

Last Update: September 14, 2020

Course	CPE123 Introduction to Computing: Computer Security
Lecture	Section 9: 8:10A-9:30A Section 12: 12:10P-1:30P
Lab	Section 10: 9:40A-11A Section 13: 1:40P-3P
Instructor	Zachary N J Peterson
Office	Usually Building 14-215
Office Hours	TTh 3-5P by appointment
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Course Description

The high-level objectives of all sections of CPE123 are to engage incoming freshmen, especially those which have no prior experience in computer science, with authentic problems and demonstrate the relevance of computing to the world around them. The course highlights the role of computers in both solving problems and constructing problems, and to challenge students with creative, constructivist challenges that are relevant to their own lives.

This section will explore CS concepts through a collection of security-themed games. Using puzzles, game play and team-based competition, students will explore topics typically reserved for advanced computer science majors—despite their wide relevance to the public. Ultimately, we hope to impart complex security concepts while still being accessible to a wide audience, fostering curiosity in security as well as a lifelong love for computer science and other STEM disciplines.

Textbook

None required.

Readings will be assigned throughout the quarter and made available on the course’s PolyLearn site.

Prerequisites

Respiration.

Learning Objectives

The course will examine the breadth and depth of computer security concepts within computer science

By the end of the quarter students will:

Computer Science Learning Objectives

1. Be exposed to the interdisciplinary nature of computer science, and its myriad professional opportunities.
2. Begin to see how computer science, as a discipline, can be meaningful, socially relevant, and change the world for the better.
3. Develop an ability to think “computationally,” allowing students to analyze and create solutions to computational problems.
4. Be provided with the core programming and problem solving skills to be successful in follow-on CSC coursework, build a community of peers, and have fun!

Computer Security Learning Objectives

5. Demonstrate a general knowledge of, and be able to differentiate between, core computer security principles.
6. Approach claims of security with an informed sense of skepticism, as well as develop an ability to intelligently critique those claims.
7. Recognize that information we store digitally can have real value, but can also be valued differently, warranting different protections.
8. When considering the value of digital assets, identify the common and emerging threats to those assets, and identify the appropriate techniques for protecting those assets.
9. Gain confidence, develop good intuitions, and integrate into their own lives the best practices and behaviors to keep secure in daily life.
10. Establish, in addition to computational thinking skills, an ability to think “counterfactually” and “adversarially” about systems, allowing students to protect these systems against adversaries thinking about them in the same way.

Topics

The course will survey a wide variety of topics in computer security, but none too deep.

Topic	Subtopics
Introduction to Computing & Security	What’s it all about, anyways?
Digital Identity & Anonymity	Passwords, biometrics, two-factor authentication mechanisms, tor
Human Factors & Physical Security	Impersonation, Phishing, Lock Picking

Securing the Web	HTTP(S), Cookies, Malicious JavaScript, SQL injections
Digital Forensics	File formats, efficient searching of file systems, data recovery
Network Security	OSI model, network traces and forensics, ports and services
Secret Communication	Symmetric and public key encryption, PGP, TLS, VPNs
Software Security	Control hijacking, fuzzing

Teaching Modality

This course will be a mixture of in-class lectures and hands-on assignments, as well as take-home lab work. The course will be conducted as a “studio,” where both the lecture and lab sessions will be opportunities for the instructor to present course material or run in-class exercises. The course has three lecture hours and three lab hours scheduled per week: students are responsible for material presented in all six hours.

Readings

Readings will be assigned via the course PolyLearn site, and it is strongly suggested that students read **before** the associated lecture.

Homework & Programming Assignments

Coursework will consist of a few written exercises and a large number of exercises to be conducted in the lab (and outside the lab). All assignments will be posted on PolyLearn.

You are responsible for keeping track of posted assignments and their due date/time. Absolutely NO late assignments will be accepted. All work is expected to be done individually, unless explicitly sanctioned by the instructor.

All homework and programming assignments will be submitted using PolyLearn. Written exercises are to be submitted in **plain text** with each response **clearly** attributed to the assigned problem. Repeating the problem statement is not required. Instructions for submitting programming assignments are provided in each assignment. **NOTE:** Be careful to submit your final version and to have tested it before submitting. *Programs that fail to run will receive no credit.*

Exams

Two exams, one midterm and one final will be given, dates to be determined. Both will be in-class and closed-book, closed-notes, closed-neighbor. Makeup exams will be given intransigently, and only under extreme circumstances.

Grade Breakdown

Prompts & Homework	15%
Labs	35%
Midterm Exam	20%
Final Exam	20%
Class participation	10%

All graded work is compulsory. Absences during midterm or final will result in a failing grade. Instructor reserves the right to amend this breakdown at any time.

Email

When you email the instructor, please put the class name in the subject line (e.g. [CPE123]). All email correspondence must adhere to academic and professional guidelines.

Conduct In Class

Please silence and put away all cell phones and refrain from surfing the web or other distractions while in class. I don't mind if you want to check out, but don't distract someone who actually wants to be there.

Academic Integrity

Collaboration

It is never acceptable to use someone else's work, in any form, as a reference while writing your own, without instructor permission.

In this case, "someone else's work" means not only other students' work or knowledge, but also materials from any other source, including, but not limited to, the world wide web, other reference books, or previous course materials. Collaboration that goes beyond general approaches or that is uncredited will be considered cheating. If you are unsure about what constitutes proper or improper collaboration, consult the instructor for guidance.

Cheating

Academic dishonesty is a serious offense, taken seriously. Any instances of cheating or plagiarism will be referred to the Office of Student Rights and Responsibilities. The Cal Poly rules and policies are listed in the catalog, as well as at the OSRR web site, <http://www.osrr.calpoly.edu>. The general policy, however, is very simply stated in the Campus Administrative Manual (C.A.M. 684):

Cheating requires an "F" course grade.

Turning in work is presumed to be a claim of authorship unless explicitly stated otherwise. If the course rules are unclear or you are unsure of how they apply, ask the instructor beforehand.

A Final Disclaimer

This document is a “living” document, and is subject to change at any time. If you have a question about the conduct of the course, please first refer to the “live” document, and not a copy. Any remaining unanswered questions should be directed to the instructor.