

Computer Security Concepts

Bulletin Description

This course provides an introduction to topics in computer security. We will cover a breadth of topics including confidentiality, integrity, availability, and authentication policies, basic cryptography and cryptographic tools, concepts in software security and network security, and legal and ethical considerations for security. The course will incorporate discussion of topical events in the news.

General Course Information

Term: Fall 2022
Department: COMP
Course Number: 435
Section Number: 001
Time: MW 1:25-2:40
Location: Chapman Hall 201
Website: <https://cs.unc.edu/~csturton/courses/securityconcepts/435-fa22.html>
CampusWire: <https://campuswire.com/c/G623E4B74/>
Gradescope: <https://gradescope.com>
Poll Everywhere: <https://pollev.com/csturton>

Instructor Information

Name: Cynthia Sturton (she/her/hers)
Office: FB 354
Office Hours: [435 Office Hours \(google calendar\)](#)
Contact: Message via Campuswire
Website: <http://www.cs.unc.edu/~csturton>

Teaching Assistants & Learning Assistants

TA: Kaki Ryan

Textbook

We will be using the following textbook, either edition is fine. Both editions are freely available online in PDF format.

- Computer Security and the Internet by Paul C. van Oorschot. ISBN: 1619-7100
Publisher: Springer. [\[PDF\]](#)

CampusWire

CampusWire will be the main site for this course. The course schedule, announcements, and assignments will be posted there. It is also where to go to ask and answer questions. Here are some guidelines.

- If you are wondering about something, ask a question!
- Answer other students' questions and refine existing answers.
- Be polite; be kind.
- Do not post code or ask others to post code.
- You may post privately to the instructors, but we reserve the right to make all or part of the post public if we feel the question is of general interest to the class. (If we do this, we won't reveal any personal information about the original poster.)
- We may post questions on CampusWire that get emailed to the instructors if we feel the question is of general interest to the class.

Course Description

Building secure systems is the responsibility of all computer scientists, not just a few security specialists. To that end, the goal of this course is for students to develop a security mindset—an outlook that requires questioning every assumption and asking how that assumption may weaken security. Along the way, students will learn the security policies that matter for different systems and application domains, how attackers can and have thwarted those policies, sometimes in surprising ways, and what steps computer scientists and engineers can take to improve the security of the systems they design. The course will cover aspects of security ethics and privacy and will incorporate discussion of related events in the news.

Target Audience

This class is meant for computer science students who wish to develop literacy in foundational computer security topics. Students who have already taken Introduction to Computer Security (COMP 535) should not enroll in this class.

Prerequisites

The prerequisites are (COMP 401, 410, and 411) or (COMP 210, 211, and 301).

Goals and Key Learning Objectives

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

- Apply a “security mindset” across major application domains
- Explain the basic building blocks of security
- Evaluate a given security policy in one of the major application domains
- Assess the support for security in a given system
- Create and apply a strategy for teaching oneself about a new technical domain
- Distinguish privacy as a consideration different from security

Course Requirements

Classes will be organized around in-class lectures, in-class discussion, lab assignments, and short quizzes on Poll Everywhere. There will be suggested readings from the textbook. There will be six lab assignments over the course of the semester, one PollEverywhere quiz per lecture, one student project, two midterms, and a final exam.

Key Dates

Midterm exam: 9/21/2021 (tentative)
Midterm exam: 11/14/2021 (tentative)
Final exam: Saturday, 12/3/2022 @ 12 PM

Grading Criteria

Quizzes: 10%
Labs: 45%
Project: 15%
Midterm exams: 20%
Final exam: 10%

Grades will be assigned according to the following scale.

A \geq 95
A- \geq 90
B+ \geq 86 $\frac{2}{3}$
B \geq 83 $\frac{1}{3}$
B- \geq 80
C+ \geq 76 $\frac{2}{3}$
C \geq 73 $\frac{1}{3}$
C- \geq 70
D+ \geq 65
D \geq 60
F < 60

Assignment and Exam Policies

Late assignments, quizzes, or exams will not be accepted. Exceptions will be made only for students with a letter from the Dean of Students. In these cases, a suitable make-up assessment will be issued and graded accordingly.

Students may drop one lab grade and two quiz grades. Students must earn an average grade of at least 50% on the midterm exams, and separately, earn at least 50% on the final exam in order to pass the course.

The course final is given in compliance with UNC final exam regulations and according to the UNC Final Exam calendar.

Course Schedule

The course schedule will be posted on the course Campuswire site.

Attendance Policy

University Policy: As stated in the University's [Class Attendance Policy](#), no right or privilege exists that permits a student to be absent from any class meetings, except for these University Approved Absences:

1. Authorized University activities
2. Disability/religious observance/pregnancy, as required by law and approved by [Accessibility Resources and Service](#) and/or the [Equal Opportunity and Compliance Office](#) (EOC)
3. Significant health condition and/or personal/family emergency as approved by the [Office of the Dean of Students](#), [Gender Violence Service Coordinators](#), and/or the [Equal Opportunity and Compliance Office](#) (EOC).

Class Policy: Instructors may work with students to meet attendance needs that do not fall within University approved absences. For situations when an absence is not University approved (e.g., a job interview or club activity), instructors determine their own approach to missed classes and make-up assessment and assignments.

University Approved Absence Office (UAAO): The [UAAO](#) website provides information and FAQs for students and faculty related to University Approved Absences.

