Lahore University of Management Sciences

CS 370 – Operating Systems

Fall 2023/24

Instructor	Muhammad Hamad Alizai
Room No.	SBASSE 9-G09A
Office Hours	TBD
Email	hamad.alizai@lums.edu.pk
Telephone	8479
Secretary/Coordinator/TA	Mr. Afaq Butt
TA Office Hours	→ LMS
Course URL (if any)	lms.lums.edu.pk

Course Basics				
Credit Hours	3			
Lecture(s)	Nbr of Lec(s)	26	Duration	75 minutes twice a week
Homeworks	Nbr of Lec(s)	14 (take home)	Duration	
Tutorial	Nbr of Lec(s)	4-8 on Fridays (online)	Duration	

Course Distribution	
Core	Yes (CS Majors)
Elective	Yes, can be taken as an elective
Open for Student Category	Juniors
Close for Student Category	None

COURSE DESCRIPTION

The course will cover the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. It further considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes and deadlocks.

The central focus is on how an operating system, in an efficient or fair way, provides an abstracted interface to the hardware resources for programs. The course consists of theoretical aspects of operating systems and practical experience in using Linux system, C programming and shell scripting.

This course assumes familiarity with basic computer organization (e.g., processors, memory, and I/O devices as covered in CS 225) and data structures (e.g., stacks and hash tables). You will need to be able to program in C (not C++) to perform the assignments in the course.

COURSE PREREQUISITE(S)	
CS 225	Fundamentals of Computer Systems
CS 202	Data Structures

COURSE OBJECTIVES	
1	Describe and design basic components of an operating system – process management, scheduling, virtual memory, concurrency, file systems and I/O.
2	Explain how an OS virtualizes CPU, memory and other hardware resources to create an illusion of multiprocessing.
3	Implement different OS techniques to learn how OS policies are translated into concrete algorithms.
4	Apply system programming and advanced data structure techniques in the design of an OS

Lahore University of Management Sciences

Academic Honesty

The principles of truth and honesty are recognized as fundamental to a community of teachers and students. This means that all academic work will be done by the student to whom it is assigned without unauthorized aid of any kind. Plagiarism, cheating and other forms of academic dishonesty are prohibited. Any instances of academic dishonesty in this course (intentional or unintentional) will be dealt with swiftly and severely. Potential penalties include receiving a failing grade on the assignment in question or in the course overall. For further information, students should make themselves familiar with the relevant section of the LUMS student handbook.

Harassment Policy

SSE, LUMS and particularly this class, is a harassment free zone. There is absolutely zero tolerance for any behaviour that is intended, or has the expected result of making anyone uncomfortable and negatively impacts the class environment, or any individual's ability to work to the best of their potential.

In case a differently-abled student requires accommodations for fully participating in the course, students are advised to contact the instructor so that they can be facilitated accordingly.

If you think that you may be a victim of harassment, or if you have observed any harassment occurring in the purview of this class, please reach out and speak to me. If you are a victim, I strongly encourage you to reach out to the Office of Accessibility and Inclusion at oai@lums.edu.pk or the sexual harassment inquiry committee at harassment@lums.edu.pk for any queries, clarifications, or advice. You may choose to file an informal or a formal complaint to put an end of offending behavior. You can find more details regarding the LUMS sexual harassment policy here.

To file a complaint, please write to harassment@lums.edu.pk.

SSE Council on Equity and Belonging

In addition to LUMS resources, SSE's Council on Belonging and Equity is committed to devising ways to provide a safe, inclusive and respectful learning environment for students, faculty and staff. To seek counsel related to any issues, please feel free to approach either a member of the council or email at cbe.sse@lums.edu.pk

Rights and Code of Conduct for Online Teaching

A misuse of online modes of communication is unacceptable. TAs and Faculty will seek consent before the recording of live online lectures or tutorials. Please ensure if you do not wish to be recorded during a session to inform the faculty member. Please also ensure that you prioritize formal means of communication (email, lms) over informal means to communicate with course staff.

Assessments

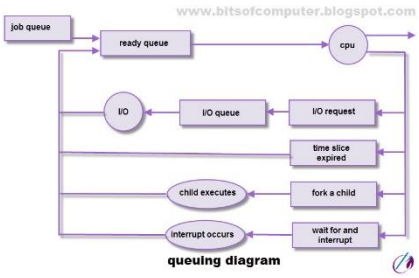
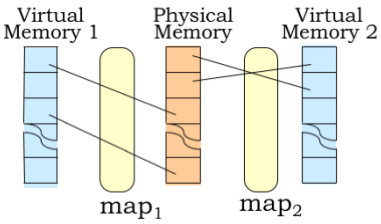
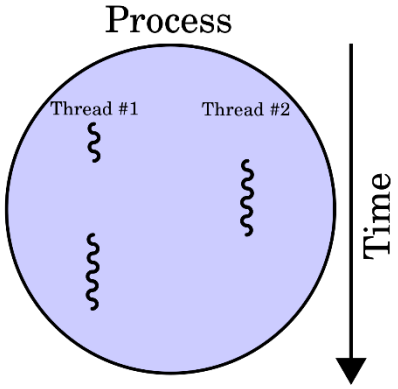
Assessment	Description	Weight (%)
Assignments / Projects	Four programming assignments	60%
Exams	Three exams (1 hour each)	40%

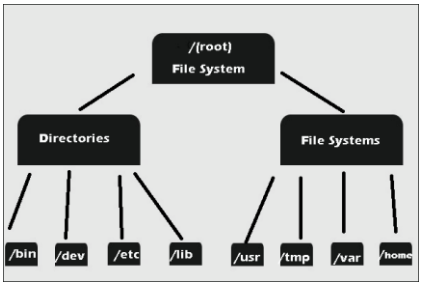
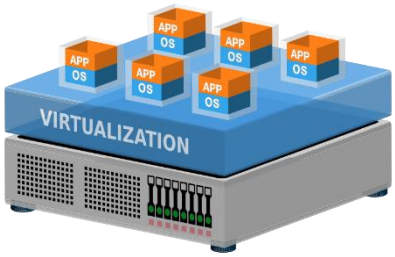
Makeup Policy

- Please refer to Student Handbook 2019-20, page 37, article 25, titled "Makeup Policy for Graded Instruments".
- *"In case N-X policy is implemented for an instrument having multiple sub instruments then petitions will not be accepted for that instrument".*

Lahore University of Management Sciences

Lectures Overview

Module	TOPIC	Metaphor	Reading	Duration
1	Processes		Chapters 4-6	2 weeks
2	Scheduling		Chapters 7-9	2 weeks
3	Virtual Memory		Chapters 13-22	3 weeks
4	Threads and Concurrency		Chapters 26-32	2 weeks
5	I/O Devices		Chapters 36-38	1 week

6	File Systems		Chapters 39-43	2 weeks
7	Virtual Machines		Appendix B	2 weeks

Textbook

The course will strictly follow the following book:

Operating Systems: Three Easy Pieces
Free textbook: http://www.ostep.org/

Reference/Supplementary Readings

Reference Material:
Operating Systems Concepts – Silberschatz (9th Edition)