

CSC362-OPERATING SYSTEM

Spring 2025

Professor:	Qixin Deng	Time:	T/Th 2:40 PM - 3:55 PM
Email:	dengq@wabash.edu	Place:	Goodrich Hall, 101
Office:	Goodrich Hall 108	Office Hour:	M/W/F Afternoon

Office Hours:

I am free most of the time on M/W/F afternoon before 5:00 pm. If you want to visit my office at another time, I hope you can make an appointment with me via email. You can email me at any time, I usually reply to emails very quickly.

Course Description:

This course explores the principles and implementation of computer operating systems. Topics may include computer system overview, operating system overview, process description and control, threads, Concurrency, memory management, virtual memory, processor scheduling, I/O management, and file system. This course will involve working on projects with large amounts of code written in the C programming language.

Reference:

1. [A Heavily Commented Linux Kernel Source Code](#)
2. [Operating Systems: Three Easy Pieces](#)

Platform:

1. [VirtualBox](#)
2. [VMware Fusion](#)
3. [Ubuntu 16.04](#)

Course Goal:

- Understand the core principles of operating system design and functionality.
- Understand how operating system concepts are applied in real-world scenarios.
- Prepare students for more advanced courses in computer science or related fields.

Prerequisites:

- CSC-211 with a minimum grade of C-
- CSC-241 with a minimum grade of C-

Textbook: Operating Systems: Internals and Design Principles (9th Edition) by William Stallings

Assignments:

There will be 1+3 assignments. All assignments are based on Linux 0.11. The reason I chose Linux 0.11 is that this is the earliest stable Linux version with only 20k lines of code. Compared with the latest Ubuntu, which has about 17 million lines of code, it is more suitable for beginners and education purposes. And

the more important thing is, this is a real-world operating system instead of a mini educational-oriented operating system. All assignments are designed based on Linux 0.11, you need to modify its code or add some new files. The programming language is C. You are allowed to work in a group, and the maximum group size is 3. You need to pick up your team members before the second week on Tuesday and I encourage the members of a group to sit together.

1. Experimental Environment Setup
2. System Call
3. Tracking and statistics of process running trajectories
4. Implementation and application of semaphore

I do not accept late submissions! If your group misses the deadline, you lose points for the assignment. One group only needs one submission.

Considering the difficulty of the course, I highly recommend starting assignments as soon as possible. Basically, I can split this course into two parts: OS principles and OS implementation. We will focus on OS principles within the limited lecture time. You have to spend a lot of time after class to read and learn the materials for Linux 0.11. [A Heavily Commented Linux Kernel Source Code](#) is a great manual to help you understand the code of Linux 0.11, you will need it to finish assignments. Usually, I will give 2 weeks for each of the assignments, but I might extend it to 3 weeks, which means there will be an overlap between assignments.

Grading:

- 50% Assignments; 40% Exams; 10% Short essay
- I will apply the letter grade criteria as below:

Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
Total	>=93	>=90	>=87	>=83	>=80	>=77	>=73	>=70	>=67	>=63	>=60

From the college side, there are no D+ or D-, which means if you are below 70, your grade will be D or F.

Class rules:

The student who shows discrimination, disrespect, bullying, and other bad behaviors during the lecture will immediately fail the course. And I will report to both the department and the college.

About AI:

Right now, AI is pretty powerful. Reasonable use of AI can make it a very good assistant for you. For example, you can have AI explain system calls in the Linux kernel or ask it about some concepts of operating systems, which will greatly enhance the efficiency of your learning. However, the misuse of AI will dumb you down. Do not try to let AI do your assignments for you, and even less so, let AI replace your thinking. If you do so, you will be replaced by AI in the future. You should rule AI, not let AI dominate you.

There will be no tolerance towards academic dishonesty, and ***cheating, Plagiarism, and misuse of AI*** can and will lead to automatic failure from the class as well as a report to the Academic Integrity Committee.

Academic Credit Policy

This course complies with the [Wabash College Academic Credit Policy](#) stated in the Academic Bulletin.

As a 300-level senior course, to promote student engagement and active learning, I will divide the students into several study groups. Each week, I will select several topics and assign them to different groups.

The groups will discuss the topics independently and deliver presentations in class, where I will provide supplementary explanations based on the content presented. Completing this task is expected to require each student to spend at least one hour per week on average and will account for **15 additional 4th hours sessions** for the semester.

In total, the course includes 15 hours of additional structured activities outside of regular class meetings (equivalent to 1 hour per week for 15 weeks.)

