

CS 166-04: Information Security Syllabus

San José State University, Fall 2022

Instructor Information

Instructor
Yan Chen

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Zoom Office Hours
TR 10:45 – 11:45 or By Appointment

General Information

TR 16:30 – 17:45 @ Boccardo Business Center 004

Catalog Description

Fundamental security topics including cryptography, authentication, access control, network security, security protocols, and software security. Networking basics are covered. Additional security topics selected from multilevel security, biometrics, blockchain, machine learning, information warfare, e-commerce, intrusion detection, system evaluation and assurance.

Prerequisite(s)

Prerequisite: CS 146 (with a grade of "C-" or better); Computer Science, Applied and Computational Math, Forensic Science: Digital Evidence, or Software Engineering Majors only. Permission codes will be provided to the requesters who fulfill the prerequisites based on the priorities stated in University Policy F17-4 (<https://www.sjsu.edu/senate/docs/F17-4.pdf>).

Course Format

Live lectures will be conducted at the set times both in person and via Zoom (<https://sjsu.zoom.us/j/81668267399>). Also, those lecture sessions will be recorded and posted on Canvas (<https://sjsu.instructure.com/courses/1488139>, which is also for all other class activities).

Office hours will be held via Zoom (<https://sjsu.zoom.us/j/85711751329>).

Course Learning Outcomes (CLO)

After completing this course, you should be knowledgeable of the major technical security challenges in each of the following four areas: cryptography, access control, protocols, and software.

Course Materials

There is no required text for this course other than all the materials (lecture notes, homework, etc.) on Canvas. You are responsible for regularly checking the Canvas course page for any updates, including its messaging system.

Further Readings

- Mark Stamp, "Information Security: Principles and Practice," 3rd edition
- Michael Sikorski and Andrew Honig, "Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software." An excellent book for information on reverse engineering that includes many hands-on exercises.
- Software Reverse Engineering (<http://reversingproject.info/>). This website, which was created by a former master's student, includes lots of good information and detailed exercises with solutions.
- The references at the end of each lecture note.

Course Requirements and Assignments

There will be 5 biweekly assignments (optional), 2 programming assignments (optional), 2 midterms (optional) and a final (mandatory). All activities are individual assignments unless specified. Copying from other's work (from other students or/and from Internet) will be considered as cheating. And no late submission will be accepted.

Biweekly Assignments

There will be 1 assignment every 2 weeks (covering 4 lectures). Assignments will be posted on Canvas as untimed quizzes, locked by passwords that are ONLY given in the lectures. Start early so you have time to ask questions if you need helps.

Programming Assignments

There will be 2 programming assignments, each includes 2 ~ 3 programming problems. You can choose any programming language. Cite the source if you use any pre-written packages or it will be considered as cheating. More details about submission will be given in class.

Midterms

There will be 2 midterms, the first one will be focus on the first two topics (crypto & software) and the second will be focus on the last two topics (access control & protocols). They will be posted on Canvas as timed quizzes. The Zoom meeting on the midterm day is also optional, but you need to finish each exam during the required time frame (see tentative schedule on page 5). Exceptions may ONLY be given in cases of a verifiable emergency or for those who live in a different time zone where the exam time would be in the midnight or early morning. You can view the midterms as practices for the final.

Although assignments and quizzes are optional, they are highly recommended to practice what you learned in class and to enhance your score. University Policy S16-9 (<http://www.sjsu.edu/senate/docs/S16-9.pdf>) states that:

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.”

The above 3 items are all optional, but points earned in those activities will be extra points adding to the final score. See “Grading Information” for more details.

Final Examination

The final will be in the same format as the midterms but is cumulative. The date and time are fixed: Thursday, Dec. 8, 14:45 - 17:00 Pacific Time. Exceptions may ONLY be given in cases of a verifiable emergency or for those who live in a different time zone where the exam time would be in the midnight or early morning.

It can be substituted with the average of the midterm scores. More details will be given in class.

Final Exam is mandatory as University policy S17-1 (<http://www.sjsu.edu/senate/docs/S17-1.pdf>) states:

“Faculty members are required to have a culminating activity for their courses, which can include a final examination, a final research paper or project, a final creative work or performance, a final portfolio of work, or other appropriate assignment.”

Both Midterms and Final are closed-all-materials.

Grading Information

There will be at least 130 points available, including extra credits from optional exercises/activities, as shown in the following table. More details will be given in class.

	Points	Details
Final Exam	100.00	Can be substituted with average midterm score
(Optional) Assignments	15.00	5 assignments total, 3 pts each
(Optional) Programs	6.00	2 program assignments total, 3 pts each
(Optional) Midterms	6.00	2 midterms, 3 pts each if grade over 50% (all-or-nothing)
(Optional) Others	3.00+	Other class activities, such as practice quiz, discussions, etc.
Total	130.00	Mandatory (100) + Optional (30+)

Grading scale

Grade	Points	Grade	Points	Grade	Points
A	Above 93.00	B minus	80.00 to 82.99	D plus	66.00 to 69.99
A minus	90.00 to 92.99	C plus	76.00 to 79.99	D	63.00 to 65.99
B plus	86.00 to 89.99	C	73.00 to 75.99	D minus	60.00 to 62.99
B	83.00 to 85,99	C minus	70.00 to 72.09	F	Below 59.99

- A+ will be given for those who receive over 110 points AND have participated in at least 2 other class activities. If more than 1% of students meet these criteria, the top 1% of students will be given an A+.
- Grade near the borderlines will be rounded up depending upon your level and quality of class participation (in-class and in the Discussions on Canvas).
- The grade might be curved ONLY if the final grades of the class at the end of the semester are not normal.

