

# CSC 352 - Systems Programming and UNIX

**Fall 2024**

**TuTh 2:00PM-3:15PM, ILC 130**

## Description of Course

Programming in C, including arrays, lists, stacks, queues, trees, pointers, and dynamic memory allocation.

Unix topics, including debuggers, makefiles, shell programming, and other topics that support C programming.

### Catalog Description:

Programming in C, including single and multi-dimensional arrays, lists, stacks, queues, trees, and bit manipulation. Unix topics, including debuggers, makefiles, shell programming, and other topics that support systems programming.

## Course Prerequisites

Prerequisite: CSC 210, CSC 252

## Instructor and Contact Information

### Instructor:

Eric Anson

Office: Gould/Simpson 809

Tel: 520 621-2675

Email: [eanson@arizona.edu](mailto:eanson@arizona.edu)

(But note the **Course Communications** section below!)

### TAs:

Noah Albright [prime47x@arizona.edu](mailto:prime47x@arizona.edu)

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Josh Samadder [joshsamadder@arizona.edu](mailto:joshsamadder@arizona.edu)

Ryan Wixon [ryanwixon@arizona.edu](mailto:ryanwixon@arizona.edu)

Class Email:

Questions about the class, assignments, or the material should be sent to the following email that goes to the instructor and all the Tas:

[cs352f24s1@cs.arizona.edu](mailto:cs352f24s1@cs.arizona.edu)

## Office Hours

(Exact office hours subject to change, consult piazza for up-to-date information.)

Additional hours may be available by appointment.

### Eric Anson

Mon, 2:00-3:30, GS 809

Tue, 3:30 – 5:00, GS 809

### TAs Office Hours

Here are the office hours for the TAs that will be held in GS 938:

Monday: 1:00-3:00

Tuesday: 12:30 - 2:00

Wednesday: 12:00 - 3:00

Thursday: 11:00-2:00

Friday: 11:00-12:30, 1:00-2:00, 3:00-5:00

There will also be OH online:

Tues 10:00am-11:30am

Thurs 10:00am-11:30am

Fri 9:00am-10:00am

Zoom link: <https://arizona.zoom.us/j/88598813314>

## Websites

Piazza: <https://piazza.com/arizona/fall2024/csc352/home>

D2L will be used for distributing grades, posting videos, and quizzes.

GradeScope will be used for returning exams, quizzes, and some assignments.

## Course Format and Teaching Methods

There will be two lectures a week. Attendance for the lectures is mandatory. Out-of-class activities will include reading about and exploring interacting with Unix and C as well as a significant number of programming projects.

## Course Objectives

- Learn about using the Unix operating system and the bash shell.
- Learn the C programming language including memory allocation and management and the use of pointers.
- Learn various programming tools available in the Unix environment.
- Get further experience in designing, writing, testing, and debugging code.

## Expected Learning Outcomes

Students will be able to:

- Being able to interact with a Unix environment via a Bash shell including navigating the file system, being able to copy, delete, edit, and search files, understanding and utilizing I/O redirection and pipes
- Understanding of, and facility with, Unix program development tools such as **make**, **gcc**, **valgrind**, etc.
- Being able to understand, write and debug simple Bash shell scripts.
- Being able to understand, write and debug complex C programs that involve multiple source files, header files, pointer manipulation, and dynamic memory management.

## Makeup Policy for Students Who Register Late

Students who register late will not be able to make up missed work.

## Course Communications

The primary path for outside-lecture communications will be Piazza. The instructor and TAs can also be reached through email. All email should be sent to [cs352f24s1@cs.arizona.edu](mailto:cs352f24s1@cs.arizona.edu). This email alias will forward the email to both the instructor **and** the TAs. Direct email to the instructor should only be used for confidential matters which would be inappropriate to share with the TAs.

## Required Texts or Readings

- K. N. King, *C Programming*. W. W. Norton & Co.
- Cameron Newham and Bill Rosenblatt, *Learning the bash Shell*, 2nd Edition. O'Reilly Media, Inc. Print ISBN-13: 978-1-56592-347-8.

There are many good books on C programming, Unix, and bash programming. The student is encouraged to explore any of these.

## Assignments and Examinations: Schedule/Due Dates

### Projects

This class will include several programming projects. The following schedule gives approximate due dates for each one. The schedule below is approximate; as we assign the projects, it may occasionally be necessary to adjust due dates. Likewise, the topics mentioned are our current plans, and are subject to change.

It is possible that we might assign **fewer** projects than listed below; however, we will not assign more.

Project 1	due on or about Fri, Sep 13	Bash scripting, Introduction to C
Project 2	due on or about Fri, Sep 20	Basic C constructs
Project 3	due on or about Fri, Sep 27	First experience with arrays and/or pointers
Project 4	due on or about Fri, Oct 4	More experience with pointers

Project 5	due on or about Fri, Oct 18	Introduction to malloc()
Project 6	due on or about Fri, Oct 25	Practice with malloc()
Project 7	due on or about Fri, Nov 1	Introduction to free()
Project 8	due on or about Fri, Nov 8	Practice with free()
Project 9	due on or about Fri, Nov 22	Misc topics in C; also continue w/ pointers
Project 10	due on or about Fri, Dec 6	Misc topics in C; also continue w/ pointers
Project 11	due on or about Wed, Dec 11	Misc topics in C; also continue w/ pointers

Projects will be due at 11:59 pm; most or all projects will be turned in electronically, using the "turnin" program on Lectura. There will be an 8 hour "grace period" during which projects will continue to be accepted without penalty, but after that late work will not be accepted. Additionally, this class does not allow re-submission of work after the due date.

