CMP 426-OSA1: Operating Systems Syllabus

Department of Computer Science
Lehman College, City University of New York

Course Information

Semester	Class Section	Class Hours	Room Number
Summer 2022	OSA1	Tu, Tu, We, Th 6:00 – 9:25 pm	Online via Zoom

Instructor Information

Instructor	Email	Office Number	Office Hours
Steven Fulakeza	steven.fulakeza@lehman.cuny.edu	GI-232 but we will meet online	5:30 pm to 6:00 pm and 9:25 pm to 9:55 pm (Please email to schedule an appointment)

Lecture & Office Hours Location: Schedule office hours using the link that is on the course website

CMP 426 Course Description: 4 hours, 4 credits
Operating systems and their role in various types of computer systems; the principles of multiprogramming; algorithms for resource allocation; multiple-computer systems.

PREREQ:
- CMP 334 and CMP 338

Course Objectives:
At the end of the course, students should be able to:
1. use the command line to interact with the operating system
2. explain operating systems and their role in various types of computer systems
3. describe the basic structure of an operating system and its components
4. describe the concept of a process, threads and how processes deal with scheduling, cooperation, and communication with other processes
5. describe CPU scheduling algorithms and be able to compare them
6. explain the classical problems in process synchronization and know several different ways to solve such problems, including semaphores, critical regions, and monitors
7. explain how to characterize and handle deadlocks, including prevention, avoidance, detection, and recovery

8. understand main memory and virtual memory and describe several different schemes for managing main memory, including swapping, virtual memory, paging, and segmentation
9. describe file/storage management
10. discuss how disks are structured and how their space is managed by the operating system

Textbook:

- A. Silberschatz, P. Galvin, and G. Gagne, *Operating System Concepts,* 10th Edition, Wiley, 2018. ISBN 978-1-119-29967-7

Textbook Website: text book web site

- **https://www.os-book.com/OS10/**

References: Lecture Notes, Blackboard, and Course Website

Course Website: http://comet.lehman.cuny.edu/sfulakeza/

Grading Policy:

CMP 426

Activity	Percentages
Homework Assignments and Blackboard Quizzes	40%
Midterm Exam	30%
Final Exam	30%

A Make-up exam might be given only when a student's absence is unavoidable. In such a case, the student must file a formal written request.

The exams will consist of two parts:
- A multiple-choice part that will be completed on Blackboard
- A written part, which will be posted on Blackboard. This part of the exam will be done at the scheduled time of the class and the exam must be submitted on Blackboard. **No emailed work will be accepted**.

Exam Schedule:
- TBA

Note: Missed final exam = Unofficial Withdraw (WU). WU counts as an F in calculating your GPA and has implications for financial aid.

Homework Assignments and Submission
Several homework assignments are given during lectures. Students need to work on the homework for preparing for exams but may not need to submit the homework assignments to the instructor. **Some selected homework problems will be assigned as formal assignments to be submitted for grading.** All homework will be submitted through Blackboard.
Students must work on their own assignments unless otherwise stated.
No late assignments will be accepted.

Homework assignments will include the following areas and more:
- Process creations/executions based on Linux/UNIX API and Win API
- Message based communications based on Linux/UNIX API
- Shared memory-based communications between processes based on Linux/UNIX API and WIN API
- Multithreading based on POSIX API, Win API, Java threads
- Java nexus IO (memory mapped IO), Windows memory mapped IO
- Synchronization based on UNIX System V API, POSIX API, Win API
- Linux kernel module programming/driver programming

Honor Code
You are encouraged to work together on the overall design of the programs and homework. However, for specific programs and homework assignments, all work must be your own. You are responsible for knowing and following Lehman's academic integrity code (available from the Undergraduate Bulletin, Graduate Bulletin, Office of Academic Standards and Evaluations, or the Smart Catalog).
All incidents of cheating will be reported to the Vice President of Student Affairs.

Expectations
Students are expected to learn the material covered in class, the material in the textbook and other assigned reading. Completing homework is an essential part of the learning experience. Students should review topics from prior courses as needed using old notes and books.

Blackboard & Communication
I will be communicating with you on a regular basis throughout the semester using the email address listed on Blackboard for this course. You are required to make sure that the email address on Blackboard is your current Lehman email address and you must check it on a regular basis. **There will be no acceptable excuse for missing an email announcement.**

Accommodating Disabilities
Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are

encouraged to register with the Office of Student Disability Services. For more information, please contact the Office of Student Disability Services in Shuster Hall, Room 238. Phone number: 718-960-8441, Email: disability.services@lehman.cuny.edu Webpage: http://www.lehman.edu/student-disability-services

Recording of Remote Classes

Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

Course Outline:

    Overview
        Chapter 1: Introduction
        Chapter 2: Operating-System Structures
    Process Management
        Chapter 3: Processes
        Chapter 4: Threads and Concurrency
        Chapter 5: CPU Scheduling
    Process Synchronization
        Chapter 6: Synchronization Tools
        Chapter 7: Synchronization Examples
        Chapter 8: Deadlocks
    Memory Management
        Chapter 9: Main Management
        Chapter 10: Virtual Memory
    Storage Management
        Chapter 11: Mass-storage Structure

Java Programming Resources

- https://www.tutorialspoint.com/java/index.htm
- https://codingbat.com/java
- https://practiceit.cs.washington.edu/
- https://www.learnjavaonline.org/
- http://www.pythontutor.com/java.html#mode=edit

C Programming Resources

- https://www.programiz.com/c-programming
- https://www.tutorialspoint.com/cprogramming/index.htm
- https://www.cprogramming.com/