CS 396 Advanced Systems Programming

Summer 2023

Course Credits: 4
Contact Hours: 55 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course provides an in-depth study of systems programming techniques. Students will learn the application of systems programming techniques in Unix/Linux, using machine-oriented programming languages. Specific topics will be covered include: procedural programming, shell basis and programming, file processing, system calls, signals and basic network programming, etc. Throughout the course, students will have the opportunity to apply their knowledge through programming assignments and projects.

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

1. Gain a deep understanding of systems programming techniques in Unix/Linux

2. Develop skills in using machine-oriented programming languages to write systems programs

3. Develop problem-solving skills and the ability to analyze and debug systems programs

4. Understand the role of systems programming in operating system design and implementation

5. Gain practical experience through hands-on programming assignments and projects

PREREQUISITES

CS 258 Data Structures and Algorithms

GRADING

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

ITEM	POINTS
Assignments	20 Points
Midterm	20 Points
Project	20 Points
Final Exam	40 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:

K. C. Wang, *Systems Programming in Unix/Linux*, Springer, 2018.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Introduction to system programming Topic 2: Roles of system programming Topic 3: Programming background Topic 4: Procedural programming **Assessments:** Assignment#1
Module 2	**Topics:** Topic 5: Process management in Unix/Linux Topic 6: Process management in Unix/Linux (Cont.) Topic 7: File processing Topic 8: System calls **Assessments:**

	Project
Module 3	**Topics:** Topic 9: Concurrent programming Topic 10: Timers and time service Topic 11: Signal and signal processing Topic 12: Signal and signal processing (Cont.) **Assessments:** Assignment#2 Project Midterm
Module 4	**Topics:** Topic 13: File Operation Topic 14: System calls for file operations Topic 15: Library I/O functions Topic 16: Shell basis & shell programming **Assessments:** Project due
Module 5	**Topics:** Topic 17: File system Topic 18: Block device I/O & buffer management Topic 19: Network programming Topic 20: Network programming (Cont.) **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.