

**CSE 5382/4382: Secure Programming**  
Fall 2023  
Syllabus – August 19, 2023 (Rev -)

## **Instructor Information**

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### **Instructor(s)**

Thomas Lawson "Trey" Jones, CISSP, CEH

### **Office Number**

ERB 321

### **Office Telephone Number**

817-272-3785 (CSE Office). As an adjunct, I do not have a phone in my office. Contact me via email.

### **Email Address**

[trey.jones@uta.edu](mailto:trey.jones@uta.edu)

### **Faculty Profile**

[Mr. Thomas Lawson Jones](https://www.uta.edu/academics/faculty/profile?username=jonest3) (<https://www.uta.edu/academics/faculty/profile?username=jonest3>)

### **Office Hours**

Before and/or after class, as schedule permits. I try to arrive on campus on Fridays by 12:15 PM and am in the office until around 1:45 PM. While I do welcome "walk ins", please try to make an appointment so I can devote a certain amount of dedicated time to your needs. I may also be available after class on some class days.

## **Course Information**

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### **Section Information**

CSE 5382-001 and CSE 4382-001

### **Time and Place of Class Meetings**

This class utilizes a Face-to-face (F2F) modality for delivery. All lectures will be in-person at **NH 202 on Fridays 2:00 PM to 4:50 PM**. I am also utilizing Echo360 to record lectures for on-demand viewing. In class attendance for lectures is highly encouraged as students get the most benefit and engagement through class interactions. All exams will be taken in person during class time.

### **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 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 using 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**

Computer Security: A Hands-On Approach, Third Edition  
Publisher: Wenliang Du (May 2022)  
Language: English  
ISBN: 978-1-7330039-5-7  
Price: \$45.95 (new on Amazon)

### **Optional Textbooks**

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  
Price: \$45.00 (new at UTA Bookstore)

### **Descriptions of Major Assignments and Quizzes**

The course will consist of one semester long homework assignment that will be submitted for a grade. This assignment must be performed individually (no collaboration with other students). The course will also consist of numerous self-paced optional labs that will not be graded but are intended to help students solidify their understanding of course content. All graded assignments are submitted via Canvas and are due by 11:59 PM on the due date. Assignments turned in late are subject to a penalty (described later in the Late Assignments Submission section).

The course will consist of four quizzes which will be taken in person during class lecture. Quizzes are not cumulative or comprehensive and generally test over topics covered since the last quiz. All quizzes will be essay style where answers are expected to be short and concise. No notes, textbooks, or electronic aids will be allowed.

I do not intend to “teach the text”; students are expected to read and learn from the text on their own time. However, I will 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 available on Canvas following the class in which they are given. Quizzes will be taken from the material in the textbook and from my lecture presentations.

### **Technology Requirements**

This class will depend heavily on the use of Canvas for submission of assignments, viewing of grades, and collaboration. While I will be available in person for office hours, I will also support office hours online via Microsoft Teams.

Each student is strongly recommended to have an x64 64-bit computer (laptop preferred for portability reasons) with a 64-bit Operating System: LINUX OS, MAC OS, or Windows OS (the ordering is alphabetical, not in order of preference). Assignments will require the use of a virtualization environment, such as Oracle VirtualBox or VMware Workstation. Students are responsible for purchasing (if necessary), downloading, and installing virtualization software on their computer. Many of the labs performed in class will use a specific virtual machine image. Information about downloading this image and instructions for setting up the environment will be posted on the course page in Canvas. Students owning computers with a different CPU architecture (such as the M1-based or M2-based Apple Macintosh computers) may alternatively use a cloud-based virtual machine for the lab environment. Most cloud providers offer a free or inexpensive plan for students to use for class assignments.

### **Grading Information**

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#### **Grading**

The following table provides a breakdown of the grading scheme for this class:

Quizzes (4 quizzes, each 15%)	60%
Project/Assignment	30%
Attendance/Participation	10%
Total Grade	100.00%

All grades will be maintained on the UTA electronic learning management system Canvas (uta.instructure.com) so students can see course scores. All course assignments/projects will be submitted via Canvas. Specific instructions for each assignment/project will be provided via Canvas as well.

I typically grade on a curve, which will be determined based on the distribution of final grades, not individual assignments or quizzes.

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.

### **Late Assignment Submissions**

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

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

### **Make-up Quizzes**

Make up quizzes 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 9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for quizzes, 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>).

## Course Schedule

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The following schedule is provided for the students to plan participation and study as needed. 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 Canvas in the Syllabus link and send out an announcement of the new schedule. It is also expected and recommended that students should review relevant textbook material prior to the date it is covered in class.

