**CSE 5321:** Software Testing

Spring 2015

**Instructor(s):** Dr.John H Robb

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**Office Hours:** TR 11am-12 pm

**Section Information:** CSE 5321 Section 002

**Time and Place of Class Meetings:** TR 2-3:20 pm, PKH 102

**Description of Course Content:** Software testing is one of the most widely used approaches to detecting software bugs, and often consumes more than 50% of the cost of software development. Furthermore, software testing is a mentaldiscipline that helps developers to write quality code in the first place. Software testing knowledge andskills are at the core of the foundational knowledge and skills a software developer must master.

Study of software quality assurance, software testing process, methods, techniques and tools. Topics include formal review techniques, black box testing, white box testing, integration testing, acceptance testing, regression testing, performance testing, stress testing, and testing of object-oriented software.

**Student Learning Outcomes:** Understand the significance of software quality assurance and the role of software testing in ensuring software quality in the entire software lifecycle.

* Understand the concepts, principles, methods, and techniques for effective software testing.
* Be able to apply the methods and techniques that are covered in this course to perform effective software testing activities in practice.

For each of the above, students will use a language, tool, or technique that is being widely

used in industry, i.e. the:

* Programming language Java
* Integrated development environment Eclipse
* Test automation framework junit.

**Required Textbooks and Other Course Materials:**

1. David Kung, Object-Oriented Software Engineering: An Agile Unified Methodology (ISBN 9780073376257) – please make sure you have this version

Recommended (but not required):

1. Paul Ammann and Jeff Offutt, Introduction to Software Testing, ISBN 978-0-521-88038-1, Cambridge University Press, 2008.
2. Jeff Tian, Software Quality Engineering, ISBN 978-0-471-71345-6, Wiley-IEEE Computer Society Press; 2005
3. Rex Black, Erik van Veenendaal, Dorothy Graham, Foundations of Software Testing ISTQB Certification, ISBN 978-1-408-04405-6, Cengage Learning EMEA, 2012

**Descriptions of major assignments and examinations:** 20% homework, 25% mid-term, 25% final exam, and 30% project. The project is still in work but is expected to involve testing an application using two different test design techniques and comparing results. Projects will be presented in class. Final will be comprehensive. 5-6 homework assignments throughout the semester.

**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, students are expected to attend classes regularly.**

**Prerequisites:** Prerequisite: CSE 5324 or concurrent enrollment.

**Grading**: 20% homework, 25% mid-term, 25% final exam, and 30% project. The project is still in work but is expected to involve an Android applet and Java server program - developing UML class diagrams and use cases, requirements, design, code, test cases. Projects will be presented in class. Final will be comprehensive. 5-6 homework assignments throughout the semester.

A >= 85%, B >= 70%, C >= 60%, D >= 50%, F < 50%

**Deadline for Homework and Written Project Deliverables:** Deadlines will be announced in class.

**Late Policy/Make-up Exams**: Assignments are expected to be turned in on time. No make-up tests will be given.

**Homework** assignments will be given with at least one week notice and will be to reinforce tool use and deliverables. **Exams** are closed book and will be used to test knowledge of the class topics studied.

**Project** grading criteria is as follows:

Details will be announced during the semester. I expect these projects will be individual projects and geared toward helping you learn to design, develop, execute, and modify software tests.

For the deliverables, the following general grading guidelines will be used, which are copied from Professor Kung.

100-90: The project result is adequate and valid and significantly exceeds expectations, the solution is well-organized and clearly described, assumptions are clearly stated.

89-80: The project result is definitely adequate and valid, the solution is organized and described, assumptions are stated.

79-70: The project result is somewhat adequate and valid, the solution is somewhat organized and partially described, some but not all assumptions are stated.

69-60: The project result is only marginally adequate or valid, the solution is poorly organized or difficult to understand, important assumptions are not stated.

59-0: The project result is incorrect or far from adequate and valid, the solution is impossible to comprehend.

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

**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

**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/#gradegrievances>.

**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/>).

**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](http://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](http://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.

**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, 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.

**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](mailto:resources@uta.edu), or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Course Schedule**

1. Overview/motivation
2. Testing in the software life cycle
3. Software quality control and assurance
4. System engineering/use case development
5. Requirements development, coverage and traceability
6. Black box testing
7. Functional testing
8. Equivalence partitions/input partitions
9. Cause effect analysis
10. Control flow-based testing
11. Graph-based coverage criteria
12. White box testing
13. Data flow-based testing
14. Test driven development (Agile)
15. Use case testing
16. Object-oriented testing
17. Agile testing
18. Object state testing
19. Testing class hierarchy
20. Web-based applications
21. Test automation
22. Regression testing
23. Stress/robustness testing
24. Metrics (test related metrics, code coverage metrics, defect removal metrics)
25. Software Reliability

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 BlackBoard module for this course.

**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.

Library Home Page <http://www.uta.edu/library>

Subject Guides <http://libguides.uta.edu>

Subject Librarians <http://www.uta.edu/library/help/subject-librarians.php>

Database List <http://www.uta.edu/library/databases/index.php>

Course Reserves <http://pulse.uta.edu/vwebv/enterCourseReserve.do>

Library Tutorials <http://www.uta.edu/library/help/tutorials.php>

Connecting from Off- Campus <http://libguides.uta.edu/offcampus>

Ask A Librarian [http://ask.uta.edu](http://ask.uta.edu/)

The following URL houses a page where we have gathered many commonly used resources needed by students in online courses: <http://www.uta.edu/library/services/distance.php>.

The subject librarian for your area can work with you to build a customized course page to support your class if you wish. For examples, visit <http://libguides.uta.edu/os> and <http://libguides.uta.edu/pols2311fm> . If you have any questions, please feel free to contact Suzanne Beckett, at [sbeckett@uta.edu](mailto:sbeckett@uta.edu) or at 817.272.0923.