. The detailed evacuation map can be found at https://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_NH/Evac_NH_202.pdf. 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 www.uta.edu/resources.

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/.

Course Schedule

The following table shows the major topics that will be covered and the estimated number of lectures for each topic. These topics will be covered in the order as they appear in the table. *The instructor reserves the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.*

Topics	# of Lectures
Syllabus	1
Introduction to Software Testing	2
Input Space Partitioning	1.5
Combinatorial Testing	2
JUnit	1 ~ 2
Control Flow Testing	2
Data Flow Testing	1
Predicate Testing	3 ~ 4
Mutation Testing	1 ~ 2
Regression Testing	1 ~ 2
Test Data Generation	1
Security Testing	1 ~ 2
Overview of Software Maintenance	2
Version Control	1 ~ 2
Code Review	1
Refactoring	2 ~ 3

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