CS 305 Operating Systems

Summer 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

The operating system provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run. This course provides an introduction to the concepts, theories and components that serve as the bases for the design of classical and modern operating systems. Topics include process and memory management, process synchronization and deadlocks.

Upon Completion of this Course, students will be able to:

1. Explain process management, processor scheduling, concurrent programming, deadlocks and synchronization, memory management, file management and I/O systems, disk scheduling;
2. Recognize user level and kernel level programming differences;
3. Implement algorithm of CPU Scheduling, Memory Scheduling and disk scheduling;
4. Compare various operating systems with respect to characteristics and features.

PREREQUISITES

CS 246 Introduction to Data Structure

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS

2 Assignments	20 Points
2 Quizzes	20 Points
Midterm Exam	25 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

A ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), ***Operating System Principles,*** 7th edition, Wiley India Private Limited, New Delhi.

Recommended (Optional) Texts or Other Materials:

None.

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Operating System and Function Topic 2: Type of Operating System Topic 3: Operating System Structure Topic 4: Operating System Services Assessments: Assignment #1
Module 2	Topics: Topic 5: Process Management Topic 6: Types of scheduling Topic 7: Scheduling in batch system/Scheduling in Interactive System/Scheduling in Real Time System Topic 8: Multiprocessor Scheduling concept Assessments: Quiz #1

Module 3	Topics: Topic 9: Process Communication and Synchronization Topic 10: Memory Management Topic 11: Demand Paging Topic 12: Page Replacement Algorithms Assessments: Midterm Exam
Module 4	Topics: Topic 13: File System Implementation Topic 14: Impact of Allocation Policy on Fragmentation Topic 15: Mapping File Blocks on The Disk Platter Topic 16: File System Performance Assessments: Assignment #2
Module 5	Topics: Topic 17: I/O Management & Disk Scheduling Topic 18: Principles of deadlock Topic 19: Deadlock Prevention Topic 20: Deadlock Avoidance Assessments: Quiz #2
Module 6	Topics: Topic 21: Security breaches Topic 22: Security Policy and Access Control Topic 23: Basics of Cryptography Topic 24: Protection Mechanisms Assessments: Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately

prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that

students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.