

CS 3710: Introduction to Cybersecurity

Instructor: Will Shand

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1 Logistics

Instructor Will Shand (email: wss2ec@virginia.edu)

Location Olsson Hall 120

Times Monday, Wednesday, Friday, 1:00pm - 1:50pm

Teaching assistants:

- Emily Huo (esh2mne@virginia.edu)
- Julia Friedman (jaf9zd@virginia.edu)
- Rhea Mahuli (rmm9uyv@virginia.edu)
- Samarth Saxena (ss9nfb@virginia.edu)
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Course website <https://www.cs.virginia.edu/~wss2ec/courses/cs3710/>

Remote attendance Class sessions for this course will be audio recorded as a reasonable accommodation for a disability for the student's own personal study and review. These audio recordings will be deleted at the end of the semester.

Please see the course page on Collab for links to Zoom meetings.

Office hours The full list of office hours is still being determined, please check the course website for the most up-to-date list. If you wish to get in touch with just the professor, I will be holding individual office hours from 11am - 12pm on Tuesdays through Zoom.

Online discussion I've set up a Discord server for the class if you wish to discuss homework assignments or have questions about any of the problems. The invite link for the Discord server is available through the course page on Collab; please

1.1 Course overview

Description This course introduces topics in offensive and defensive cybersecurity. The first half of the course will cover the attacker's perspective, loosely following the framework of the Cyber Kill Chain. We will discuss the different stages of the offensive operational lifecycle, various vulnerabilities and methods for exploiting them, and malware development. In the second half of the course we will take lessons learned from the attacker's point of view and turn them towards defensive security. Topics that we'll cover include cryptography engineering, networking, system administration, and monitoring.

This course is intended to help software engineers learn a security mindset, and prepare security engineers by giving them the tools they need to tackle real-world cybersecurity problems.

Textbook and reading materials This course does not have a textbook, and you are not required to purchase any reading materials for it.

1.2 Grading

- **Lab and programming assignments (9 points/assignment):** there will be seven labs throughout the course. The labs will test your knowledge of the previous weeks' topics and give you hands-on experience.

In addition, you will be responsible for completing two programming assignments. These assignments are designed to give you interactive experience with security engineering.

Each lab and programming assignment will be worth 9 points.

Evaluation criteria: your labs and programming assignments will be graded based on your ability to complete the assigned tasks by creatively applying the skills taught in class. You will also be evaluated on your ability to demonstrate knowledge of the topics covered in this course.

- Your two assignments with the lowest grade will be dropped, so that the maximum number of points you can get in this category is 63.

- **Lightning talk (9 points):** you will be responsible for recording a video of one “lightning talk” with slides on a cybersecurity-related topic of your choice. Each talk should be at least 5 minutes long and no longer than 10 minutes. Your talk can cover any cybersecurity topic of your choice, for instance: a tool, a historical event, a specific vulnerability, a strain of malware, and so on.

In the first week of the course you will sign up for a Friday sometime during the semester; ***your recording must be submitted at least two days before the date you signed up for.*** Selected talks will be presented on designated Fridays.

Evaluation criteria: you will be evaluated based on your ability to succinctly and clearly present your analysis to the instructors and your classmates, as well as the comprehensiveness of your analysis.

- **Midterm and final (14 points each):** there will be a CTF-style midterm and final, each worth 14 points. The midterm will cover offensive techniques from the first half of the course, while the final will cover defensive techniques from the second half of the course.

Evaluation criteria: you will be graded based on your ability to accomplish objectives using the techniques and tools taught in each half of the semester.

Grading scale

Letter grade	Points
A+	100
A	95 - 99
A-	90 - 94
B+	87 - 89
B	83 - 86
B-	80 - 82
C+	77 - 79
C	73 - 76
C-	70 - 72
D+	67 - 69
D	63 - 66
D-	60 - 62
F (no credit)	< 60

1.3 Late policy

All late assignments, *excluding Lightning Talks*, will be accepted for up to three days after the due date *without penalty*. For instance, Lab #1 is due on Friday, Sep. 2nd at 11:59 PM; if you miss the deadline, you may submit the assignment late until Monday, Sep. 5th at 11:59 PM. Assignments submitted after the late deadline will not be accepted.

