

## Syllabus\_CS1550 Introduction to Operating Systems (2024-2025\_Fall)

### 1 General Information

- Course Number: 312200030; Credit hours: 3
- Instructor: Dr. CHEN Yanru, [chenyanru@scu.edu.cn](mailto:chenyanru@scu.edu.cn)
- Office: Rm417, PI New Building(North), Jiangan Campus 江安匹兹堡学院大楼(北楼)417
- Office hours: Thurs. at noon&late afternoon, or easily schedule any mutually convenient time
- Lecture: **01-Thurs.,08:15-11:00,PI212** 江安匹兹堡学院 212(Rm212,Zone 4,Liberal Arts Building,Jiangan 江安文科楼四区212)  
Teaching Assistant: **01-GAO** Ruihan, [2694271794@qq.com](mailto:2694271794@qq.com)
- Lecture: **02-Thurs.,13:50-16:25,Rm211,PI New Building(North)**江安匹兹堡学院大楼(北楼)211  
Teaching Assistant: **02-ZENG** Di, [2327900323@qq.com](mailto:2327900323@qq.com)

### 2 Course Information

#### 2.1 Description

This course provides an introduction to basic concepts of operating systems (OS), which serve as a crucial interface between computer hardware and higher-level applications. Topics include process management, concurrency, inter-process communication, memory management and protection, file systems, and security mechanisms. The course also examines the architecture and functionalities of modern OS.

#### 2.2 Prerequisite

CS0447 Computer Organization and Assembly Language; CS0449 Intro to Systems Software

#### 2.3 Course Objectives

This course is intended to introduce the fundamental concepts that modern OS use to manage computer resources effectively. Beyond the concepts introduced in lecture, course projects will take one such OS, Linux, and examine source code. Through course projects, students will enhance their problem-solving skills by implementing and testing new features in the OS kernel.

#### 2.4 Learning outcomes

By the end of the course, students will be able to: Explain the fundamental challenges of resource management, such as CPU scheduling, memory allocation, and file system organization. Weigh the advantages and disadvantages of different OS management schemes/algorithms. Communicate technical concepts & solutions effectively in written lab reports or presentations, demonstrating a clear understanding of OS internals.

### 3 Textbooks

#### 3.1 Primary Reading

- **OSIDP**: William Stallings, Operating Systems: Internals and Design Principles, 9<sup>th</sup> Edition. Pearson, 2020. (978-7-121-39000-5)

#### 3.2 Supplementary Readings

- **OSC**: A. Silberschatz, P.B. Galvin, and G. Gagne, Operating System Concepts, 10<sup>th</sup> Edition, John Wiley & Sons, Inc., 2018. (978-1-119-32091-3)
- Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau, Operating Systems: Three Easy Pieces, November, 2023 (Version 1.10). <https://pages.cs.wisc.edu/~remzi/OSTEP/>
- Tanenbaum, Andrew S., Modern Operating Systems, 5<sup>th</sup> Edition. Pearson, 2022. (978-0-137-61888-0)
- **CSAPP3e**: Randal E. Bryant and David R. O'Hallaron, Computer Systems: A Programmer's Perspective, Third Edition (CS:APP3e), Pearson, 2016, North American Edition (ISBN-10: 0-13-409266-X).

## 4 Schedule

The weekly topics may be adjusted based on class progress. They serve as a guide for your primary, supplementary and extra readings, helping you to concentrate on specific concepts.

Week	Date	Thursday Topic	Readings	Timeline
1	09.05	Intro to the Course; Computer System Overview	OSIDP: Chap0,1;	
2	09.12	OS Introduction: History of OS, System Calls	OSIDP: Chap2 OSC: Chap1,2	Recitation1 due(09.12)
3	09.19	Process; Thread	OSIDP: Chap3,4; OSC: Chap3,4	Recitation2 due(09.19)
4	09.26	<b>Lab 1</b>		
5	10.03	National Holiday		
6	10.10	Midterm Exam1 (to be determined)		
7	10.17	<b>Lab 2</b>		
8	10.24	Concurrency-Mutual Exclusion and Synchronization	OSIDP: Chap5 OSC: Chap6,7	Recitation3 due(10.24)
9	10.31	<b>Lab 3</b>		
10	11.07	Concurrency-Dead Lock and Starvation	OSIDP: Chap6 OSC: Chap6,7	Recitation4 due(11.07)
11	11.14	<b>Lab 4</b>		
12	11.21	Midterm Exam2 (to be determined)		
13	11.28	Memory Management, Swapping	OSIDP: Chap7 OSC: Chap8	Recitation5 due(11.28)
14	12.05	Virtual Memory	OSIDP: Chap8 OSC: Chap9	Recitation6 due(12.05)
15	12.12	Scheduling; Security, Virtual machines	OSIDP: Chap9,15 OSC: Chap5,14-16	Recitation7 due(12.12)
16	12.19	I/O Management:Page replacement algorithms, I/O-DMA, Interrupts, Polling, Disks, RAID,Disk Arm Scheduling; File System:File System Implementations, FAT vs. i-nodes;	OSIDP: Chap11,12; OSC: Chap10-13	Final review
17	12.26	Final exam (to be determined)		

