Syllabus for CS 474 – Operating Systems I

Fall 2020
The class will be fully online

When: TR 3:00 pm - 4:15 pm
Instructor: Tao Wang
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Course Overview:

This course covers an exciting range of materials from the broad field of operating systems, including basic operating system structure, CPU scheduling concepts, process concurrency, deadlock handling and mitigation, memory management, and file systems. We will examine influential historical systems and important current efforts, extracting lessons both on how to build systems as well as how to evaluate them.

Course Objectives:

1. Develop an understanding of the principles of operating systems.
2. Understand threads and their implementation, benefits, and issues
3. Develop insight into process management and scheduling issues.
4. Understand the concept of cooperating processes, including communication, synchronization, and deadlock.
5. Understand classical concurrency issues and their solutions
6. Understand OS control and management of real and virtual memory
7. Develop an understanding of file system implementation and of multiple levels of hardware support and management.
8. Be able to evaluate operating system features.

Pre-requisites:

Knowledge of C/C++ programming language and basic Linux commands is essential. A basic understanding of Computer Architecture is desired.

Textbook:

Operating Systems Concepts, Ninth Edition, by Silberschatz, Galvin, and Gagne published by John Wiley and Sons.

Evaluation Components:

1. Homework Assignments (3 HWs - 15%): To be completed individually.
2. Quiz (10%).
3. Programming Projects (3 - 30%): two individual project and one group project.
4. Midterm (20%): Closed books and notes. Course covered till date.
5. Final Exam (25%): Closed books and notes. Covers all materials. Emphasis on the parts after the midterm.

Grading scale:

Grade	Range		
A+	100%	to	97%
A	< 97%	to	94%
A-	< 94%	to	90%
B+	< 90%	to	87%
B	< 87%	to	84%
B-	< 84%	to	80%
C+	< 80%	to	77%
C	< 77%	to	74%
C-	< 74%	to	70%
D+	< 70%	to	67%
D	< 67%	to	64%
D-	< 64%	to	60%
F	< 60%	to	0%

Grading Policy:

1. All programming projects and assignments need to be done in C/C++. Programs written in any other languages will not be graded.
2. All assignments and projects must be submitted through Canvas (learn.nmsu.edu). Assignments must be typed; you can submit written assignments at your own risk. If we can't read it, we won't grade it!
3. Assignments and projects need to be submitted by the specified deadline, on the day of the submission. Late work will not be accepted except in cases of verifiable

emergencies. You will have a 6-day emergency fund/slack time for the entire semester: use it wisely.

4. I expect students to be honest and not cheat on their assignments or exams. Collaboration on all class components must be acknowledged. If you use any published or unpublished work in your class work, you must give full citation. In light of this, I expect you to know the University's policies (https://arp.nmsu.edu/5-10/) on student conduct, academic dishonesty, etc. Any academic dishonesty will result in an F in the course.

Non-Discrimination:

If you have any questions about NMSUs Non-Discrimination Policy and complaints of discrimination, including sexual harassment, you may contact Laura Castille, Executive Director of the Office of Institutional Equity, at 575-646-3635 with your questions.

Accommodations:

Students in need of academic accommodations for a disability may consult with the office of Student Accessibility Services to arrange appropriate accommodations. Students are required to give reasonable notice prior to requesting an accommodation.

Tentative List of Topics:

I will post all the materials online (e.g., slides, video etc.)

Week1: Chpts. 1, 2	Introductions, System Structures
Week2: Chpt. 3	Processes, Inter-process Communication
Week3: Chpt. 4	Threads
Week4: Chpt. 5	Process Synchronization, Semaphores, Critical Sections, Monitors
Week5: Chpt. 6	CPU Scheduling
Week6: Review, Mid-term exam (Oct. 1)	Best of Luck!
Week7: Chpt. 7	Handling Deadlocks, Deadlock detection and avoidance
Week8: Chpt. 8	Memory management
Week9: Chpt. 9	Virtual Memory
Week10: Chpt. 9	Virtual Memory (cont'd)
Week11: Chpt. 10, 11	File Systems Implementation
Week12: Time to show your work	Final Project Presentation
Week13: Review and Feedback	
Week14	Happy Thanksgiving!
Final (Dec. 10)	Best of luck for the Final!

Every part of this syllabus is subject to adjustment as the semester progresses. Please contact me as soon as possible if you're dissatisfied with the course topics, policies, discussions, grading, etc. I'll be happy to accommodate reasonable requests for modifications.