### Midterms

We will have two midterm exams. They will be held during the regular lecture times in our regular classroom. They are tentatively scheduled for Thu 10/10 and Thu 11/14.

### Pop Quizzes

Pop quizzes will be given frequently. These quizzes will be given in class. Students must be present to take the quizzes. No makeup quizzes will be given, but the lowest 1/5 of the quiz grades (in favor of the student) will be dropped to allow for unavoidable absences.

### Written Assignments

There is the possibility of a few short, written assignments. Some of these assignments might be online.

### Final

There will be a cumulative final which will be given in our regular classroom on:

**Mon, Dec 16, 3:30 – 5:30 PM**

## **Final Examination**

There will be a cumulative final given.

**The final is scheduled for**

**Mon, Dec 16, 3:30 – 5:30 PM**

<https://registrar.arizona.edu/faculty-staff-resources/room-class-scheduling/schedule-classes/final-exams>

## **Grading Scale and Policies**

### Grading Scale

We will use a simple grade cutoff scheme. This means that if you earn the number of points listed for a given grade, you are guaranteed that grade. At the end of the semester, we reserve the right to **lower** these cutoffs (meaning that it might be easier to earn a good grade);

however, we do not guarantee that we will do so. However, we guarantee that we will not raise these cutoffs (making it harder to earn a good grade).

- 90% A
- 80% B
- 70% C
- 60% D

#### Point Distribution

Points will be distributed as follows:

- 10% Quizzes & Written Assignments
- 40% Assignments
- 30% Midterms
- 20% Final Exam

Within each category, points are distributed evenly; that is, every quiz is worth the same as every other, and every assignment is worth the same as every other. Thus, the exact value of each quiz or assignment will depend on the number of each event that is assigned.

#### Grading Schedule

Projects will be graded, typically, within 6 days of the due date. If exceptions must be made occasionally, staff will inform the students about the delay and the reason for it.

Pop quizzes and exams will be graded within 10 days.

#### **Incomplete (I) or Withdrawal (W):**

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <https://catalog.arizona.edu/policy/courses-credit/grading/grading-system>.

**Dispute of Grade Policy** If you have an issue with how a quiz, project, or exam was graded, you must submit a request for a regrade (through email) to within 7 days of when the item was returned to you.

### **Scheduled Topics/Activities**

This is a list of the topics we will cover. The dates may change slightly. Every semester the pace moves a little differently based on student questions, etc. There are no assigned readings for these topics. While outside reading in the recommended (or other) texts is encouraged, all information required will be on the slides which will be posted on D2L.

Week 1	Aug 27, 29	Introduction, Basic Unix
Week 2	Sep 3, 5	Basic C, shell scripting
Week 3	Sep 10, 12	Basic C, shell scripting
Week 4	Sep 17, 19	Arrays, Structs, Pointers
Week 5	Sep 24, 26	Arrays, Structs, Pointers
Week 6	Oct 1, 3	Structs, Pointers, Program testing, valgrind
Week 7	Oct 8, 10	gdb, Midterm on 10/10
Week 8	Oct 15, 17	gdb, gcov
Week 9	Oct 22, 24	cmd line arguments, file I/O, free
Week 10	Oct 29, 31	C Preprocessor
Week 11	Nov 5, 7	C programming topics
Week 12	Nov 12, 14	separate compilation, midterm on 11/14

Week 13	Nov 19, 21	system calls, make
Week 14	Nov 26	make, THANKSGIVING on 28th
Week 15	Dec 3, 5	more Unix, performance tuning
Week 16	Dec 10	performance tuning, program hygiene
	Dec 16 (3:30)	Final

## Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Some learning styles are best served by using personal electronics, such as laptops and iPads. If these are used for other purposes (games, web browsing, videos, etc) they can be very distracting for other students. Please only use devices for classroom related activities during the lectures. In this class bringing laptops is encouraged as students might want to try bits of code during the lectures.

## Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>

Also watch the video available at

[https://arizona.sabacloud.com/Saba/Web\\_spf/NA7P1PRD161/app/me/ledetail;spf-url=common%2Flearningeventdetail%2Fcrty0000000000003841](https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/app/me/ledetail;spf-url=common%2Flearningeventdetail%2Fcrty0000000000003841)

## University-wide Policies link

Links to the following UA policies are provided here, <http://catalog.arizona.edu/syllabus-policies>:

- Absence and Class Participation Policies
- Threatening Behavior Policy
- Accessibility and Accommodations Policy
- Code of Academic Integrity
- Nondiscrimination and Anti-Harassment Policy

## Department-wide Syllabus Policies and Resources link

Links to the following departmental syllabus policies and resources are provided here, <https://www.cs.arizona.edu/cs-course-syllabus-policies> :

- Department Code of Conduct
- Class Recordings
- Illnesses and Emergencies
- Obtaining Help
- Preferred Names and Pronouns
- Confidentiality of Student Records
- Additional Resources

- Land Acknowledgement Statement

### **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.