

# COS 350: Systems Programming

Department of Computer Science  
Spring 2024

## Instructor Info

Dr. Xin Zhang

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Office: Rm C282, Dubyak Center, Portland

Student Hours: Tu 3:30 PM-4:30 PM

Th 12:30 PM-1:30PM

or by appointment

## Course Meetings

Payson Smith 306, Portland

Tu/Th 11:00 AM-12:15 PM



[Student Services and Policies Hub](https://mycampus.maine.edu/group/usm/student-services-and-policies-hub)<sup>1</sup>.

## 1. Course Information

### 1A. Course Description

Explore the foundations of system programming in this comprehensive course. Covering essential Linux concepts, C programming, Linux commands, and shell scripting, participants will gain a deep understanding of Linux systems. Through hands-on practice, students will learn to navigate Linux environments, write efficient C programs, utilize command-line tools effectively, and create scripts to automate tasks.

### 1B. Course Materials & Books

#### *Recommend*

- "The Linux command line: A Complete Introduction " by William E. Shotts, Jr. (**L for short in the following**)
- "The C Programming Language, 2<sup>nd</sup> Edition" by Brian W.Kernighan and Dennis M.Ritchie (**C for short in the following**)

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<sup>1</sup> [https://mycampus.maine.edu/group/usm/student-](https://mycampus.maine.edu/group/usm/student-services-and-policies-hub)

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### Supplemental

- “The Linux Programming Interface: A Linux and UNIX System Programming Handbook”, 2010, by Michael Kerrisk.

In addition to the above book, we will be using and learning the C programming language and the Linux operating system. Documentation is available on Linux using the “man” command, as well as on the Web. These sources combined with lectures should be adequate for this class; however some students may find it helpful to obtain additional books for C and Linux.

## 1C. Course Learning Outcomes

By the course's completion, participants will be able to:

1. Understand core Linux concepts, such as system architecture and file systems.
2. Write basic programs in the C language.
3. Execute essential Linux commands for navigation, basic system administration and so on.
4. Create shell scripts to automate routine tasks in a Linux environment.

## 1D. Prerequisites

COS 285 Data Structures and COS 250 Computer Organization. Or getting permissions from the instructor.

## 2. Coursework & Grading

### 2A. Course Assessment

Assessment Name	Value
Class attendance	10%
2 Quizzes	10%
4 Assignments	20%
4 Experiments	40%
Mid-term Exam	20%
<b>Total:</b>	<b>100%</b>

## 2B. Attendance

Active participation in class sessions enhances learning and provides valuable insights, so I encourage all students to attend regularly.

## 2C. Quizzes

Quizzes will be given in class by paper. These will be announced at least one class prior as well as posted on Brightspace. There will be two quizzes in this course, each carrying equal weight.

## 2D. Assignments

Assignments should be completed individually. Homework assignments will be due on the day by 11:59PM. For example, assuming that the first homework due is Feb. 14th, which means you should submit your work before Feb. 14th 11:59PM. All assignments will be submitted and graded through Brightspace. There are totally four assignments, each of them is weighted equally (5% each). Penalties for late submissions will be enforced.

## 2E. Experiments

Four individual experiments are scheduled, each requiring completion according to a provided report template, which will be posted in Brightspace. Submit the report and any accompanying source code via Brightspace for each experiment. Deviation from the report template guidelines will result in a deduction of points. Notably, the weightage differs for each experiment: the first holds 5%, the second and third hold 10% each, and the final experiment is weighted at 15%. Experiments will be due on the day by 11:59PM. For example, assuming that the experiment due is Feb. 14th, which means you should submit your work before Feb. 14th 11:59PM. Penalties for late submissions will be enforced.

## 2F. Exams

There is a mid-term exam, which will take place before the spring break and will be conducted online. There is no final exam.

## 2G. Bonus

Bonus points will be available in this course; however, the maximum achievable score remains capped at 100.

## 3. Class Schedule

### 3A. Course Schedule

Week	Date	Topics	Readings	Start	Due
1	Jan 16	Introduction to system programming			
	Jan 18	Operator system: Linux, Windows, concept			
2	Jan 23	Linux command: concept, terminal, simulation	L5	A1	
	Jan 25	Linux file system	L2, L4	E1	
3	Jan 30	I/O, redirection, pipelines	L6		
	Feb 1	User, group, permissions	L9		A1
4	Feb 6	Processes, networking	L10, L16		E1
	Feb 8	Text: processing, Vi	L12, L20	A2	
5	Feb 13	File: search, archiving, backup	L17, L18	E2	
	Feb 15	Wrap up Linux commands	Handout		
6	Feb 20	Shell Script: concept, introduction	L24		A2
	Feb 22	Variables, comments	L25, L34, L35		
7	Feb 27	Control flow	L27, L29, L31, L33		E2
	Feb 29	Input and output	L28		
8	Mar 5	Review class			
	Mar 7	Mid-term exam			
9	Mar 12	Spring break		A3	
	Mar 14				
10	Mar 19	Arguments, options, functions, script organizations	L26, L32		
	Mar 21	Error, debug and test	L30	E3	A3
11	Mar 26	Regular expression	L19		
	Mar 28	Wrap up shell scripts	Handout		
12	Apr 2	C language: concept, compile and execution	C1		E3
	Apr 4	C language: datatypes, control flow, examples	C2,C3	A4, E4	
13	Apr 9	C language: function, array, pointer, string	C4,C5		

	Apr 11	C language: system programming	Handout		
14	Apr 16	C language: I/O, structure	C6,C7		
	Apr 18	C language: error, Debug			A4
15	Apr 23	Wrap up C language	Handout		
	Apr 25	Review class			E4

A = Assignment, E = Experiment. For the reading column, L stands for "*The Linux command line: A Complete Introduction*", and C stands for "*The C Programming Language, 2<sup>nd</sup> Edition*". For example, L2 means the Chap.2 in book L.

## 4. Course-Specific Policies

### 4A. Late Assignments

Late assignments will be marked down 5% per day that they are late, and assignments submitted after three days will not be accepted (except under special circumstances such as illness or other unanticipated impediments).

### 4B. Plagiarism

Plagiarism is turning in work that is not your own. Searching the internet for answers or using answers created by others is plagiarism and may result in failing the course as well as appropriate disciplinary action. It is your responsibility not to leave your work where others might copy it.

### 4C. Getting Help

I am committed to everyone achieving success. Please do not hesitate to seek assistance when necessary. You can:

- Use the discussion board in Brightspace.
- Join student hours (or by appointment).

## 5. Academic Services & Policies

Below you'll find a brief list highlighting some of the most crucial student services and supports.

- **Request disability accommodations** | (207) 780-4706 | [dsc-usm@maine.edu](mailto:dsc-usm@maine.edu)

- **Report Interpersonal violence** | (207) 780-5767 | [usm.titleix@maine.edu](mailto:usm.titleix@maine.edu)
- **Report on-campus emergencies and safety concerns** | (207) 780-5211 or your local police agency.
- **Get academic help** | [mycampus.maine.edu/group/usm/learning-commons](https://mycampus.maine.edu/group/usm/learning-commons)
- **Get technology help** | [usm.maine.edu/computing/helpdesk](https://usm.maine.edu/computing/helpdesk)
- **Meet with an academic advisor** | [usm.maine.edu/advising](https://usm.maine.edu/advising)

For USM's most complete and current information on services available to students, as well as academic policies, use the QR Code to go to the [Student Services and Policies Hub webpage](https://mycampus.maine.edu/group/usm/student-services-and-policies-hub)<sup>2</sup>.



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