

SYLLABUS – CS 4536: Programming Language Design  
Instructor: Rose Bohrer (pronouns: she/her)  
Time: Tue,Fri | 2:00 PM – 3:50 PM  
Classroom: Innovation Studio 205  
Instructor Office: Fuller Labs 139  
Office hours: **Thursdays, 11am-12pm, in-person in FL 139**

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## Sections About People (The Important Stuff)

### Inclusion + Classroom Climate Expectations

Computer science is for all of us. That means you too. It is important to take a moment to say this because I can guarantee there are students in this class who do not always feel welcome here. Maybe even you.

Inclusion only gets better when people work together to make it that way. I expect all of you to welcome each other, in your own way. On my part, I hope to create a classroom climate where you would feel comfortable sharing any feedback you have on this topic, and also feel comfortable reaching out for help if you do experience any ignorant behavior. Though I have not lived through all the things that my students live through, I know what it is like to look around the room and see that nobody looks like you. I will do my best.

To be clear, here is an incomplete list of things that need to be said more in CS classrooms: All Black Lives (Still) Matter, Anti-Asian Racism is a Pandemic, No Human is Illegal, and Disability Rights are Human Rights.

### Mental Health (is in the Back)

I have put my mental health statement at the end of the syllabus to avoid triggering anyone. I encourage you to read it when you are in the right mood because mental health is more important than school.

### Disability + Accommodations

The best way to arrange accommodations is to have OAS (Office of Accessibility Services) [notify me](#) – this helps me keep everything organized. It is standard to remind you of this on the syllabus.

**OAS Email:** AccessibilityServices@wpi.edu    **OAS Phone:** (508) 831-4908

***Do you want to know what accommodations are or whether you can get them?*** OAS and your doctor are good people to ask. I'm also happy to give my non-professional advice for things I personally live through: autism, ADHD, Ehlers-Danlos Syndrome.

***Is there an accommodation that would help you, but OAS does not usually provide?*** I would love to discuss with you. I can't promise anything, but we should try.

### Stupid Question Policy

It is course policy that there are no stupid questions. If you still feel that your question is stupid, it is course policy that you should ask it anyway. This policy matters because when you need help, you may not be sure how to ask a perfect question yet. You may also have questions that relate to background knowledge or life outside of class, and these might be even more important. This is a list of questions that are not stupid. It is not complete (there are no stupid questions):

- What happened in the last two weeks of class?
- What do I do if English is hard?
- What does the school counseling center really do? Does it really even help?
- I'm having a hard time in school. What are accommodations? Do I count?
- How do I do well in school if I work two jobs and I'm still hungry?
- How am I supposed to be motivated when **<\*waves hands wildly at the world in general\*>**

I cannot do my job well if my students are afraid to ask for help.

## Deciding Whether to Take the Course

### What's This Course About?

The scope of this course is broader than the course description may imply: we cover a broad range of perspectives on programming language. This does not mean that it covers debates like “Should we program in language X vs. Y?” Rather, I cover: what do different kinds of people care about when they think about programming languages? How do researchers in theory, software engineering, social sciences, and humanities ask different kinds of questions about programming languages?

### What Will I Do In This Class?

You will do the following in your homework assignments:

- 1) Implement parts of a programming language (parsing, evaluation, type-checking) in the Rust programming language
- 2) Perform miniature language design exercises
- 3) Perform a usability study about language design with your classmates
- 4) Engage critically with academic research about the intersections of human-computer-interaction with social issues as it pertains to programming languages.

### Learning Objectives

Through the above activities, we aim to meet the following list of course objectives:

- 5) Identify problems where programming language design can be used
- 6) Communicate with clarity and technical depth about language design
- 7) Develop a mathematically-precise definition of a language's syntax
- 8) Develop a mathematically-precise definition of a language's semantics
- 9) Implement interpreters for programming languages
- 10) Situate your own work among the schools of thought discussed in class

### Why Should I Take It?

Potential reasons include:

- You will work as a programmer. Most people don't write compilers for a living, but most career programmers will use language design skills one day, because most big programs contain “little languages” – features that use these same design skills
- You will work in human-computer interaction or other fields that rely substantially on design skills
- You want to be prepared to perform or consume research about programming languages

## What is The Course Schedule?

Each lecture has material associated with it in the HCPL textbook. Make sure to do the reading for each chapter to help understand the lecture material.

