CS 452: Intro to Computer Security

Fall 2020

Course Information
Instructor: Dr. Yanyan Li, Email: `yali@csusm.edu`
Lecture: TuTh 9:00 am - 10:15 am, via zoom at https://csusm.zoom.us/j/91911316258
Office Hours: TuTh 4:00 pm - 5:30 pm, or by email appointment
Office: virtual room at https://csusm.zoom.us/j/94905741675

Required Textbook: *Computer Security: A Hands-on Approach* by Wenliang Du, CreateSpace Publishing, 2017. ISBN: 154836794X.

Course Description: This course introduces students to the principles of computer security, with an emphasis on applied encryption, software/system security, and web security. Subjects such as encryption algorithm, access control, authentication, buffer overflow, SQL injection and cross-site scripting attack will be covered. Both theoretical and practical knowledge are provided to enhance understanding of computer security issues. This course emphasizes on hands-on learning.

This course counts as an elective for CS, CIS and SE majors.

Course Prerequisite: CS 433: Operating Systems

Course Learning Outcomes: Upon successful completion of this course, students will be able to

1. State the basic concepts in computer security, including security policies and models
2. Explain how different encryption/decryption methods work
3. Describe the application scenarios for various security mechanisms
4. Identify the common vulnerabilities in computer programs
5. Analyze different web and network attacks
6. Explain countermeasures and defense to various attacks
7. Evaluate system security risks and threats and propose solutions
8. Apply computer security principles to solve real world problems

Teaching Methodology: Lectures, labs, discussions, and assignments. Materials will be assigned for reading, discussion, and examination. Preparation prior to the class is expected. Class lectures will be technical and will mostly follow the material presented in the book along with relevant papers from the literature.

Technology Use: This class uses Cougar Courses (https://cc.csusm.edu) to support dissemination of course information, interaction among students and instructors, and submission of student work. Questions concerning homework assignments shall be directed to the instructor via email or posted on Cougar Courses forums for feedback from the instructor as well as other students.

Grades: The final score will be determined by the following formula:

10%	Class Attendance & Participation
16%	Homework Assignments
24%	Computer Security Labs
20%	Semester-long Course Project
30%	Exams (10% Midterm Exam + 20% Final Exam)

The final letter grade will be assigned using the scheme below:

	A: 93% or above	**A-**: 90% or above
B+: 86% or above	**B**: 82% or above	**B-**: 79% or above
C+: 76% or above	**C**: 70% or above	
	D: 60% or above	**F**: any other scores

Class Attendance: This course requires your full effort, so it is expected that you will attend all classes and give your complete attention to the instructor for the full class period. Also please be respectful to each other and avoid activities that are potentially disruptive. Students are expected to read related materials and complete hands-on tutorials outside of scheduled class meetings.

Homework Policies: Homework assignments are due at the beginning of the class on the dates specified in the assignments. On all assignments you are welcome to work with anyone else on ideas and understanding, but your writing should be your own and you should carefully acknowledge all contributions of ideas by others, whether from classmates or from papers you have read. Acts of academic dishonesty will not be tolerated and will lead to unconditional failure of the class.

Extensions: Each student has a total of 72 extension hours (3 days) throughout the semester. This automatic extension can be spent in units of 24 hours (1 day) on any of the assignments, labs and project submissions. We will not accept submissions for any single assignment more than 72 hours (3 days) after its regular deadline. The score for any late submission you make after you've used up your three free late days will be max(0, original_score $\times$ (1 - 0.2 $\times$ x)) where x is how many late days you've used after your three free ones.

Security Labs: Security labs are important components of this class as they will greatly help you understand the course content. Most of the labs are scheduled to do in-class, however pre-class lab document reading and environment setup are necessary and needed in most of the time. Some labs are divided to do in different classes due to the limit of each class time.

Course Project: You will work on a semester-long course project in this class. The topic of this project is chosen by you, and the details of the project will be discussed later in a specific time.

Exams: Midterm exam will be given during the regular lecture time in week 8. The final exam will be held on **Thursday, December 17th, 9:15 am - 11:15 am**. It is a comprehensive exam and will cover all sections listed in the class schedule, but will focus on the sections after midterm.

Note: Any discrepancy on homework, lab and exam grades shall be submitted to the instructor **within one week** of the day that the grades are released (not the day you check it).

Academic Honesty: Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/material that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks. Students are responsible for honest completion of their work including examinations.

There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor's attention. The instructor reserves the right to discipline any student for academic dishonesty, in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole.

Incidents of Academic Dishonesty will be reported to the Dean of Students. Sanctions at the University level may include suspension or expulsion from the University. Refer to this webpage https://www.csusm.edu/policies/active/documents/academic_honesty_policy.html for more info.

Disability Support Services (DSS): Students with disabilities who require academic accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disability Support Services (DSS). This office is located in Craven Hall 4200 and can be contacted by phone at (760) 750-4905, TDD (760) 750-4909 or by email at: dss@csusm.edu. Students authorized by DSS to receive accommodations should meet with me during my office hours, or in another private setting, in order to ensure your confidentiality. Note: Students may not record (audio or video) in this class except in accordance with ADA accommodations. Any recordings made in connection with a disability accommodation are for the student's personal academic use only and may not be distributed in any manner to any other individual.

Resources for Success in Online Class

1. Tips for a successful transition to online learning
2. So your classes are online, three keys to success
3. Working from home, how to stay focused
4. Recommendations for Students in a Virtual Learning Environment
5. Cougar Care Network (CCN) provides information, connection to resources, advocacy and support for students dealing with personal, academic, financial or other challenges which may adversely affect their academic success and/or collegiate experience.

General Recommendations

1. Your tuition pays for class time, don't throw it away by skipping classes for no good reason. Neither does it honor your money to access none-class related activities during class.
2. Your tuition also pays for support outside of the scheduled class meetings. Take advantage of office hours or make appointments with instructors when you need help.
3. Your tuition does not guarantee any grade. Work hard and work smart to secure a good grade.
4. If you want to build an impressive portfolio for future employment,go extra miles on your class projects instead of simply meeting the the standard requirements.

Tentative Class Schedule

Date	Class Topics
Week 1	Class Intro & Security Intro
Week 2	Symmetric key encryption
Week 3	Course Project Intro & Idea Pitch
Week 4	Asymmetric key encryption
Week 5	Digital Signature & PKI
Week 6	Linux Security, Set-UID programs
Week 7	Attack surfaces, environment variable
Week 8	Midterm Exam week
Week 9	Buffer Overflow intro, stack frame
Week 10	Buffer Overflow lab
Week 11	Buffer Overflow countermeasures
Week 12	SQL Injection attack
Week 13	SQL countermeasures, web basics
Week 14	XSS Attack intro & lab
Week 15	Final Project Presentation
Week 16	Final Exam