CSCE 5550 – Introduction to Comp Security

Fall 2022

Instructor Contact

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Office Hours: Wednesdays 2pm - 3pm

Communication Expectations: In this course, we will be using Canvas actively. For any questions about the clarification of a lecture material, assignment, or project, it is recommended to use Canvas first (e.g., Discussions). For other concerns or questions, feel free to email me. The emails will be generally replied back in one day (if not in hours); however, due to unexpected reasons, it may end up a bit longer (if you are not receiving any response in two days, please email me again). And please be patient! For the assignments and quizzes, the expected grades will be provided within two weeks.

Course Description

The aim of this course is to introduce the concepts and principles of computer security and privacy. It covers both theoretical and practical aspects of computer security, including security models and assurance, OS and network security, common security threats and countermeasures against them, cryptography, risk management and data privacy.

Course Structure

This course will be in-person. The expected schedule is provided below and we will be discussing one module every week.

Course Schedule

Note: This is a tentative schedule and may change during the semester.

- Week 1 (08/31/2022): Course introduction and overview of computer security + Fundamentals of secure systems design
- Week 2 (09/07/2022): OSI layers and their security
- Week 3 (09/14/2022): Routing security and DOS attacks + Firewalls and VPNs
- Week 4 (09/21/2022): Intrusion Detection and Network Data Audit, Access Control and OS Security

- Week 5 (09/28/2022): Access Control and OS Security + Security policies and multilevel security models I
- Week 6 (10/05/2022): Security policies and multilevel security models + Control hijacking attacks, buffer overflow
- Week 7 (10/12/2022): Countermeasures against control hijacking + Malware + (QA session for midterm)
- **Week 8 (10/19/2022): Midterm Exam**
- Week 9 (10/26/2022): Cryptography + Key management and network security
- Week 10 (11/02/2022): User identification + Web security
- Week 11(11/09/2022): Database security + Secure coding and software analysis
- Week 12 (11/16/2022): Virtualization security + Vulnerability analysis
- Week 13 (11/23/2022): No class – Thanksgiving break
- Week 14 (11/30/2022): Data privacy and anonymization + IT security management and risk assessment + Legal aspects and ethics
- Week 15 (12/7/2022): Pre-final day (Overview, summary, QA for the final)
- Week 16 (12/14/2022): **Final Exam**. Based on https://registrar.unt.edu/exams/final-exam-schedule/fall, "Evening Classes: have their final exams on the earliest usual class time this week. Classes with start times 5:00 p.m. and later are considered evening classes.".

Course Prerequisites or Other Restrictions

There are no prerequisites required for this class. However, it is strongly suggested that you have the following backgrounds: networking basics, programming basics, operating system basics, basic knowledge of Linux.

Course Objectives

By the end of this course, students will be able to:

1. Describe cybersecurity for different cyberspaces
2. Identify and apply threat modeling and security models
3. Find out the vulnerabilities in the existing networking protocols and the possible exploitations.
4. Understand how intrusion detection and prevention systems work and use them as needed
5. Learn about how security in operating systems applied and how malware infect and propagate
6. Interpret basic cryptography concepts as well as specific commonly used algorithms and protocols
7. Examine and apply administrative issues in security; such as planning, security policies, risk analysis as well as privacy concepts and data anonymization
8. Obtain hands-on experience in using common security tools, such as firewalls, intrusion detection systems, and port scanning software

Materials

Recommended textbooks:
- P. Pfleeger, S.L. Pfleeger, and J.Margulies, "Security in Computing," 5th Edition, Prentice Hall, 2015
- Matt Bishop, "Computer Security: Art and Science," 2nd Edition, Addison-Wesley, 2019

Supplementary reading:
- W. Stallings and L. Brown, "Computer Security: Principles and Practice", 4th Edition, Pearson, 2018.

Teaching Philosophy

Cybersecurity is a growing concern that cannot be solved through a holistic solution; hence, we need to understand individual items in cyberspace and act accordingly. To do this, we need to have both theoretical and hands-on experience. Throughout this course, we will be learning both of them.