**Schedule note:** The last week of the term, the instructor is absent because she must attend a research conference. The TA will run the review session and proctor the exam, which happen during class time (or in the proctoring center, if you have accommodations)

#	Topic	Date	Read Ch.	Deadline
1	Course Intro	25-Aug	1,2	
2	Rust	29-Aug	3	
3	Regex+Context-Free	1-Sep	4,5	A1
4	Syntax Trees, PEGs	5-Sep	6,7	
5	Evaluators	8-Sep	7	A2
6	Op. Semantics	12-Sep	8	
7	Types	15-Sep	9	A3
8	Design 1	19-Sep	10	
9	Design 2	26-Sep	12,13	
10	Natural Language	29-Sep	17	A4
11	Gender+Disability	3-Oct	13,14	
12	Media+Play	6-Oct	15,16	
13	Review	10-Oct		A5
14	Final	13-Oct		

## How Do Grades Work?

The grade breakdown is:

- 75% assignments: 5 assignments x 15% each
  - o The average assignment, by point count, is roughly 75% programming, 25% written problems such as design exercises
- 5% attending and participating on the day we do user studies in class (to be announced, no earlier than Sep 26)
- 20% final exam
- I do not provide built-in extra credit opportunities, but if the default grading scheme is not serving you well, I am open to discussing additional options. If so, the important thing is to talk with me early enough that we have time to act.

The majority of the assignment work is auto-graded programming work where the score is based on how many tests your code passes. On each assignment, a minority of the work is design work, which is graded by completion, i.e., the percentage of tasks where an honest effort is made.

To provide significant flexibility without compromising rigor, all grades follow the **Honest Effort Policy**:

- If you make an honest effort on an autograded assignment /submission by the deadline, you gain the privilege to resubmit the assignment as many times as you want, at any time up to the last day of class, without grade penalty.

- All homework which is not autograded, is graded based on whether an honest effort is made, on a per-problem basis
- We wish to reward students who reach out to course staff for help when needed. If you attend office hours or otherwise connect with course staff for help on an assignment, we will always consider that assignment to be an honest effort.
- If a student makes an honest effort on the midterm and every assignment, they earn the right to take the midterm a second time without penalty at the end of the course, upon request
- If a student makes an honest effort on every assignment and test but would otherwise have a failing grade, they pass the course with the minimum grade required to use it toward their degree. I do not award A's for effort but I do award passes for effort.

## Course Details

### Textbook(s) / Learning Materials

The textbook for this course is “Human-Centered Programming Languages” (HCPL), a free e-textbook I wrote specifically for this course. The book is available at [bookish.press/hcpl](http://bookish.press/hcpl). The book is not currently available in hardcopy, but you are welcome to print it out.

Some students seek additional study materials outside the textbook. This course encourages such curiosity. My textbook contains extensive references to other works. Curious students are recommended to start their exploration with these works, whose quality I have already vetted.

The HCPL textbook is based on a semester's worth of notes from a previous version of this course and a summer of intensive writing – it is a thorough and complete resource. At the same time, revisions are expected to continue. Students are welcome to send professionally-worded feedback on the book. As is typical, I plan to list your name in the acknowledgements if I use your feedback.

### Do I Need Any Software?

You will need to install the Rust language and an editor for it. Visual Studio Code is the typical editor.

You should also join the course Slack, used for announcements and asking questions:

[https://join.slack.com/t/undergradprog-gsg1993/shared\\_invite/zt-21rqxbpd2-IKUnLY16xsvtC\\_shrJTKQg](https://join.slack.com/t/undergradprog-gsg1993/shared_invite/zt-21rqxbpd2-IKUnLY16xsvtC_shrJTKQg)

### Student Hours/Office Hours

**For CS 4536: Thursdays, 11am-12pm, in-person in FL 139**

**For CS 536: Tuesdays, 10am-11am, in-person in FL 139**

CS 536 students receive priority on Tuesday office hours, but 4536 students are welcome.

If the time or location do not work for you, we can arrange others.

**Am I Stuck Enough for Office Hours?** Yes. Actually, you do not need to be stuck. You can come because you just feel like it. I want people to come.

**What are They?** Office Hours, also called Student Hours, are time specifically set aside for the instructor (me) to give hands-on help to students (you). Office hours are one of the main and first places you should go if you would like help understanding anything in the course, both for help with a specific task or general help. One advantage of office hours is that you can ask for direct or detailed help with course

work. Although we spend most of the office hours time talking about things from the course, they can also be a good opportunity for unstructured learning. If you are curious about anything such as related topics or current research in this area, feel free to ask.