Class Date	Class Topics / Activities
8/25/2023	Introductions and Course Overview, The Software Security Problem [Chapter 1, Secure Programming Book] <i>{Start of material for Quiz 1}</i>
9/1/2023	Privileged Programs (SetUID) [Chapter 2, Computer Security Book], <b>Lab Assignment 1 Posted (Environment Variables and SetUID Programs)</b>
9/8/2023	Environment Variables [Chapter 3, Computer Security Book], Shellshock [Chapter 16, Computer Security Book] <i>{End of material for Quiz 1}</i> , Buffer Overflow (Part 1) [Chapter 4, Computer Security Book] <i>{Start of material for Quiz 2}</i> , <b>Lab Assignment 2 Posted (Shellshock)</b>
9/15/2023	Buffer Overflow (Part 2) [Chapter 4, Computer Security Book] Return-to-libc [Chapter 5, Computer Security Book], <b>Lab Assignment 3 Posted (Buffer Overflow), Quiz 1</b>
9/22/2023	Format Strings [Chapter 6, Computer Security Book], Race Condition [Chapter 7, Computer Security Book], <b>Lab Assignment 4 Posted (Return-to-libc)</b>
9/29/2023	Dirty COW Attack [Chapter 8, Computer Security Book], Input Validation [Chapter 5, Secure Programming Book] <i>{Covered on Quiz 4}</i> , <b>Lab Assignment 5 Posted (Format Strings), Project Posted (Input Validation)</b>
10/6/2023	Errors and Exceptions [Chapter 8, Secure Programming Book] <i>{End of material for Quiz 2}</i> , Web CSRF [Chapter 12, Computer Security Book] <i>{Start of material for Quiz 3}</i> , Web XSS [Chapter 13, Computer Security Book], <b>Lab Assignment 6 Posted (Race Condition)</b>
10/13/2023	Splunk, <b>Lab Assignment 7 Posted (Web CSRF), Quiz 2</b>
10/20/2023	Web SQL Injection [Chapter 14, Computer Security Book], More Web Security Considerations (Part 1), <b>Lab Assignment 8 Posted (Web XSS)</b>
10/27/2023	More Web Security Considerations (Part 2), Heartbleed <i>{End of material for Quiz 3}</i> , Introduction to Static Analysis [Chapter 2, Secure Programming Book] <i>{Start of material for Quiz 4}</i> , <b>Lab Assignment 9 Posted (Web SQL Injection)</b>
10/27/2023	<b>Last day to drop classes (4 PM)</b>

<b>Class Date</b>	<b>Class Topics / Activities</b>
11/3/2023	Static Analysis as Part of the Code Review Process [Chapter 3, Secure Programming Book], NSA SCA Studies, <b>Lab Assignment 10 Posted (Understanding and Using Static Code Analysis Tools)</b>
11/10/2023	Static Analysis Internals [Chapter 4, Secure Programming Book], Mobile Application Security, <b>Quiz 3</b>
11/17/2023	Attack Surface Analysis, Threat Modeling, Supply Chain Risk Management, <b>Project Due</b>
11/24/2023	<b>Thanksgiving break (no class)</b>
12/1/2023	Topics TBD {End of material for Quiz 4}
12/8/2023	<b>Final Exam Day (Quiz 4)</b>

*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*

## **Institution Information**

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UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the [Institutional Information](https://resources.uta.edu/provost/course-related-info/institutional-policies.php) page (<https://resources.uta.edu/provost/course-related-info/institutional-policies.php>) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

## **Additional Information**

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### **Face Covering Policy**

Face coverings are not mandatory, all students and instructional staff are welcome to wear face coverings while they are on campus or in the classroom.

### **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. Attendance is important and strongly encouraged. While classes are recorded using Echo360 for on demand viewing after the fact, it is not intended as a substitute for being present in class and contributing to class discussions. Therefore, 10% of the final grade is based on attendance and participation. 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.

### **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. 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\\_202.pdf](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.

### **Academic Success Center**

The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: [Academic Success Center](#). To request disability accommodations for tutoring, please complete this [form](#).

**The IDEAS Center** (<https://www.uta.edu/ideas/>) (2<sup>nd</sup> Floor of Central Library) offers **FREE** tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at [www.uta.edu/IDEAS](http://www.uta.edu/IDEAS), or call (817) 272-6593.

<p><b>Emergency Phone Numbers:</b> In case of an on-campus emergency, call the UT Arlington Police Department at <b>817-272-3003</b> (non-campus phone), <b>2-3003</b> (campus phone). You may also dial 911. Non-emergency number 817-272-3381</p>
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