Note: Instructors have the authority to make academic adjustments without official notice from the UAAO. In other words, it is not required for instructors to receive a University Approved Absence notification in order to work with a student. In fact, instructors are encouraged to work directly with students when possible.

Honor Code

All students are expected to follow the guidelines of the UNC Honor Code. In particular, students are expected to refrain from "lying, cheating, or stealing" in the academic context. If you are unsure about which actions violate the Honor Code, please see me or consult studentconduct.unc.edu.

Labs are to be done individually. Students may discuss the assignment with others, but may not share code.

In the course of this class we may discuss known vulnerabilities and attacks on computer systems. This is not an invitation to exploit these vulnerabilities in real systems. You may not attempt to break into any system that is not your own; you may not attempt to thwart or circumvent the security of any system that is not your own. Doing so is, at a minimum, a violation of the honor code and likely a violation of the law. Use caution; even accidental exploits may be subject to prosecution.

Optional Mask Use Statement

UNC-Chapel Hill is committed to the well-being of our community – not just physically, but emotionally. The indoor mask requirement was lifted for most of campus on March 7, 2022. If you feel more comfortable wearing a mask, you are free to do so. There are many reasons why a person may decide to continue to wear a mask, and we respect that choice.

Disclaimer

The professor reserves the right to make changes to the syllabus, including lab due dates, project due dates, and exam dates. These changes will be announced in class and on Campuswire as early as possible.

Acceptable Use Policy

By attending the University of North Carolina at Chapel Hill, you agree to abide by the University of North Carolina at Chapel Hill policies related to the acceptable use of IT systems and services. The Acceptable Use Policy (AUP) sets the expectation that you will use the University's technology resources responsibly, consistent with the University's mission. In the context of a class, it's quite likely you will participate in online activities that could include personal information about you or your peers, and the AUP addresses your obligations to protect the privacy of class participants. In addition, the AUP addresses matters of others' intellectual property, including copyright. These are only a couple of typical examples, so you should consult the full [Information Technology Acceptable Use Policy](#), which covers topics related to using digital resources, such as privacy, confidentiality, and intellectual property.

Additionally, consult the University website "[Safe Computing at UNC](#)" for information about the data security policies, updates, and tips on keeping your identity, information, and devices safe.

Accessibility Resources and Service

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, including mental health disorders, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: <https://ars.unc.edu> or email ars@unc.edu.

Counseling and Psychological Services

UNC-Chapel Hill is strongly committed to addressing the mental health needs of a diverse student body. The [Heels Care Network](#) website is a place to access the many mental resources at Carolina. CAPS is the primary mental health provider for students, offering timely access to consultation and connection to clinically appropriate services. Go to their website <https://caps.unc.edu/> or visit their facilities on the third floor of the Campus Health building for an

initial evaluation to learn more. Students can also call CAPS 24/7 at 919-966-3658 for immediate assistance.

Title IX Resources

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at <https://eoc.unc.edu/report-an-incident/>. Please contact the University's Title IX Coordinator (Elizabeth Hall, titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvscc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.

Policy on Non-Discrimination

The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals' abilities and qualifications. Consistent with this principle and applicable laws, the University's [Policy Statement on Non-Discrimination](#) offers access to its educational programs and activities as well as employment terms and conditions without respect to race, color, gender, national origin, age, religion, genetic information, disability, veteran's status, sexual orientation, gender identity or gender expression. Such a policy ensures that only relevant factors are considered and that equitable and consistent standards of conduct and performance are applied.

If you are experiencing harassment or discrimination, you can seek assistance and file a report through the Report and Response Coordinators (see contact info at safe.unc.edu) or the [Equal Opportunity and Compliance Office](#), or online to the EOC at <https://eoc.unc.edu/report-an-incident/>.

Diversity Statement

I value the perspectives of individuals from all backgrounds reflecting the diversity of our students. I broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. I strive to make this classroom an inclusive space for all students. Please let me know if there is anything I can do to improve. I appreciate suggestions.

Undergraduate Testing Center

The College of Arts and Sciences provides a secure, proctored environment in which exams can be taken. The center works with instructors to proctor exams for their undergraduate students who are not registered with ARS and who do not need testing accommodations as provided by ARS. In other words, the Center provides a proctored testing environment for students who are unable to take an exam at the normally scheduled time (with pre-arrangement by your instructor). For more information, visit <http://testingcenter.web.unc.edu/>.

Learning Center

Want to get the most out of this course or others this semester? Visit UNC's Learning Center at <http://learningcenter.unc.edu> to make an appointment or register for an event. Their free, popular programs will help you optimize your academic performance. Try academic coaching, peer tutoring, STEM support, ADHD/LD services, workshops and study camps, or review tips and tools available on the website.

Writing Center

For free feedback on any course writing projects, check out UNC's Writing Center. Writing Center coaches can assist with any writing project, including multimedia projects and application essays, at any stage of the writing process. You don't even need a draft to come visit. To schedule a 45-minute appointment, review quick tips, or request written feedback online, visit <http://writingcenter.unc.edu>.

Grade Appeal Process

If you feel you have been awarded an incorrect grade, please discuss with me. If we cannot resolve the issue, you may talk to our departmental director of undergraduate studies or appeal the grade through a formal university process based on arithmetic/clerical error, arbitrariness, discrimination, harassment, or personal malice. To learn more, go to the [Academic Advising Program](#) website.