

CS 481/ECE 437 Operating Systems, Spring 2019

Instructor: Jed Crandall, crandall@cs.unm.edu

PGP info is on my website: <https://www.cs.unm.edu/~crandall>

Never hesitate to email me directly about anything. If you're emailing me something about a group assignment, always cc the members of your group unless there's some reason for privacy.

Office and office hours: Farris Engineering Center 3060. Mondays and Tuesdays 2pm to 3:30pm, or by appointment.

Class meeting time and place: MWF from 1pm to 1:50pm, in ME 210. Attendance will not be recorded and will not be explicitly part of your grade, but I strongly encourage you to attend class regularly.

Prerequisites: CS 341 (Computer Organization and Design) or an equivalent class before taking this class is strongly recommended.

TA: None.

Mailing list and other : I will create a mailing list for course announcements and give you info about it early in the semester. I will also create a forum for discussion, probably an IRC chatroom.

Course website: <http://www.cs.unm.edu/~crandall/operatingsystems19/>

I'll post lots of important stuff here, like the lab assignments, links to the mailing list, *etc.*

Required text: NONE. We'll use a lot of online resources such as Wikipedia and academic papers.

Grading: The final grade will be calculated as 60% labs, 20% midterm #1, and 20% midterm #2. The points for each will be added up and divided into the total possible before weighting, so a 100-point lab does not *necessarily* contribute the same amount to your grade as a 100 point midterm. I reserve the right to curve the overall grades at the end of the semester (up, never down) if I don't feel that they reflect the amount of effort students put into the class. The overall grade will be out of 100, weighted as described above. For letter grade purposes, below 60 is an F, 60 and up is a D, 65 and up is a C-, 70 and up is a C, 75 and up is a C+, 80 and up is a B-, 82 and up is a B, 85 and up is a B+, 87 and up is an A-, and 90 and up is an A. I rarely give A+'s, usually to students who teach me something.

Labs: Tentatively, there will be three lab assignments. How each lab gets graded will be written on the lab assignment. Tentatively, the three labs are expected to be:

1. Analyzing a system call trace for one or more shell commands, with pipes and some other interesting things going on.
2. Investigating processes on the system, including their address spaces, open files, and scheduling.
3. A lab about concurrency, probably requiring C programming and possibly based on the lock set algorithm.

You will be required to maintain your own installation of Linux where you have root access. This can be a bootable USB stick, virtual machine, old piece of hardware, or whatever you want but the exact version and distribution of Linux will be prescribed by me and you will not be allowed to install graphics (clutters up the process list).

Be sure to start early on the lab assignments and get the help you need to get them done. They will be substantial efforts.

Late assignments will be accepted only in special circumstances (medical, etc.).

For lab writeups, English spelling and grammar may affect your grade, since it's very difficult for me to read---and therefore also difficult for me to understand---English writing that has poor grammar. There are various University resources for helping students with English writing, contact me if you need help finding these resources.

Homeworks: There will be about eight to ten relatively light homework assignments throughout the semester, that will not be turned in or graded.

Midterm #1: Midterm #1 will be on Friday, March 8th, 2019 at 1:00pm in the normal class meeting place at the normal class meeting time. You will have 50 minutes to complete the exam. It may be curved.

Midterm #2: Midterm #2 will be on Monday, April 22nd, 2019 at 1:00pm in the normal class meeting place at the normal class meeting time. You will have 50 minutes to complete the exam. It may be curved.

Final: There will be no final.

UNM statement of compliance with ADA: “Qualified students with disabilities needing appropriate academic adjustments should contact the professor as soon as possible to ensure your needs are met in a timely manner. Students must inform the professor of the disability early in the class so appropriate accommodations can be met. Handouts are available in alternative accessible formats upon request.”

Cheating and collaboration, personal statements:

Every homework assignment and lab assignment, unless I specify otherwise, should be an individual effort where you do your own work and only discuss the assignment with your classmates at a high level.

Each lab will have a special section of the assignment writeup where I'll try to be as specific as possible about what is allowed or not allowed with respect to cheating and collaboration. In general, you are expected to do your own work, and for group work all group members are expected to contribute. (Note: I don't anticipate assigning any group assignments this semester, but reserve the right to).

If you copy and paste any material (English text, figures, etc.) from any source you must clearly delineate it and attribute it properly to its source. Representing the work and materials of others as your own will not be tolerated in this class. Anything that is a full sentence or more that was not written originally by you has to be in quotes or indented in italics with a reference to clearly indicate where the material came from. Even if it was an accident, any kind of plagiarism in this class will result in an F in the class and possibly further actions pursuant to UNM policy.

Each test will state at the top what materials you're allowed to use (book, notes, etc.). Not noticing, for example, that the top of the test says that it's not open notes is not an excuse. Anything not specified as open is closed. In other words if the test instructions don't say “open-iPod” you should assume that the test is closed-iPod, and if the test instructions don't say “open-cheat-sheet-on-the-inside-of-your-water-bottle-label”, assume that the test is closed-cheat-sheet-on-the-inside-of-your-water-bottle-label.

All university policies regarding these matters will be strictly enforced. I will give the cheating parties an F in the class and report them to the Dean of Students, but I may pursue further action in some cases.

Grades of “Incomplete” or “Withdrawal”, changes in grade mode, or any other special accommodations will only be considered in cases where circumstances arose that were outside the control of the student (such as a death in the family, medical issues, etc.). Losing a scholarship or visa status because of a low grade is a very serious issue, but it's up to you to do well in the classes you register for to make sure that doesn't happen, not up to the instructors of the classes you take.

My expectations of you as students:

- **Be studious:** I'm fairly old-fashioned, I expect students to come to class, to come on time, to stay on task, to take the time to make sure they understand things well, *etc.* Also, because of the ITV format I ask that we speak one at a time and that you please not have side conversations while somebody else is talking.
- **Take responsibility for your own learning:** you're registered for a 400-level class at a major research institution. If you find that coming to the regularly scheduled class time is a waste of time, then you're probably not taking responsibility for your own learning. Don't expect me to spoon-feed you information that is already well-known, you don't want to pay ~\$750 in tuition for me to tell you what's in a ~\$90 textbook that you could read yourself if you wanted to. My job is to teach you how to learn things that nobody knows yet and spark in you a passion for computer operating systems. A good philosophical approach for you to take in this class is to “teach the teacher.”
- **Do only excellent work:** anything worth doing is worth doing well. In terms of your grade, you'll be much better off doing solid work that is very simple than to try to do complicated things and do a shoddy job of it. Keep your work and writing simple and make sure everything you do is excellent and technically sound.

Material to be covered:

Processes, threads, scheduling, process communication and signals, memory management, virtual memory, paging, virtualization, concurrency, race conditions, deadlocks, priority inversion, file systems, I/O. For each of these topics, I'll try to include case studies and info about cybersecurity.

A heavy emphasis will be placed on UNIX and UNIX-like systems, especially Linux.

The class will also have several lectures and homeworks that focus on societal impact issues.

Ethical scholarship and proper use of UNM resources:

You're responsible for understanding the laws and UNM policies pertaining to everything we do in class.