CSE 4400/5400: Computer Security (Spring 2025)

Course Information

Course Number and Title: CSE 4400/5400 Computer Security

Credits: 3

Prerequisites: CSE 3100 (Systems Programming), 3400 (Introduction to Computer and Network Security), and 3666 (Introduction to Computer Architecture); open only to students in the School of Engineering and declared Computer Science minors.

Instructor and TA

Dr. Yuan Hong, yuan.hong@uconn.edu

TA: Shenao Yan, shenao.yan@uconn.edu

Office Hours

Tuesdays, 11am – 12:00pm, Dr. Yuan Hong, ITE 265

Wednesdays, 1pm – 2:00pm, Shenao Yan, ITE 114

Lectures

Lecture Time: Tuesdays and Thursdays, 9:30am – 10:45am, AUST 103

Course Description

Computer security and the design of secure systems. Cryptographic tools. Operating system security and access control. Network, software and database security. Randomness generation. Malicious software. Anonymity and privacy. Various attacks and countermeasures. Ethical, legal and business aspects.

Course Goals and Objectives

The goals of the course are 1) to introduce students to security issues in the design of computer systems, 2) to encourage students to critically think about the security issues in computer systems, and 3) to deepen their understanding by studying mistakes in some designs and attacks.

The objectives of the course are:

1. Explain and define basic design methods and terminology introduced in the course.
2. Apply proper design principles for security.
3. Analyze and evaluate the security aspect of a system.
4. Explain and analyze the security mechanisms in existing systems.

Textbook

No required textbook.

Grade

Students' final grade is based on the following components:

- Hands-on Projects (4 projects): 50%.
- Honors Conversion and Graduate Section: 1 more project (optional to other students).
- Homework (4 homeworks): 32%
- Quizzes (9 quizzes): 18%

Submit project and homework assignments on HuskyCT. Explain your answers.

Quizzes will be in-person.

We will make every effort to provide feedback and grades of assignments soon. For some assignments, we will need more time. If you have questions regarding the grading of assignments, you MUST contact either the instructor or TA within ONE WEEK after graded work is returned to you (or to the class). Please check "My Grades" section in HuskyCT frequently.

The final grade is based on the weighted total of components in the course. You can **estimate** your grade using the following table. The calculated weighted total will be rounded to the nearest tenth.

Weighted total	Letter Grade
≥ 93.0	A
< 93.0 and ≥ 90.0	A-
< 90.0 and ≥ 87.0	B+
< 87.0 and ≥ 83.0	B
< 83.0 and ≥ 80.0	B-
< 80.0 and ≥ 77.0	C+
< 77.0 and ≥ 73.0	C
< 73.0 and ≥ 70.0	C-
< 70.0 and ≥ 67.0	D+
< 67.0 and ≥ 63.0	D
< 63.0 and ≥ 60.0	D-

Late Policy

All course due dates are specified in the assignments. Deadlines are based on Eastern Time. The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.

If a homework assignment or a project cannot be completed by the deadline, you must contact the instructor or TA **before** the deadline to arrange a late submission, and provide valid university accepted reasons and evidence. Otherwise, late submissions are not accepted. There may be a penalty for late submissions.

Please note that sometimes late submissions cannot be arranged, especially when doing so would slow down the progress of the class.

Attendance

Attendance is not required. However, students are strongly encouraged to attend lectures and office hours.

Tentative Schedule

Week	Start	End	Topics	Project	HW	Quiz
1	01/21	01/28	Introduction. Crypto Review		1	
2	01/30	02/04	Hash. OS Review.	Project 1		1
3	02/06	02/11	Authentication		2	
4	02/13	02/18	Access Control. Security Policy Model			2
5	02/20	02/25	Buffer Overflow	Project 2	3	3
6	02/27	03/04	Process. Malware			4
7	03/06	03/11	Software		4	
8	03/13	03/25	Race Condition. Memory.	Project 3		5
9	03/27	04/01	Memory. Side-channel Attacks			6
10	04/03	04/08	Meltdown & Spectre. Booting and attacks			7
11	04/10	04/15	TPM. Secure Booting.	Project 4		
12	04/17	04/22	Secure Booting. VM			8
13	04/24	04/29	SGX. Random			9

Software/Hardware/Technical Requirements

The software/hardware/technical requirements for this course include:

- Python 3.6 or higher
- Virtualbox and Ubuntu image, or a virtual machine in cloud. More information will be provided in Project 1.
- HuskyCT/Blackboard
- Adobe Acrobat Reader (or other PDF readers)
- Google Apps
- Microsoft Office (free to UConn students through uconn.onthehub.com)
- A cell phone or another device that can scan documents into PDF files

NOTE: This course has NOT been designed for use with mobile devices.

For information on managing your privacy at the University of Connecticut, visit the University's Privacy page.

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/. Students are strongly encouraged to contact CSD in the first three weeks of the semester.

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
    - Academic Integrity
    - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Academic Integrity

Academic integrity is a fundamental expectation of all students in this course. Cheating, plagiarism, and other forms of academic misconduct are not allowed in this course. Below is a list of common misconducts. Please notice that this is **not** a complete list and that not every misconduct is relevant in this course. It is your responsibility to be familiar with the Student Code of Conduct and conduct yourself according to the standards that are described in the code.

- Copy answers from another student's examination sheet, homework, quiz, lab assignment, or project assignment.
- Copy answers from solutions provided to students who already took the course, or other people.
- Copy answers from other sources such as the Internet and other people's discussions that you do not participate in.

- Make use of notes during a closed book/closed notebook examination.
- Make use of electronic devices, e.g., cell phones, which are not allowed in an examination.
- Allow another student to take an examination in your place.
- Represent the work from other people as your own.
- Assist another student to violate academic integrity (e.g., allow one or more students to copy your work).

You may discuss the homework with anyone and use any reference material, provided you do not copy any other person's work or solutions from any sources. Appropriate reference or credit must be acknowledged if you use the results from other people.

For the programming projects, it is expected that you write every line of code that you submit (with the exception of code given out in class and simple online examples, typically a few lines, that demonstrate the usage of library functions or system calls). The following are examples of activities that are prohibited:

- Copying code from another student.
- Giving code to another student (via email, printouts, photos, voice, etc.).
- Posting code in a publicly accessible location.

Evaluation of Course Experience

Students will be given an opportunity to provide feedback on their course experience and instruction using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

The University of Connecticut is dedicated to supporting and enhancing teaching effectiveness and student learning using a variety of methods. The Student Evaluation of Teaching (SET) is just one tool used to help faculty enhance their teaching. The SET is used for both formative (self-improvement) and summative (evaluation) purposes.

Additional informal formative surveys and other feedback instruments may be administered within the course.

Copyright

Students should be aware that instructors' materials are protected by copyright regardless of whether such a statement appears in the syllabus.

More information is available at Copyright and Teaching | UConn Library.

Success

UConn has many resources to help students succeed. Success in this course and in your major program depends heavily on your personal health and well-being. Recognize that stress is an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. Your teaching assistants and instructors strongly

encourage you to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the semester, before the demands of exams and projects reach their peak. Please feel free to reach out to us about any difficulty you may be having that may impact your performance in your courses or campus life as soon as it occurs and before it becomes too overwhelming. In addition to your academic advisor, we strongly encourage you to contact the many other support services on campus that stand ready to assist you.

- Dean of Students Office
- Academic Achievement Center
- Student Health and Wellness