Important Dates:

Midterm	TBD
Final	TBD

Guidelines for Ethical Computing and Working with Others

For the purposes of this course, adhering to the Gentleman's Rule means also adhering to the ACM Code of Ethics and Professional Conduct. The Code lays out the fundamental ethical principles that should guide all students and professionals in their study and work when computing and technology are involved. One major part of ethical computing is respecting the ideas and works of others, and only using them in an ethically appropriate and responsible manner. Computing, like almost all human endeavors, is a collaborative enterprise. We learn from each other and from the work of those who came before us, just as our descendants will learn from us. To not respect the works of others damages one's own learning, and ultimately damages human society as a whole.

For the purpose of this course, I will add the following guidelines. In general, unless specifically authorized for a particular assignment, you should refrain from providing program code or solutions to another student, or receiving program code or solutions from another student. More concretely: providing code or solutions to another student or receiving code or solutions from another student, unless specifically authorized, constitutes academic dishonesty and a violation of the Gentleman's rule. This applies also to both past and future students in this course.

For the purpose of this course, I am happy for students to work in collaborative partnerships. You can discuss it together, but you have to finish your exercises by yourself! Collaborative means learn from each other, do not copy-paste! You should not turn in anything unless you fully and completely understand it and can fully and completely explain it.

In order to foster your ability to communicate about technical matters, any assignment may include an interview with me, during which I will ask you to explain your code or solution and the process by which you came to it. While I acknowledge that technical communication is a skill that must be practiced to be improved, exceptionally poor performance during an interview will raise my suspicions that you may be in violation of the Gentleman's Rule and the ACM Code.

The Syllabus as a Living Document

A syllabus is a living document and can be amended. I will communicate any syllabus changes; it is your responsibility to be aware of course policies at all times.

Quantitative Skills Center (QSC)

Is biology shredding your brain into fine particulate matter? Does chemistry have your anxiety level reacting negatively? Do you have bugs in your computer science code that you just can't squash? Are the demands of your economics homework far outpacing your supply? Is math leaving you feeling irrational or derivative? Has your last physics exam, not gravity, been pulling you down? If you have questions about biology, chemistry, computer science, economics, mathematics, or physics, visit the Quantitative Skills Center (QSC)! Our department-selected tutors will work with you to answer your questions and deepen your understanding of each subject. The QSC operates Sundays, Tuesdays, and Thursdays from 7- 11pm on the second floor of the Library. Please check out the QSC webpage <https://www.wabash.edu/ace/qsc> for specific tutor availability. If you have any questions, please email Vic Lindsay at lindsayv@wabash.edu.

Writing Center

Do you have questions about how to start a paper? Are you struggling to get all of your ideas to fit? Do you have a draft but want someone to review it? Are you unsure of how to incorporate comments from your professor? Head to the Writing Center! No matter what your writing questions or needs, the Wabash Writing Center. Consultants are eager and able to help you! Please visit the webpage, <https://www.wabash.edu/ace/writing> to schedule an appointment. If you have any questions, please email the director, Dr. Koppelman, at koppelmz@wabash.edu.

The Office of Student Enrichment

Succeeding at Wabash College takes a great deal of effort and planning. Life is complex, assignments are time consuming, and staying involved keeps you running. When you have questions about how to make everything fit into your schedule, how to study more efficiently, how to take better notes, or any other question about developing your college skills, visit the Office of Student Enrichment (OSE). Go to <https://www.wabash.edu/ace/office> and follow the “Make an Appointment” link to arrange a one-on-one, personalized meeting with Dr. Koppelman or one of the OSE Advisors. No matter your questions, we will work with you to find a solution that helps you achieve your goals.

Disability and/or Special Accommodations

Students with disabilities (apparent or invisible) are invited to confidentially discuss their situation with the disability coordinator, Heather Thrush, Associate Dean for Student Engagement and Success. If a student wishes to receive an academic accommodation, it is required that his documentation of the disability be on file with Dean Thrush, who can, in confidence, provide information and guidance. Early notification helps us all work together in the most effective ways. To make an appointment with Dean Thrush, call (x6347), or email thrushh@wabash.edu. Appointments can be available via Zoom, if needed.

This is a tentative schedule, we will not strictly follow the plan. As you know, there are 14 weeks of classes in total, here I only list class content arrangement of 12 weeks. I left some redundancy in order to make room for some unexpected events. Also give us some time to discuss assignments and the Linux 0.11.

Course Content Arrangement	
Week #	Course Content
Week 01	Computer System Overview
Week 02	Operating System Overview
Week 03	Process Description and Control
Week 04	Threads
Week 05	Concurrency: Mutual Exclusion and Synchronization
Week 06	Concurrency: Deadlock and Starvation
Week 07	Memory Management
Week 08	Virtual Memory
Week 09	Uniprocessor Scheduling
Week 10	Multiprocessor and Real-Time Scheduling
Week 11	I/O Management and Disk Scheduling
Week 12	File Management