CSE 4321/CSE 5321: Software Testing
Spring 2017

Instructor(s): Dr. John H Robb

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Section Information: CSE 4321-002, CSE 5321-001

Time and Place of Class Meetings: T/Th 3:30-4:50pm, NH 112

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 mental discipline that helps developers to write quality code in the first place. Software testing knowledge and skills 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 (on reserve at Nedderman Hall):

1. David Kung, Object-Oriented Software Engineering: An Agile Unified Methodology (ISBN 9780073376257) – please make sure you have this version
2. Paul C Jorgensen, Software Testing: A Craftsman's Approach, Fourth Edition (ISBN: 1466560681)

Recommended (but not required):

1. Rex Black, Erik van Veenendaal, Dorothy Graham, Foundations of Software Testing ISTQB Certification, ISBN 978-1-408-04405-6, Cengage Learning EMEA, 2012

2. Jeff Tian, Software Quality Engineering, ISBN 978-0-471-71345-6, Wiley-IEEE Computer Society Press; 2005
3. Paul Ammann and Jeff Offutt, Introduction to Software Testing, ISBN 978-0-521-88038-1, Cambridge University Press, 2008.

Descriptions of major assignments and examinations: See grading below.

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 required to attend classes.** Attendance will be taken and used as indicated below.

Prerequisites: Prerequisite: for graduate students CSE 5324 or concurrent enrollment.

Grading: 40% homework, 55% quizzes, 5% attendance. 8 homework assignments throughout the semester. Five non-comprehensive quizzes (11% each).

The final letter grades will be based on a curve of students' performance.

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 unless arrangements are made prior to the test. Medical absences from a quiz require a doctor's note.

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 or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: 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.

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.

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/

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, or view the information at www.uta.edu/resources.

The IDEAS Center (2nd Floor of Central Library) 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.

Course Schedule (key dates in red are fixed, all else subject to change as needed)

Date	Lecture materials	Assign	Due	Review	Prep
1/17/2017	M01, Course Overview	HW 1			
1/19/2017	M03 (HW 1 due 1/24)				
1/24/2017	M02	HW 2	HW 1		
1/26/2017	M04			HW 1	
1/31/2017	M04 (HW 2 due 9/12)		HW 2		
2/2/2017	M05			HW 2	Quiz 1
2/7/2017	Quiz 1 (M01-M04)				
2/9/2017	M06a	HW 3		Quiz 1 scores	
2/14/2017	M06a				
2/16/2017	M06b		HW 3		
2/21/2017	M06b			HW 3	Quiz 2
2/23/2017	Quiz 2 (M05-M06a)				
2/28/2017	M06b,M07,M08			Quiz 2 scores	
3/2/2017	M09	HW 4			
3/7/2017	M09,M10				
3/9/2017	M10		HW 4		
3/14/2017	Spring Break (no class)				
3/16/2017	Spring Break (no class)				
3/21/2017	M11	HW 5		HW 4	Quiz 3
3/23/2017	Quiz 3 (M6b-M08)				
3/28/2017	M11		HW 5	Quiz 3 scores	
3/30/2017	M11,M12			HW 5	
4/4/2017	M12	HW 6			
4/6/2017	M12				Quiz 4
4/11/2017	Quiz 4 (M09-M11)				
4/13/2017	M13,M14		HW 6	Quiz 4 scores	
4/18/2017	M15	HW 7		HW 6	
4/20/2017	M16				
4/25/2017	M16		HW 7		
4/27/2017	M17	HW 8		HW 7	Quiz 5
5/2/2017	Quiz 5 (M12-M17)				
5/4/2017	Review Quiz 5/Discuss HW 8		HW 8	HW 8	

Course Material

Module	Description
M01	Introduction to Software Testing
M02	Software Requirements
M03	Black Box Testing Techniques (BVAs, ECPs, Decision Tables)
M04	Black Box Testing Techniques (State diagrams and tables)
M05	Black Box Testing Techniques (Sequence enumeration)
M06	Black Box Testing Techniques (Combinatorial testing, Use Case
M07	Requirements Traceability
M08	Graph Theory for Testers
M09	White Box Testing Techniques (Path testing, cyclomatic
M10	White Box Testing Techniques (Switches, Code coverage criteria)
M11	White Box Testing Techniques (Short-circuiting, loops, test design)
M12	White Box Testing Techniques (JUnit)
M13	White Box Testing Techniques (JaCoCo - code coverage tools)
M14	Unit/Integration Testing and EasyMock
M15	White Box Testing Techniques (Data Flow Testing)
M16	Mutation Testing
M17	Agile and Industry Case Studies
M18	Test Management and Test Best Practices
M19	Test Career and Test Certification
M20	Course Review

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

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 or at 817.272.0923.