## 5 Grading Policy

### 5.1 Grading Structure

Total	Attendance	Recitations	Assignments	Midterm exams	Final exam
100%	3%	7%	30%	30%	30%

**5.1.1 Attendance:** Besides 3% of attendance, attending lectures can **effectively** boost your grade, as **bonus points** are selectively awarded (it's recorded) based on factors like class interaction, individual improvement, random quizzes, & special roles like course representatives.

**5.1.2 Recitations:** 7 recitations (due on Thursday; see the schedule).

**5.1.2 Assignments:** Specific requirements for the labs will be announced during the semester.

#### 5.1.3 Exam INSTRUCTIONS:

1. Exam is closed book with **one** double-sided A4 paper with notes (excluding pre-worked problems; more than one would be confiscated). Early submission is only allowed after one hour.

2. During exam: **Pencils** & red pens are not allowed for answers; they're considered as drafts. Calculators & correction tapes are allowed, but **no borrowing**. Tearing papers by pages, talking to others, electronic aids such as smartwatches, phones are not allowed.

3. Full mark is 100; write **clearly** to avoid grading errors. If make a mess, clearly indicate your final answers. Answer directly in the provided space; no extra answer paper is needed. For your convenience, the space can work as drafts too, but clearly separate drafts from answers.

## 5.2 Grade Rebuttal

To correct honest grading mistakes & prevent unnecessary requests, one-time grade rebuttal requests are allowed. It includes regrading entire work for fairness, possibly altering grade up or down. Submit official requests via email within **certain period** set by instructors (after the period, the grade is final), not via social media. Requests must attach the typewritten paragraph clearly explaining perceived grading errors, with references.

## 5.3 Grace-day Policy

*For your well-being, if you encounter an ongoing issue like long-term hospitalization where grace days cannot help, promptly inform advisor & instructor **before due date**, as it can affect performance in every courses.*

You have **3 grace days** at your disposal for this course to handle any emergencies like computer issues, high workloads, medical situation, personal matters, family things, or school events, etc. Grace days cannot be exchanged, traded, bought, or sold. We advise conserving them later for challenging submissions or unexpected emergencies where you have to use it. It's **automatically** used in chronological order, & can be used for recitations, assignments & attendance.

### 5.3.1 Grace-day Policy for Late Submissions (Recitations & Assignments):

1. All submissions are due by **11:59pm** on due date, only latest one is graded; if submitted at 00:01am (2mins past), it's 1 day late because it's the next calendar day. Late submissions beyond grace days incur **20% daily penalty**; submissions are **not accepted more than 4 days** overdue.

2. If submitted 1 day late with grace days left, no penalty incurs as 1 grace day is automatically used; if submitted 4 days late with 3 grace days left, 1-day penalty incurs as 3 grace days are automatically used; if submitted 4 days late with no grace days left, 4-day penalty incur; if submitted 5 days late, it's considered not done, and grace days do not apply.

### 5.3.2 Grace-day Policy for Attendance:

1. If informing instructor in advance for lecture absence due to **any emergencies** with grace days remain, your attendance is fine as 1 grace day is automatically used.

2. Students are **responsible** to obtain missed contents due to own absence & complete all submissions. Ideally, following original schedule facilitate learning in a more structured way.

## 6 Academic Integrity

Students must maintain professionalism, honesty, integrity & ethical standards throughout the semester. **Cheating is strictly prohibited** including unauthorized materials, copying, or viewing others' solutions, etc. You may discuss & share insights (that's how you learned), but you must work independently & submit your own work. Specifically, violations in submissions result in heavy score penalties for both parties (don't take away others' learning opportunities). Violations in exams directly lead to disciplinary actions under University's Academic Integrity Policy. **Thanks!**

**Pay attention to the timeline. The stage is all yours.**

**Enjoy!**