Instructor Information

Instructor: Shirin Nilizadeh
Office Number: ERB 530
Email Address: shirin.nilizadeh@uta.edu
Faculty Profile: http://crystal.uta.edu/~shirin/
Office Hours: Mon. 10:00-11:50 AM

Course Information

Section Information: CSE 4380, Section 001
Time of Class Meetings: Tue./Thur. 200-3:20 PM
Place of Class Meetings: SH 333

Lab Information

Lab Section Information: CSE 4380, Sections 002 and 003
Time of Lab Meetings: Tue. 4-6:50 PM, Thur. 4-6:50 PM, or Friday 4-6:50 PM.
Place of Lab Meetings: ERB 106

GTA Information

GTA: Mohit Singhal
GTA Email Address: mohit.singhal@mavs.uta.edu
Office Number: ERB 504
Office Hours: Wed.1-3:00 PM

Course Description

Description of Course Content:
This is the hands-on introduction to the basics of security for upper-level undergraduate students and graduate students. Includes system security, buffer overflows, a high-level overview of cryptography, firewalls and intrusion detection/prevention, malware, penetration testing, forensics, and system administration.
Student Learning Outcomes:
- Use cryptographic primitives directly in order to understand their respective uses and how they work together to provide security.
- Develop simple malware in order to understand hooking and how hooking can be subverted for malicious purposes.
- Set up and use defensive and security testing technologies in the network and operating system in order to see how they defend against attacks.
- Exploit software vulnerabilities in order to understand how they work and how defenses could stop them.
- Study a range of concepts to gain a broad understanding of the field of information security.
- Apply class knowledge in a capture-the-flag simulation exercise at the end of the semester.

Required Textbooks and Other Course Materials:
  In addition to the textbook, each week the instructor may provide some papers and articles.

Descriptions of major assignments and examinations:
- Activity and assignment details will be explained in detail within each week’s corresponding learning module.

  Reading Assignments: They include a few questions on the reading materials that students are required to study before the class. All assigned readings should be completed by Monday midnight.

  Presentations: Students will give a 5-minutes brief presentation in class to talk about a couple of recent security vulnerabilities or defenses related to the class’s topic in that week. The instructor arranges the date for each student.

  Labs: In the labs, you will work in pairs to learn how attacks operate and how to defend against them.
  - Lab 1: Cryptography: Sept. 9-13
  - Lab 3: Malware: Oct. 21-25
  - Lab 4: Buffer Overflows (2 weeks): Nov. 4-8 and Nov. 11-15

  Lab Assignments: Each lab exercise includes a pre-lab assignment due by the Sunday midnight before the lab week.
  - Pre-Lab 1: Cryptography: due by Sept. 8
  - Pre-Lab 3: Malware: due by Oct. 20
  - Pre-Lab 4: Buffer Overflows: due by Nov. 3
  - Pre-CTF: due by Nov 10.
  - CTF Write-up: due by Dec. 6

  CTF Lab: Nov. 19-23.
  In this lab exercise, students will work in teams in a jeopardy-style capture-the-flag game to earn points awarded by performing security tasks and exercises that you have learned in class and even some new ones. Students will write a team report showing how they applied class knowledge to the game.

  Exam 1: in-class, Thursday Oct. 10
  Covers everything discussed up to and including Week 8

  Exam 2: Tuesday Nov. 26
  Comprehensive; focus on Buffer Overflows and Web Security
• **Quiz:** Thursday Dec. 3 *(NOT included in the grading)*
  The quiz covers administrative issues in securing networks.

### Grading Information

**Grading:**

- Lab Exercises (4 in-lab with 4 pre-lab exercises): 36%
  - Labs 1 & 3 are worth 7%, Labs 2 & 4 are worth 11%
- CTF Lab: 11%
- CTF Write-up: 4%
- Reading Assignments: 15%
- Exams (2 in-class): 30%
- Presentation & Class Participation: 4%

Grades for the exam will be curved by the instructor and scaled to a standard A = 90-100, B = 80-89, C = 70-79 scale. Final grades will simply be the weighted average of the scores, based on the percentages shown above. Small amounts of extra credit may be available, but only on a class-wide basis (no individual requests will be granted). No grade bumps will be offered; 89.99 is a B in this class.

Students are expected to keep track of their performance throughout the semester which Canvas facilitates, and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below.

**Make-up Exams:**

Make-ups for graded activities may be arranged if your absence is caused by illness or personal emergency. A written explanation (including supporting documentation) must be submitted to your instructor; if the explanation is acceptable, an alternative to the graded activity will be arranged. Make-up arrangements must be arranged prior to the scheduled due date.

**Grace periods:** To accommodate for unavoidable circumstances, you will be given a **3-day** grace period for your assignments (3 days for each). Beyond the deadline (and grace period if applicable), you will be penalized 25% a day. For example, if you score 73% and are 5 minutes late, you will be penalized 25% for 1 day, resulting in a score of 73 – 25 = 48%). Use these freebies wisely — they are meant for circumstances such as falling ill or interviewing. I will not grant any additional extensions.