Lightning Talks *must* be submitted at least two days before the Friday that you signed up for. For instance, if you signed up for the Friday, Sep. 9th deadline, you must submit your Lightning Talk no later than 11:59 PM on Wednesday, Sep. 7th.

If you need an extension or additional accommodations, please let me know in advance so that I can find the best way to help you.

1.4 Honor code

All assignments for this class are individual assignments. Discussion between students is okay, but solutions that you submit must be authored individually. Do not copy solutions nor share them with other students until grades have been handed back to you. All students are expected to understand and follow [UVA's honor code](#).

In this class you will have multiple opportunities to attack and exploit machines. You *may not* attack any infrastructure that the instructor has not designated as within scope. In particular, this means that any infrastructure under the [virginia.edu](#) domain, including the course website, are out-of-bounds for attacks.

2 Homework assignments

This course will have seven labs and two programming assignments, each worth 9 points. The due dates for these assignments is as follows (*subject to change depending on the pace of the course*):

	Due date	Topic
Lab #1	Sep. 2 @ 11:59 PM	Linux basics
Lab #2	Sep. 9 @ 11:59 PM	Exploitation
Lab #3	Sep. 23 @ 11:59 PM	Exploitation
Programming assignment #1	Sep. 30 @ 11:59 PM	Malware
Lab #4	Oct. 14 @ 11:59 PM	Password cracking
Programming assignment #2	Oct. 21 @ 11:59 PM	Cryptography
Lab #5	Oct. 28 @ 11:59 PM	Traffic analysis
Lab #6	Nov. 4 @ 11:59 PM	Access control
Lab #7	Nov. 18 @ 11:59 PM	System administration

3 Course schedule

The course schedule is subject to change during the semester. To see the most up-to-date version of the schedule, check out the course website:

<https://www.cs.virginia.edu/~wss2ec/courses/cs3710/schedule/>

4 Additional information

4.1 Accommodations and Discrimination Policy

My goal is to make this course a safe and welcoming learning environment for all students. Please let me know if you have any issues with the material or design of the course, and I will work with you to figure out how this class can accommodate you and your needs.

Students with disabilities may wish to get in touch with the Student Disability Access Center (SDAC). To learn more about SDAC, you can check out

<https://www.studenthealth.virginia.edu/SDAC>

If you have been approved for accommodations through SDAC, please get in touch with me (either through my email or during individual office hours) so that we can work out a plan together.

4.2 Religious accommodations

Through the Office for Equal Opportunity and Civil Rights:

It is the University's long-standing policy and practice to reasonably accommodate students so that they do not experience an adverse academic consequence when sincerely held religious beliefs or observances conflict with academic requirements. Students who wish to request academic accommodation for a religious observance should submit their request in writing directly to the instructor of the course. Students and instructors may contact EOOCR at uvaocr@virginia.edu or (434) 924-3200 if they have any questions regarding this policy, which is set forth in the Academic Accommodation for Religious Observances section of PROV-008: Teaching Courses for Academic Credit, the Undergraduate Record, and the Graduate Record.

4.3 Discrimination, sexual harassment, and other forms of interpersonal violence

I have a zero-tolerance policy for any form of discrimination or sexual harassment inside or outside of class. If you have been subject to discrimination on the basis of age, color, race, disability, or any of the other categories covered by [UVA's Policy on Sexual and Gender-Based Harassment and Other Forms of Interpersonal Violence](#), the [Office for Equal Opportunity and Civil Rights](#) is available to assist you.

If you or someone you care is a target of sexual, domestic, or other interpersonal violence, there are additional community and university resources available to help you. [The Sexual Assault Resource Agency \(SARA\)](#), [Shelter for Help in Emergency \(SHE\)](#), and [the UVA Women's Center](#) all make themselves available to students here in Charlottesville.