CS 253: Systems Programming
Fall 2025 4 credits
Hybrid format: Recorded lecture, lab Monday 3:00-5:45 in MLH 310

Instructor Information

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Office Hours: Monday 1:30-3:00, Thursday 10:30-12:00
Course Website: `https://isoptera.lcsc.edu/seth/cs253`

Course Description

Detailed overview of software development on unix-like operating systems with an emphasis on systems programming using C, C++, or an equivalent systems programming language. This includes an introduction to command-line usage and scripting using a common shell. Students will learn about mechanisms available on POSIX-compliant platforms such as signals, pipes, and file descriptors. Co-requisite: CS211.

Pre-requisite

CS211 with a C or better, may be taken concurrently

Course Learning Outcomes

At the end of the course, students should understand:

- How to operate a command-line interface.
- How Unix-like operating systems such as Linux are structured.
- C memory management, including pointer arithmetic and heap allocation
- The basics of unix programming using C, including signals, fork/exec, pipes, and related constructs

Textbook

"The Linux Command Line", William Shotts, second edition. Available for free (.pdf only) from `http://linuxcommand.org`

Communication Policy

Email is the best way to reach me, and I try to respond within 24 hours during the work week (Monday through Friday). Often I respond on weekends as well, but less consistently.

Grading

Your grade will be calculated based on the following items:

Item	Percentage of grade
Midterm Exam 1	10%
Midterm Exam 2	20%
Final	30%
Lab	10% total
Autoquiz	5% total
Active Learning	10% total
Projects	15% total

Attendance will not be taken in this class except as required for fiancial aid purposes. However, all material presented during lecture is "fair game" for the midterm and final, and some of this material may not be in the book as well. Therefore I recommend that you always attend class.

I strive to return feedback on assignments within a week, however, other priorities such as providing content for class and answering student questions may override this goal.

Grades will be assigned according to a standard curve, that is:

A: 90% +
B: 80%- 90%
C: 70%- 80%
D: 60%- 70%
F: less than 60%

Use of + or - grades (such as B+ or A-) and curves will be at the instructor's discretion.

Course Assignments

Course assignments will appear on the course website. There will generally be a weekly lab assignment, but also projects with a longer timeframe, a practice tool on isoptera called autoquiz, and occasional active learning assignments.

Deadlines and late work

Late work will not be accepted except by instructor discretion. However, partial credit will be given for partially-completed work. It is better to turn in an unfinished assignment for partial credit than to not turn in something on time and receive a 0.

Academic Dishonesty

Cheating on any assignment will result in failing the class. Some things which constitute cheating in this class are:

- Copying another student's homework
- Turning in homework created by another student
- Reading another student's answers on a test
- Sharing all or part of your completed homework with another student before the assignment is due

Appropriate collaboration on homework involves sharing ideas with other students, but not source code! Although it is often tempting to help another student by showing them how your completed program, script, or command works, this is not helpful to their learning. However, this does not mean you cannot collaborate with other students on homework. Sharing of ideas, principles, and algorithms is permitted and encouraged.

Tentative Course Calendar

Note: Students often take CS253 and CS211 at the same time, which is fully supported. The schedule below emphasizes C once students taking CS211 have had some time to learn the basics of C++. To begin working in the right direction, we'll add in a little bit of C each week starting at the beginning, so that everyone is ready when the class re-focuses on C about halfway through the class.

CS253 Systems Programming Fall 2025 Calendar		
Week	**Course Content**	**Relevant Chapters**
Aug 18	Introduction to Linux, file tree, terminals, SSH	1-3
Aug 25	Input redirection, pipes, more command line usage	4-6
Sep 1	Labor day (no class Monday), Permissions, more advanced shell usage	7-9
Sep 8	Variables Processes and process management, OS structure	10 and 11
Sep 15	Package Management, Installing Programs, Software Development	14 and 22
Sep 22	Midterm Exam 1 and Answers, finding things	16
Sep 29	Archiving, backups	17, 18
Oct 6	Regular Expressions and Text Processing	19, 20
Oct 13	Strings in C, debuggers	TBD
Oct 20	C Memory Management	TBD
Oct 27	Fork/exec process management	TBD
Nov 3	Midterm Exam 2 and Answers, C programming reminders	
Nov 10	Pipes and File Descriptors, Signals	TBD
Nov 17	Remaining C programming topics	TBD
Nov 24	Thanksgiving Break! No class all week	
Dec 1	Topics of Interest or Review	
Dec 8	Final Exam Monday, December 8, at 3:00 PM in MLH 310	

College Statement on State Law, Academic Freedom, and Course Expectations

Effective July 1, 2025, Idaho Code § 67-5909D establishes that courses "derived from or that promote" certain concepts associated with critical theory or diversity, equity, and inclusion (DEI) may be subject to additional state-level reporting and oversight. However, the statute also explicitly affirms that it does not "limit the free discussion of ideas in a classroom setting." At LC State, this provision protects our ability to foster a learning environment grounded in open inquiry, respectful dialogue, and academic integrity.

As one of Idaho's four public four-year institutions, LC State is governed by policies of the Idaho State Board of Education, including the following principles articulated in SBOE Policy III.B:

"Membership in the academic community imposes on administrators, faculty members, other institutional employees, and students an obligation to respect the dignity of others, to acknowledge the right of others to express differing opinions, and to foster and defend intellectual honesty, freedom of inquiry and instruction, and free expression on and off the campus of an institution."

In line with these principles, this course is designed to encourage your academic development through thoughtfully selected readings, activities, and assignments. You are invited to engage critically with course materials, analyze competing viewpoints, and arrive at your own reasoned conclusions. While some content may challenge your perspective, you will not be asked or required to adopt any specific ideological or political position.

As you review the course syllabus and other instructional materials, please know they have been developed to support a respectful, engaging, and rigorous learning community. If at any point you decide that this course does not align with your academic preferences or goals, you are encouraged to contact your Academic Advisor (full email: advisor@lcsc.edu) to discuss available alternatives. Be sure to consult the LC State Academic Calendar for important deadlines related to course withdrawal or schedule changes. If you are receiving scholarships or financial aid, consult with the Financial Aid Office about potential impacts on scholarships or financial aid eligibility.

If you have questions about course content, instructional approach, or academic freedom policies, please contact the Provost/VP of Academic Affairs (full email: academicaffairs@lcsc.edu). We are committed to your success and to upholding LC State's standards of academic excellence, respect, and transparency.