

Course Syllabus

Course Information

Course Prefix, Number, Section: CS/SE 4348.004

Course Title: Operating Systems Concepts

Term: Fall 2024

Modality: Traditional

Times: MW 2:30-3:45pm

Location: ECSS 2.306

Professor Contact Information

Instructor: Chung Hwan Kim

Office Phone: 972-883-3551

Office Location: ECSS 3.201

Email Address: chungkim 'at' utdallas 'dot' edu

Office Hours: Mondays 3:45-5pm (this could be changed at the instructor's discretion)

Course Website: <https://crs.s3lab.io/cs4348/2024/fall/>

Course Modality and Expectations

Instructional Mode	Traditional
Course Platform	The course will be taught face-to-face. Instructor and students meet according to the schedule. Limited availability due to classroom spacing.
Expectations	After completing the course, students are expected to gain the abilities to understand and apply the following topics: (1) memory management and virtual memory; (2) process management; system calls, page faults, interrupts, and exceptions; (3) multi-threading, synchronization and deadlocks; and (4) I/O and file systems.
Asynchronous Learning Guidelines	Students are mandated to attend class synchronously. Students <i>should</i> consult to the instructor <i>in advance</i> and get excuses, in case they cannot attend the class on time to take a quiz for any reasons.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Students are required to satisfy the following prerequisites:

- Computer Architecture (CS/SE 2340)
- Systems Programming in UNIX and Other Environments (CS/SE 3377)
- Data Structures and Introduction to Algorithmic Analysis (CS/SE/CE 3345)

IMPORTANT: This class assumes familiarity with Unix commands and the C programming language throughout.

Course Description

This course teaches how internals of modern operating systems are working with hardware/software stack. In the course, we will learn fundamental concepts of operating systems by building an operating system by our own hand. In particular, lab assignments are based on JOS, an educational OS project, and the students will build it starting from booting (Lab 1), virtual memory (Lab 2), process (Lab 3), multi-tasking (Lab 4), and finally to file system (Lab 5). We will also cover concurrency issues in systems by learning on how to implement locks and other synchronization mechanisms and how to resolve deadlock issues.

Student Learning Objectives/Outcomes

In this course, students will learn fundamental concepts in operating systems: their design, implementation, and usage. After completing the course, students are expected to gain the abilities to understand and apply the following topics: (1) memory management and virtual memory; (2) process management; (3) system calls, interrupt, and exceptions; (4) multi-threading, synchronization, and deadlocks; and (5) IO and file systems.

Required Textbooks and Materials

Textbook: *Operating Systems: Three Easy Pieces*

Authors: Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau

Retail Price: \$26.42 (paperback at Amazon.com)

Available Online for Free: <http://pages.cs.wisc.edu/~remzi/OSTEP/>

Publisher: CreateSpace Independent Publishing Platform

Copyright Date: 09/01/2018

ISBN: 978-1985086593

Suggested Course Materials

Instructor will post suggested resources and materials on the course website.

Assignments & Academic Calendar

Week	Date	Topic and Quiz (Tentative)	Lab Assignment (Tentative)
1	8/21	Course Introduction	All Labs out
2	8/26, 8/28	Booting, Memory and Address Space	-
3	9/4	Systems Programming for the Labs	Lab 1 due: 9/8 (11:59pm)
4	9/9, 9/11	Virtual Memory	-
5	9/16, 9/18	JOS Memory Management, Quiz 1	-
6	9/23, 9/25	User/Kernel Context Switch, Quiz 1 Review	Lab 2 due: 9/29 (11:59pm)
7	09/30, 10/2	Interrupt, Faults, and Exceptions	-
8	10/7, 10/9	Multi-threading and Data Races	-
9	10/14, 10/16	Locks and Synchronization, Quiz 2	-
10	10/21, 10/23	Concurrency Bugs and Deadlock, Quiz 2 Review	Lab 3 due: 10/27 (11:59pm)
11	10/28, 10/30	Scheduling, Disks and Device I/O	-
12	11/4, 11/6	File Systems	-

13	11/11, 11/13	Crash Consistency, Quiz 3	-
14	11/18, 11/20	Virtual Machines, Quiz 3 Review	-
15	-	Fall and Thanksgiving Breaks (No Class)	Lab 4 due: 12/1 (11:59pm)
16	12/2, 12/4	OS Security, and Final Course Review	Lab 5 due: 12/8 (11:59pm, no late submission allowed)

Grading Policy

(including percentages for assignments, grade scale, etc.)

Evaluation		
Lab Assignments	4 labs (Lab 1: 10%, Lab 2: 15%, Lab 3: 20%, Lab 4: 25%)	70%
Quizzes	3 quizzes (10% each)	30%
Exams	No midterm or final exam	
Extra Credits	Optional Lab 5 (10%) Challenges in lab assignments and questions during class (1-2% each)	

Grading Scale

- Lab assignments and quizzes will be evaluated on a 100-point scale (0-100).
- Late assignment submission will be penalized 10 points per day (24-hour period).
- Late days are not applicable to Lab 5 submission (firm deadline).

Scaled Score (%)	Letter Equivalent
97.1-100	A+
93.1-97	A
90.1-93	A-
87.1-90	B+
83.1-87	B
80.1-83	B-
77.1-80	C+
73.1-77	C
70.1-73	C-
60.1-70	D
Less than 60	F

COVID-19 Guidelines and Resources

The information contained in the following link lists the University's COVID-19 resources for students and instructors of record.

Please see <http://go.utdallas.edu/syllabus-policies>.

Classroom Conduct Requirements Related to Public Health Measures

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021 semester to the extent allowed by state governance. Texas Governor Greg Abbott's Executive Order [GA-38](#) prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we strongly encourage all Comets to get vaccinated and wear face coverings as recommended by the CDC. Check the [Comets United: Latest Updates webpage](#) for the latest guidance on the University's public health measures. Comets are expected to carry out [Student Safety](#) protocols in adherence to the Comet Commitment. Unvaccinated Comets will be expected to complete the [Required Daily Health Screening](#). Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the [Student Code of Conduct – UTSP5003](#).

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes. Faculty have the discretion to set an attendance policy for their in-person meetings, but the absences due to COVID-19 cannot be counted against a quarantined student.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

NOTE: if the instructor records any part of the course, then the instructor will need to add the following syllabus statement:

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Off-campus Instruction and Course Activities

(Below is a description of any travel and/or risk-related activity associated with this course.)

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

Academic Support Resources

The information contained in the following link lists the University’s academic support resources for all students.

Please see <http://go.utdallas.edu/academic-support-resources>.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please review the catalog sections regarding the [credit/no credit](#) or [pass/fail](#) grading option and withdrawal from class.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.