

CS686-3 – Advanced Topics in Computer Security – Spring 2024

Professor: Dr. Vahab Pournaghshband (e-mail: vpournaghshband@usfca.edu)

Instructor's Webpage: vahab.cs.usfca.edu

Course Webpage: <http://cs686.cs.usfca.edu/>

Lectures: TuTh 2:40-4:25pm

Office Hours: TuTh 1:40-2:40pm (via Zoom and at HR440G) & TTh 4:25-4:45pm (at LS G12)

Teaching Assistant: Xiuhui (Luna) Wang (e-mail: xwang247@dons.usfca.edu)

Office Hours: Refer to the course webpage (via Zoom and at HR411)

Course Description. Prerequisite: CS621, CS336, or the instructor's consent. Survey of modern topics in computer security, including systems security, advanced topics on cryptography, protection, access control, security in networks, secure coding practices, safe languages, and blockchain.

Student Learning Outcomes. On completion of this course the student should be able to accomplish the following:

1. Uncover and understand the current directions of research in computer security.
2. Understand the state-of-the-art in cryptography, cryptographic protocols, and applications in attack and defense mechanisms networked systems.
3. Understand how to conduct research and develop innovative ideas in cybersecurity.

Textbook. There is no required textbook for this course. I will provide publicly available online resources.

Course Outline. The following (tentative) topics will be covered in this course:

- Principles of Computer Security
- Authentication and Authorization
- Secure Communications
- Networks Security
- Software Security, Secure Coding, Safe Languages
- Cryptography
- Blockchains and Cryptocurrencies
- Other

Grading: Your grade will be based upon the following weighted list:

- Labs 30% (6 labs @ 3, 3, 6, 6, 6, 6)% each respectively)
- Project 50%
- Research Paper Presentation 10%
- Exam (April 23rd): 10%

Your combined percentage can be converted to a letter grade using the table below. Required percentages may be slightly reduced at the instructors discretion, but it won't increase.

A	92%	A-	90%	B+	88%	B	82%	B-	80%	C+	78%
C	72%	C-	70%	D+	68%	D	62%	D-	60%	F	0%

Labs. The labs will be posted on the course webpage along with their due dates. The students' solution to those will be submitted via Canvas. All labs must be done individually. Late submissions will not be accepted and will receive no credit.

Exam. There will be one exam in this course. There will be no final exam during the finals week.

Paper Presentation. Every student must present one research paper from the list of selected papers during the lecture.

Project. The project will be posted on the course webpage and discussed in lecture. The project may be done in groups of four or five. The students' solution to that (all deliverables: code, documents, slides, etc.) will be submitted via Canvas. Late submissions will not be accepted and will receive no credit.

Collaboration Policy. All project team members will receive the same grade regardless of the distribution of work between the partners (so choose your partners wisely!).

Course Webpage. The URL for the course website is cs686.cs.usfca.edu. You must check the webpage for announcements at least once every other weekday. Important announcements will be posted on the course webpage. The credentials (username and password) to access the password protected sections of the webpage will be announced in the first class. You may ask the professor for this information as well.

Piazza. If you have a question, the best way to contact us is via the class Piazza site. The staff (professor and TA) will check the site regularly. If your question is not of interest to other students, please mark the question as private: select "Post to: Individual Student(s)/Instructor(s)" at the top and then type "Instructors" in the field underneath it. If you have an administrative question, then you can either use the private post on Piazza or my and your TA's emails. More information about the class Piazza site is available on the course webpage.

Students with Disabilities: If you are a student with a disability or disabling condition, or if you think you may have a disability, please contact USF Student Disability Services (SDS) at (415) 422-2613 within the first week of class, or immediately upon onset of disability, to speak with a disability specialist. If you are determined eligible for reasonable accommodations, please provide me with your SDS Verified Individualized Services and Accommodations (VISA) form, and we will discuss your needs for this course. For more information, visit: <http://www.usfca.edu/sds> or call (415) 422-2613.

Academic Dishonesty: As a Jesuit institution committed to *cura personalis* — the care and education of the whole person — USF has an obligation to embody and foster the values of honesty and integrity. USF upholds the standards of honesty and integrity from all members of the academic community. All students are expected to know and adhere to the University's Honor Code. You can find the full text of the code online at <http://myusf.usfca.edu/academic-integrity/>.

Counseling and Psychological Services: Our diverse staff offers brief individual, couple, and group counseling to student members of our community. CAPS services are confidential and free of charge. Call 415-422-6352 for an initial consultation appointment. Having a crisis at 3 AM? We are still here for you. Telephone consultation through CAPS After Hours is available between the hours of 5:00 PM to 8:30 AM; call the above number and press 2.

Confidentiality, Mandatory Reporting, and Sexual Assault: As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. I am required to share information regarding sexual misconduct or information about a crime that may have occurred on USF's campus with the University. Here are other resources: To report any sexual misconduct, students may visit the Title IX Coordinator Leighia Fleming

(UC 5th floor) or see many other options by visiting our website: <https://myusf.usfca.edu/title-ix> Students may speak to someone confidentially, or report a sexual assault confidentially by contacting Counseling and Psychological Services at 415-422-6352 or speaking to a clergy member in University Ministry at 415-422-4463. To find out more about reporting a sexual assault and resources at USF, visit USFs Callisto website at: <https://usfca.callistocampus.org/>. For an off-campus resource, contact San Francisco Women Against Rape (SFWAR) (415) 647-7273 (www.sfwar.org).

Changes to Syllabus. Changes may be needed to this syllabus and to the course plan. All such changes to the syllabus will be announced on the course webpage and will be announced via e-mail. Students are responsible for this information.