

CSE 5382/4392: Secure Programming

Fall 2018

Syllabus – August 24, 2018

Instructor(s): Thomas Lawson "Trey" Jones, CISSP

Office Number: ERB 322

Office Telephone Number: 817-272-3785 (CSE Office). As an adjunct, I don't have a phone in my office. Contact me via email.

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Office Hours: Before and/or after class, as schedule permits, by appointment only. I try to arrive on campus on Fridays by 12:30 PM and am in the office until around 1:45 PM.

Section Information: CSE 5382-001

Time and Place of Class Meetings: NH 111, Fridays 2:00 PM to 4:50 PM

Description of Course Content: This course is an introduction to methods of secure software design and development for upper-level undergraduate students and graduate students. Students will learn about the major security problems found in software today. Using this knowledge, they will work in teams to find these bugs in software, fix the bugs, and design software so that it has fewer security problems. Static analysis tools will be a core part of the class, but students will also be exposed to black box testing tools. Topics will include input validation, buffer overflow prevention, error handling, web application issues, and XML. Prerequisites: CSE 3310 and CSE 3320, or equivalent.

Student Learning Outcomes: The student should understand the principles necessary to develop secure software within the larger context of System Security Engineering. In addition, the student will have the opportunity to apply their understanding of secure software development principles through the use of static code analysis (both manual and automated) as well as implementation and exploitation of vulnerabilities that are the result of poor programming practices.

Required Textbooks and Other Course Materials:

Secure Programming with Static Analysis

Paperback: 624 pages, (*Electronic versions also available*)

Publisher: Addison-Wesley Professional (July 9, 2007)

Language: English

ISBN-10: 0321424778

ISBN-13: 978-0321424778

Descriptions of major assignments and examinations: The course will consist of 3-4 examinations and 4-6 homework assignments and/or class project assignments. Some of the assignments will be performed individually and some potentially will be performed in teams. In the event that an assignment will be performed in teams, peer feedback from each participant will be requested so that students who are not perceived to be contributing at an acceptable level will be appropriately penalized.

I do not intend to "teach the text"; students are expected to read and learn from the text on their own time. I will, however include key textual material in my presentations. Students should NOT assume that chapter subtopics included in lectures are to be given greater importance than others. In addition, I will include other industrial experience in my lecture presentations and these slides will be uploaded to Blackboard following the class in which they are given. Exams will be taken from the material in the text book and from my lecture presentations.

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, attendance is important and strongly encouraged. I reserve the right to utilize unscheduled quizzes or in-class assignments as a means to grade attendance. Attendance will count for up to 5% of your final grade. Any student who has a legitimate reason to miss class must pre-coordinate with me via e-mail in order to be excused and not be penalized. 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.

Other Requirements: Each student is required to have a 64-bit laptop with a 64-bit Operating System: LINUX OS, MAC OS, or Windows OS (the ordering is alphabetical, not in order of preference). You will be required to install Open Source Software tools that will be needed to complete the course assignments. In general, most OSS tools are readily available for LINUX and Windows, but not necessarily Apple computers and OS's. Some assignments will also require the use of a virtualization environment, such as Oracle VirtualBox or VMware Workstation Player/Pro.

For assignments that are team-based, you will need to coordinate time during the week to meet with other team members. Arranging scheduled meeting times for each team will be left to each team. It is a team effort in that no one is more important than the other, but experience shows that an agreed leader can be useful for actions such as coordinating meetings and submitting team completed assignments to Blackboard. The leader will be the point of contact to the professor for team interactions.

Grading:

Quizzes (4 quizzes, each 12.5%)	50%
Course Assignments (5 assignments, each 6%)	30%
Project	15%
Attendance	5%
Total Grade	100.00%

All exams will be administered during class as shown on the schedule (below) and will be handwritten, closed note and closed book.

All course assignments/projects will be submitted via Blackboard. Specific instructions for each assignment/project will be provided via Blackboard as well.

All grades will be maintained on the UTA electronic Blackboard (elearn.uta.edu) so students can see course scores.

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor and Graduate Teaching Assistant) if their performance drops below satisfactory levels; see "Student Support Services," below.

While all attempts are made to give sufficient time to complete assignments, extenuating circumstances may occur in which the class deems that more time is necessary. Any such extensions are at the professor's discretion.

Assignment submissions will be accepted up to 4 days late. Late assignments will be subject to a grading penalty as defined below.

Days Late	Penalty
1 or less	-10 points
2	-20 points
3	-30 points
4	-50 points
5 or later	Grade of 0

In the event that the resulting grade after applying the late penalty is less than 0, a grade of 0 will be assigned.

Make-up Exams: Make up exams will be handled on a case by case basis. Students need to inform the professor as soon as possible via email, describing the reason for missing scheduled exams. If the professor determines the exam can be made up, arrangements will be made. In general, the expectation is that the student requesting to make up the exam will be required to take the exam prior to the regularly scheduled exam date, not after.

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 6 hours per week of their own time in course-related activities, including 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 University Catalog (<http://catalog.uta.edu/academicregulations/grades/#graduatetext>).

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/>).

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.

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 uta.edu/eos.

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. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@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 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 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. Additional information is available at <https://www.uta.edu/conduct/>.

The punishment for academic dishonesty in my class will be a grade of zero on the assignment/examination/project in question.

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>.

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 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>.

Final Review Week: For semester-long courses, 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 can be reached via the hallway to the left or right. Specific evacuation routes for this room can be found online at https://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_NH/Evac_NH_111.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 <http://www.uta.edu/universitycollege/resources/index.php>.

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

The following schedule is provided for the students in order to plan participation and study as needed. While I am very familiar with the topic, I am reading this course and using this text for the first time; thus, I am preparing lecture notes as the course progresses. It is highly likely that I will need to adjust topics and course lectures on an ongoing basis. When that occurs, I will upload an updated version of the course schedule on Blackboard in the Syllabus link, and send out an announcement of the new schedule. Dates shown are when the student should have read the chapters.

Class Date	Class Topics / Activities
8/24/2018	Introductions and Course Overview, Chapter 1: The Software Security Problem, Homework 1 Assigned
8/31/2018	Chapter 2: Introduction to Static Analysis, NSA SCA Studies
9/7/2018	Chapter 3: Static Analysis as Part of the Code Review Process, Threat Modeling
9/14/2018	Chapter 5: Handling Input, Homework 1 Due Homework 2 Assigned, Quiz 1
9/21/2018	Chapter 4: Static Analysis Internals, Supply Chain Risk Management

9/28/2018	Chapter 6: Buffer Overflow
10/5/2018	Chapter 7: Bride of Buffer Overflow, Homework 2 Due, Homework 3 Part 1 Assigned
10/12/2018	Chapter 8: Errors and Exceptions, Quiz 2
10/19/2018	Homework 3 Part 1 Due, Homework 3 Part 2 Assigned
10/26/2018	Chapter 9: Web Applications (Part 1)
11/2/2018	Last day to drop classes (4 PM)
11/2/2018	Chapter 9: Web Applications (Part 2), Homework 3 Part 2 Due, Homework 4 Assigned
11/9/2018	Chapter 10: XML and Web Services, and Database Vulnerabilities
11/16/2018	Chapter 11: Privacy and Secrets, Quiz 3
11/23/2018	Thanksgiving Break (no class) Homework 4 Due
11/30/2018	Chapter 12: Privileged Programs, Mobile Application Security
12/7/2018	Project Due Final Exam Day (Quiz 4)

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. – Thomas L. "Trey" Jones

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