Class Protocol

- **Face coverings/masks are required during the in-person lectures** as per university policy.
- Do NOT share any course material publicly (on Canvas, GitHub, etc.) without permission, including but not limited to lecture notes, lecture videos, passwords, homework/exam solutions, and class meeting links.
- No late homework questions (within 24 hours before due, excluding follow-ups) via email.
- **Instances of academic dishonesty will not be tolerated.** Your own commitment to learning, as evidenced by your enrollment at San José State University and the University's Academic Integrity Policy (<https://www.sjsu.edu/senate/docs/F15-7.pdf>), require you to be honest in all your academic course work. Cheating or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in **a reduction in final course grade** (you will get a warning if it's first time; 1 letter grade off every time after) and administrative sanctions by the University.

Important Dates

Date	Description
Aug. 23, Tuesday	First Day of instruction (for this class)
Sep. 15, Thursday	Last day to drop without a W grade
Sep. 15, Thursday	Last day to add classes via MySJSU
Sep. 15, Thursday	Last day to submit credit/no-credit option request
Nov. 6, Sunday	Daylight saving time ends (at 2:00 AM Pacific Time)
Nov. 11, Friday	Semester withdrawal deadline
Dec. 6, Tuesday	Last day of instruction
Dec. 8, Thursday	Final examination (for this class) 14:45 - 17:00 Pacific Time
Dec. 9, Friday	All class activities due (for this class)
Dec. 20, Tuesday	Grades viewable on MySJSU

Visit <https://www.sjsu.edu/registrar/calendar/fall-2022.php> for the Academic Calendar.

University Policies

Per University Policy S16-9 available at <http://www.sjsu.edu/senate/docs/S16-9.pdf>, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page available at <http://www.sjsu.edu/gup/syllabusinfo>. Viewing these policies and resources is highly recommended.

COVID-19 and Monkeypox Safety Training

Students registered for a College of Science (CoS) class with an in-person component should view the CoS COVID-19 and Monkeypox Training slides (https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6) for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the SJSU Health Advisories website. By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

Course Schedule

This is a tentative schedule and is subject to change (except for the final exam) but with fair notice.

Lesson	Date	Topics
0	Tue., Aug. 23	Introduction to the Course
1	Thur., Aug. 25	Crypto - Symmetric Key Crypto - Classic Ciphers
2	Tue., Aug. 30	Crypto - Symmetric Key Crypto - Stream Ciphers
3	Thur., Sep. 1	Crypto - Symmetric Key Crypto - Block Ciphers (part 1)
4	Tue., Sep. 6	Crypto - Symmetric Key Crypto - Block Ciphers (part 2)
5	Thur., Sep. 8	Crypto - Public Key Crypto (part 1)
6	Tue., Sep. 13	Crypto - Public Key Crypto (part 2)
7	Thur., Sep. 15	Crypto - Public Key Crypto (part 3)
8	Tue., Sep. 20	Crypto - Hash Functions
9	Thur., Sep. 22	Software - Software Flaws
10	Tue., Sep. 27	Software - Malware
11	Thur., Sep. 29	Software - Reverse Engineering & Other Attacks
12	Tue., Oct. 4	Software - Other Attacks on Software
13	Thur., Oct. 6	Midterm 1 Review (Crypto & Software)
/	Tue., Oct. 11	Midterm 1 (Crypto & Software)
14	Thur., Oct. 13	Midterm 1 Solution
15	Tue., Oct. 18	Access Control - Authentication (part 1)
16	Thur., Oct. 20	Access Control - Authentication (part 2)
17	Tue., Oct. 25	Access Control - Authorization (part 1)
18	Thur., Oct. 27	Access Control - Authorization (part 2)
19	Tue., Nov. 1	Protocol - Conceptual Protocols (part 1)
20	Thur., Nov. 3	Protocol - Conceptual Protocols (part 2)
21	Tue., Nov. 8	Protocol - Real-world Protocols (part 1)
22	Thur., Nov. 10	Protocol - Real-world Protocols (part 2)
23	Tue., Nov. 15	Protocol - Network Protocols
24	Thur., Nov. 17	Midterm 2 Review (Access Control & Protocol)
/	Tue., Nov. 22	Midterm 2 (Access Control & Protocol)
/	Thur., Nov. 24	Thanksgiving Holiday - No Class
25	Tue., Nov. 29	Final Review
26	Thur., Dec. 1	Machine Learning in Information Security (part 1)
27	Tue., Dec. 6	Machine Learning in Information Security (part 2)
Final	Thur., Dec. 8	14:45 – 17:00 Pacific Time