Technical Requirements & Skills

Minimum Technology Requirements

- Computer (*a computer that can run multiple virtual machines is suggested; if you don't/can't have a computer with the required computational resources, please contact me and we will be looking for the solutions*)
- Reliable Internet access
- [Canvas Technical Requirements (Links to an external site.)](https://clear.unt.edu/supported-technologies/canvas/requirements) (https://clear.unt.edu/supported-technologies/canvas/requirements)

Computer Skills & Digital Literacy

- Using Canvas
- Using email with attachments
- Downloading and installing software
- Using office programs
- Creating, configuring, and using virtual machines
- Programming experience with Python or C/C++ and Bash is recommended
- Basic experience with Linux is recommended

Rules of Engagement

- Treat your instructor and classmates with respect in email or any other communication.
- Always use your professors' proper title: Dr. or Prof., or if in doubt use Mr. or Ms.
- Unless specifically invited, don't refer to your instructor by first name.

- Use clear and concise language.
- Remember that all college-level communication should have correct spelling and grammar (this includes discussion boards).
- Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you."
- Use standard fonts such as Ariel, Calibri or Times New Roman and use a size 10 or 12 point font
- Avoid using the caps lock feature AS IT CAN BE INTERPRETED AS YELLING.
- Limit and possibly avoid the use of emoticons like :) or J.
- Be cautious when using humor or sarcasm as the tone is sometimes lost in an email or discussion post and your message might be taken seriously or sound offensive.
- Be careful with personal information (both yours and others').
- Do not send confidential information via e-mail

See these [Engagement Guidelines (Links to an external site.)](https://clear.unt.edu/online-communication-tips) (https://clear.unt.edu/online-communication-tips) for more information.

Getting Help

Technical Assistance

UIT Help Desk: [http://www.unt.edu/helpdesk/index.htm (Links to an external site.)](http://www.unt.edu/helpdesk/index.htm)
Email: helpdesk@unt.edu
Phone: 940-565-2324
In-Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm

Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm

For additional support, visit [Canvas Technical Help (Links to an external site.)](https://community.canvaslms.com/docs/DOC-10554-4212710328) (https://community.canvaslms.com/docs/DOC-10554-4212710328 (Links to an external site.))

For the **class-based software and platforms**, you can contact me through my email.

Student Support Services

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of

an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- [Student Health and Wellness Center (Links to an external site.)](https://studentaffairs.unt.edu/student-health-and-wellness-center) (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- [Counseling and Testing Services (Links to an external site.)](https://studentaffairs.unt.edu/counseling-and-testing-services) (https://studentaffairs.unt.edu/counseling-and-testing-services)
- [UNT Care Team (Links to an external site.)](https://studentaffairs.unt.edu/care) (https://studentaffairs.unt.edu/care)
- [UNT Psychiatric Services (Links to an external site.)](https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry) (https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry)
- [Individual Counseling (Links to an external site.)](https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling) (https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling)

Other student support services offered by UNT include

- Registrar (https://registrar.unt.edu/registration)
- [Financial Aid (Links to an external site.)](https://financialaid.unt.edu/) (https://financialaid.unt.edu/)
- [Student Legal Services (Links to an external site.)](https://studentaffairs.unt.edu/student-legal-services) (https://studentaffairs.unt.edu/student-legal-services)
- [Career Center (Links to an external site.)](https://studentaffairs.unt.edu/career-center) (https://studentaffairs.unt.edu/career-center)
- [Multicultural Center (Links to an external site.)](https://edo.unt.edu/multicultural-center) (https://edo.unt.edu/multicultural-center)
- [Counseling and Testing Services (Links to an external site.)](https://studentaffairs.unt.edu/counseling-and-testing-services) (https://studentaffairs.unt.edu/counseling-and-testing-services)
- [Pride Alliance (Links to an external site.)](https://edo.unt.edu/pridealliance) (https://edo.unt.edu/pridealliance)
- [UNT Food Pantry (Links to an external site.)](https://deanofstudents.unt.edu/resources/food-pantry) (https://deanofstudents.unt.edu/resources/food-pantry)