***What if I Need More Help?*** I know there will limited scheduled hours of office hours each week, so it can be hard to get enough individual help in a busy week. I want to help you despite these limits, so here is my advice for how to get help despite our limited resources:

- If my office door is open, you can always ask whether I am free to answer a question.
- You are always welcome to ask questions on the course Slack at any time. You are encouraged to ask questions early and often.
- You can post the question on Slack where other students can see it and even answer it. This also reduces the number of duplicate questions and helps me answer you faster
- I will check Slack at least once every weekday during business hours. I usually answer it much more, but questions asked at night are usually not answered until the next day.
- Using Slack helps me be more available to help you
- If you want more scheduled office hours, tell me. I cannot promise them, but I will try.
- If you want an individual meeting for 1-on-1 help, tell me. I may respond by scheduling general office hours instead, but it's good to ask because sometimes I can do 1-on-1.
- If you want a specific kind of office hours such as a review session, tell me.
- If you're not sure how to start, here are [tips](#) for how to ask questions that get good answers.

### Attendance

Attendance is only explicitly required on days we have exams and the day we perform user studies in class (to be announced), because this is essential for your homework assignment. If you must miss those days, arrange an alternative solution with me by email. On all other days, it is an expectation that you will attend most days and only miss class when you have a reason to do so. However, I will not ask you to give me a reason or to tell me explicitly when you miss class. Just attend by default and miss when you need to.

### Where Do I Find The Course Content Online?

Canvas. I do not have a separate course website.

### Extension Policy

Because of the honest effort policy, I expect that requests for extensions will be rare. That being said, I cannot remember the last time that I said no to an extension outright. I will typically say yes to extension requests, but you must request before or as soon as possible to the deadline so that I can serve as a source of accountability for you. That is, if you fall asleep and miss a submission deadline, I will accept a late submission the next day, but if you do not participate consistently in the course and then attempt a late submission of all work at the end of the term, it would not be accepted. It is also common for me to counter-propose a shorter extension when long extensions are requested.

### Holiday Policy

Because our students come from many different backgrounds, there is potential that I inadvertently schedule important activities on a day when you have an important holiday (e.g., religious, cultural,

national). If required course activities such as exams interfere with your holiday, please contact me as soon as you can to make alternative arrangements.

### Technology Policy

If financially feasible, you are expected to bring a laptop to class. We might allocate class time for you to work on programming homeworks, for example

### Academic Integrity Policy

WPI's website has university-wide academic integrity policies. The policy for this course is that you are encouraged to talk together about problems but that you should write everything you submit. If you need to ask questions about your code on Slack, send them in a group DM to course staff, not somewhere publicly visible. All other questions can be asked publicly.

## Mental Health

Content warning: transphobia, racism, xenophobia, suicide, and police brutality.

I started this job in Fall 2021. My first year here coincided with the peak of the worst mental health epidemic in WPI's history, with the deaths of 7 students in 6 months. Most of the deaths were by suicide and most of the victims were in computing-related majors.

On a personal level, I want my students to know this profoundly shapes how I view the job. When compared against your personal well-being, academic achievement ***does not matter to me***. My favorite part of my job is the opportunity to support you as a person, and mental health is key to that. I don't want to just repeat some boilerplate, so here are some things I want you to know instead:

1. I have been there. There is nothing you can say or do that will scare me. I mean that in a good way.
2. Social connection is good for you, so I try to encourage social interaction in the course design.
3. I'm not going to judge you, period, I just want you to be okay. Missed class? Don't know what's going on? Cried in lecture? Vomited on my office floor? I'm not going to judge you. ***I need you to internalize this fact.***

I have been encouraged to tell you to contact the counseling center for non-emergency treatment ([sdcc@wpi.edu](mailto:sdcc@wpi.edu), [508-831-5540](tel:508-831-5540), 16 Einhorn Road) or call Campus Police ([508-831-5555](tel:508-831-5555)) if someone's life is in immediate danger. However, nobody is stopping me from also telling you:

1. There are many therapists in Worcester that take student insurance
2. General practitioners ("your regular doctor") are the main source of antidepressant prescriptions.
3. Calling American police during mental health crises has gotten innocent patients killed, especially Black, Brown, trans, and disabled patients. They have traumatized people who I personally cherish. Mobile crisis response teams are an alternative and are often much better at avoiding violence. Community HealthLink has one in Worcester. I do not know whether it is good, but I feel I should share a link: <http://www.communityhealthlink.org/chl/youth-and-family-services/youth-mobile-crisis-intervention-ymci>
4. The Trans Lifeline (877-565-8860) is a crisis-intervention hotline ("suicide hotline") run by binary and nonbinary trans people. As of 2020, they do not call police unless required by law.

The family of one of the victims (Nathan S. Morin) called for donations to [American Foundation for Suicide Prevention](#). In his memory, consider this a standing invitation to support mental health orgs in our community.

In conclusion: I think about mental health a lot. Like, a lot a lot. Don't be shy, okay?