CPE 454 Syllabus v3

Spring 2022

Instructor Information

Sections:	01, 02
Instructor:	John Bellardo
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Course Website:	https://www.csc.calpoly.edu/∼bellardo/courses/454
Office Hours:	Tu + Th: 0900-0930; W: 1010-1100
Office Hours:	https://users.csc.calpoly.edu/∼bellardo/office_hours.php

Office hours are guaranteed until the earlier of the posted end time or the time at which there are no more students. I am typically in my office outside of my published office hours. Feel free to stop by and talk with me. If the door is closed, please knock. The majority of the time I'll be available to assist you immediately, however there may be some instances where another task is higher priority. If that is the case I'll tell you, and I appreciate your understanding. If necessary we can also set up an appointment outside of the normal office hours to meet.

I will also respond to email, however I do receive a large quantity over the quarter and I tend to fall behind. There may be a day or two lag before you receive a response. You can also contact me via iMessage using the screenname listed above. I will occasionally send announcements to the course mailing list. These announcements get delivered to your @calpoly.edu email address. It is your responsibility to ensure you regularly check that email account. You can always configure the account to forward all email to an off-campus account.

Course Objectives

1. Deepen your understanding of the concepts and theory behind Operating Systems.
2. Learn through hands on experience how operating systems are built.
3. Apply the concepts learned in the lecture in programming assignments.
4. To develop the skills enabling clear communication to peers of operating system strategies, problems, and solutions.
5. To develop the skills necessary for the continuation of life long learning in the area of operating systems.

Prerequisites

CSC/CPE 453.
*****Time*****

Course Website

The course website contains the current course schedule, all labs, and other handouts. The URL for the course website is
`https://www.csc.calpoly.edu/~bellardo/courses/2224/454/index.php`. Use your my.calpoly.edu portal credentials to access the site. See the instructor if you can't log in.

Required Texts

None. All material is available online for free.

Recommended Texts

None. All material is available online for free.

Handouts

Periodically, handouts may be passed out to cover additional material or provide examples. If you miss a class and the handout(s) are not available on the course website, it is your responsibility to obtain a copy from a fellow student. I will not have extra copies of the handouts in my office.

Assignment Weights

I reserve the right to change these weights at any time

Assignment	**Weight**
Operating System	100%
Total:	100%

Milestone Complete	**Estimated Grade**
FAT32 File Read (M15)	A
Process Management and Keyboard Driver (M11)	B
Heap Allocator (kmalloc) M09	C

Consistently demoing late assignments can reduce your letter grade, especially if you wait until the last week of the quarter to demo everything!

Project / Programming Assignments / Labs

There is only one project / programming assignment / lab this quarter. Write your own operating system. This will easily fill the quarter. This project will be broken down into multiple smaller milestones. This will help with both grading and sequencing of the development. The program is individual.

Written Exam

There is currently no written exam planed for the class. I reserve the right to change this decision if the class isn't progressing as well as I'd like.

Plagiarism and Cheating

Cooperative work is an important part of learning; you are encouraged to study together, discuss the lectures, laboratory concepts and computer network issues. However, it is cheating to turn in duplicate code (even one small function or comment), and it is cheating to copy work (even one line) from another student's assignment or file. It is cheating to copy work (even one line) from a published source. It is cheating to lend another student your assignment. It is cheating to write part (even one line) of another student's assignment. It is cheating to take the work of someone else, modify it to appear to be different, and submit it as your own. It is cheating to receive any assistance from any other person (except from me and any special permission that I give you) during an evaluation period. Any attempt at deception (such as resubmitting a program assignment n as program assignment $n + 1$) is considered cheating. It is cheating to make any statement, written or verbal, that is known to be incorrect. It is cheating to knowingly or unknowingly enable someone else to cheat (*e.g.*, leaving your assignment files world readable). You may not submit work that you and another student completed with another person(s) in another course. During a test, if you look at the work of another student, have a device on your desk that has access outside the classroom, or it is determined that your work could not have been done independently, it will be determined that you have cheated. You are responsible for your program code and if someone uses your code during this class or in the future, you will be held equally responsible for the cheating. **If you cheat or your work is similar to that of another student(s), you will receive a course grade of F and a letter will be sent to the campus Judicial Affairs Office requesting that you be suspended if it was the first offense and dismissed if there has been a prior occurrence.**

Topics

1. OS Toolchain, Loading, BIOS
2. Debugging an OS, gdb, VGA driver, and printf()
3. Keyboard driver, both polling and interrupt-driven
4. Interrupt controller, Interrupt handlers, Interrupt Stacks
5. Standard IBM PC components
6. Serial driver
7. x86 long mode programming
8. Page allocators and heap allocators
9. Kernel memory management and page faults
10. Cooperative and preemptive multitasking
11. Process management
12. Computer time management
13. Block and Character device drivers
14. VFS, MBR, FAT32

15. Loading ELF executables
16. System Calls
17. User mode
18. and more!

Sensitive communication via email

I generally do not discuss grades or course standing questions over email because emails are easily forged and are generally insecure. However, I am willing to discuss such matters if proper email encryption is used. This requires an out-of-band key exchange. If you are interested in this see me after class or during office hours.

Disclaimer

This syllabus is a forward looking document. It conveys my expectations for this course as of the start of the quarter. It is not a contract. I reserve the right to make minor and/or major changes to all aspects of this syllabus and this course as I see fit.