Academic Support Services

- [Academic Resource Center (Links to an external site.)](https://clear.unt.edu/canvas/student-resources) (https://clear.unt.edu/canvas/student-resources)
- [Academic Success Center (Links to an external site.)](https://success.unt.edu/asc) (https://success.unt.edu/asc)
- [UNT Libraries (Links to an external site.)](https://library.unt.edu/) (https://library.unt.edu/)
- [Writing Lab (Links to an external site.)](http://writingcenter.unt.edu/) (http://writingcenter.unt.edu/)
- [MathLab (Links to an external site.)](https://math.unt.edu/mathlab) (https://math.unt.edu/mathlab)

Course Requirements

- Assignments: 15%
- Labs: 25%
- Group project: 15%
- Midterm: 20%
- Final exam: 25%

Grading

- A = [90%, 100%]
- B = [80%, 90%)
- C = [70%-80%)
- D = [50%-70%)
- F = [0%-50%)

Late submissions will result in losing 15 points per day. *However, for special circumstances (e.g., health) with the proper documents, contacting the professor in advance is suggested.*

Course Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

Course Policies

Assignment Policy

For each assignment, I will be sending an email (and a notification will be added) with the deadline. The assignment can be theoretical and/or hands-on questions that may require writing some code or installing a software and running it, analyzing some data, etc. You will be uploading your answers through Canvas drop box.

The University is committed to providing a reliable course system for all users. However, in the event of an unexpected server outage or any unusual technical difficulty which prevents students from completing a time-sensitive assessment activity, the instructor will extend the time windows and provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and contact the UNT Student Help Desk: helpdesk@unt.edu or 940.565.2324 and obtain a ticket number. The instructor and the UNT Student Help Desk will work with the student to resolve any issues at the earliest possible time.

Examination Policy

The midterm and final exams will be closed-book/closed-notes exams. Other than emergencies (such as health), there will be no make-up exams, and, in case of a make-up exam, we will be discussing the policy and time individually case by case.

Instructor Responsibilities and Feedback
My main responsibility in this course is to provide you the required theoretical and hands-on experience for cybersecurity so that you can start research or job hunting in this domain. As this is the introduction course, I highly suggest you continue taking other cybersecurity-related courses if you are interested in this domain.

As mentioned before, the feedback will be given in up to two weeks for assignments, quizzes, and midterm.

Late Work
Late submission will end up losing 15 points (out of 100) per day.

Attendance Policy
The student is responsible for regular and punctual attendance and is expected to participate in all courses in which the student is enrolled.

Class Participation
Class participation is highly suggested. Even though the attendance will not be directly involved in the grading policy, the discussions and examples throughout the semester may be a part of the exams.

Syllabus Change Policy
This is a tentative syllabus that might be changed. Upon a change, I will be notifying all through Canvas.

UNT Policies

Academic Integrity Policy

Academic Integrity Standards and Consequences: According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors **including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage**. A finding of **academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University**.

ADA Policy

The University of North Texas makes reasonable academic accommodations for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (Links to an external site.) at http://www.unt.edu/oda. You may also contact ODA by phone at (940) 565-4323.

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Retention of Student Records

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Blackboard online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student's records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (Links to an external site.) (https://deanofstudents.unt.edu/conduct) to learn more.

Access to Information - Eagle Connect

Students' access point for business and academic services at UNT is located at: my.unt.edu (Links to an external site.). All official communication from the University will be delivered to a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail Eagle Connect (Links to an external site.) (https://it.unt.edu/eagleconnect).

Student Evaluation Administration Dates

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey

link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the [SPOT website (Links to an external site.)](http://spot.unt.edu/) (http://spot.unt.edu/) or email spot@unt.edu.

Sexual Assault Prevention

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.