**Attendance:**

At the University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of 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, I will be grading attendance based on your participation in each lecture. Also, in every class period, you will learn by actively participating in the process of solving problems and working in small groups. Missing class, therefore, means missing out on learning opportunities that cannot be gained from the textbook.** 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 must 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 Canvas. This date is reported to the Department of Education for federal financial aid recipients.

**Lab Attendance and Completion:** Attendance to your assigned lab section during lab weeks is mandatory. You are expected to come to lab having completed a pre-lab assignment that will be checked by the GTA before you may begin the lab. The lab hours are fixed. We will allow you to complete an unfinished lab by attending
GTA office hours in the following week (max. 1 hour), but at the cost of 10 points (out of 100) deducted from your grade for that lab.

**Course Schedule (Subject to Change)**

<table>
<thead>
<tr>
<th>Week</th>
<th>Class Dates</th>
<th>Topic</th>
<th>Activity</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 22</td>
<td>Class overview, motivation and overview of computer security</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Aug. 27, Aug. 29</td>
<td>Cryptography: symmetric encryption and Message Authentication and Hash Functions</td>
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<td></td>
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<tr>
<td>3</td>
<td>Sep. 3, Sep. 5</td>
<td>Cryptography: Public-Key Encryption and Homomorphic Encryption</td>
<td>Pre-Lab 1</td>
<td>Sep. 8</td>
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<tr>
<td>4</td>
<td>Sep. 10, Sep. 12</td>
<td>User Authentication</td>
<td>Lab 1</td>
<td></td>
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<tr>
<td>5</td>
<td>Sep. 17, Sep. 19</td>
<td>Access Control</td>
<td>Pre-Lab 2</td>
<td>Sep. 22</td>
</tr>
<tr>
<td>6</td>
<td>Sep. 24, Sep. 26</td>
<td>Internet vulnerability: Denial-of-Service Attacks</td>
<td>Lab 2.1</td>
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<tr>
<td></td>
<td></td>
<td>Securing the Internet: firewalls, intrusion detection systems</td>
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<tr>
<td>7</td>
<td>Oct. 1, Oct. 3</td>
<td>Securing the Internet: firewalls, intrusion detection systems + Exam Review</td>
<td>Lab 2.2</td>
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<tr>
<td>8</td>
<td>Oct. 8, Oct. 10</td>
<td>EXAM 1 (No class on Oct 8)</td>
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<tr>
<td>9</td>
<td>Oct. 15, Oct. 17</td>
<td>Internet vulnerability: malware, viruses, worms</td>
<td>Pre-Lab 3</td>
<td>Oct. 20</td>
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<tr>
<td>10</td>
<td>Oct. 22, Oct. 24</td>
<td>Software security: Memory architecture + buffer overflow</td>
<td>Lab 3</td>
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<tr>
<td>11</td>
<td>Oct. 29, Oct. 31</td>
<td>Defense for buffer overflow, + common attacks</td>
<td>Pre-Lab 4</td>
<td>Nov. 3</td>
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<tr>
<td>12</td>
<td>Nov. 5, Nov. 7</td>
<td>Web Security: Injection Attacks</td>
<td>Lab 4.1+ Pre-CTF</td>
<td>Nov. 10</td>
</tr>
<tr>
<td>13</td>
<td>Nov. 12, Nov. 14</td>
<td>(semi) Automatic methods for security bug detection</td>
<td>Lab 4.2</td>
<td></td>
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<tr>
<td>14</td>
<td>Nov. 19, Nov. 21</td>
<td>Advanced Topics + Exam Review</td>
<td>CTF</td>
<td>Dec. 6</td>
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<tr>
<td>15</td>
<td>Nov. 26, Nov. 28</td>
<td>EXAM 2 THANKSGIVING (No class on Nov. 28)</td>
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<tr>
<td>16</td>
<td>Dec. 3</td>
<td>Advanced Topics + Quiz</td>
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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. — Shirin Nilizadeh
Institution Information

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 page (http://www.uta.edu/provost/administrative-forms/course-syllabus/index.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

Emergency Exit Procedures:
Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. 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 Success Programs:
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 by appointment, drop-in tutoring, etutoring, supplemental instruction, mentoring (time management, study skills, etc.), success coaching, TRIO Student Support Services, and student success workshops. For additional information, please email resources@uta.edu, or view the Maverick Resources website.

The IDEAS Center (https://www.uta.edu/ideas/) (2nd 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, or call (817) 272-6593.

The English Writing Center (411LIBR):
[Optional.] The Writing Center offers FREE tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the Writing Center (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see Writing Center: OWL for detailed information on all our programs and services.

Librarian to Contact:
Each academic unit has access to Librarians by Academic Subject that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

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