

CS 4414/5416: Systems Programming

Course Introduction

David Bindel

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Welcome!



Prof. David Bindel

Office: CIS 487

Hours: Thu 1:30-2:30, Fri 1-2

<https://www.cs.cornell.edu/~bindel/>

Course information at:

<https://www.cs.cornell.edu/courses/cs4414/2026fa/>

Previous	Current
Ken Birman	David Bindel
C++	Rust
Cloud-hosted ML	Cloud-hosted dev
Separate ugrad/MEng sections	Combined sections
Grade 75% project	Grade 18% project

- 4414 for CS systems requirement
- 5416 for graduate credit (including early-admit MEng)
- 5416 additional learning outcome: cloud-based Linux development of networked services
 - 4414 can participate, but not required
- Cannot take both!

- Non-CS students should add themselves to the waitlist
 - If you have trouble, read the FAQ
 - If you still have trouble, file a ticket
- See the FAQ for the latest
- I can help navigate the system, but I do not control it!

- Rust programming (about three weeks): the language fundamentals, how the main abstractions are implemented
- Writing fast code (two weeks): modeling and profiling, role of memory and optimizing compilers
- Unix abstractions (three weeks): files, pipes, virtual memory, processes and IPC, introduction to sockets

- Concurrent programming with threads (three weeks): message-based and shared-memory concurrent programming, concurrent network programming
- Asynchronous programming (two weeks): async/await, nonblocking I/O, and behind-the-scenes implementation via state machines

- You know how to program in C
 - Well! And at least one other language!
- You know enough about a Unix terminal to be dangerous
- You know something about computer org (a la 3410)

- Readings: Mostly from the Rust book and CS:APP3e
- Class sheets (10%, 0.5 pts/class): responses and questions
- Lab/discussion (12%, 1 pt/class): computer activities!
- Projects (18%, 3pt/project): coding on your own time
- Midterm (**20%**): scheduled for 9/22, mostly Rust
- Final (**40%**): not yet scheduled, mostly systems concepts

Policy highlights

- We expect you to read and practice outside class
- Bring paper and pen/pencil to class (devices put away)
- Bring a computer to the lab/discussion
- Hard deadlines are hard. Submit on time!
- Corey Torres will help with SDS; we will use ATP
- Makeup midterm will be a few days later at 8AM
- Groups are encouraged for labs and HW
 - But you are responsible for understanding things yourself

- May use to search, explore and review, practice
- Please don't use it for coding (you won't learn as much)