

COURSE DESCRIPTION

NAME OF INSTITUTION	Lahore Garrison University
PROGRAM (S) TO BE EVALUATED	Computer Science , Spring 2022

Course Description : This course covers introduction to operating systems, which serve as an interface between computer hardware and the user. The operating system is responsible for the management and coordination of processes, sharing of limited resources of the computer. Students will be exposed to the techniques and algorithms that may be applied in designing an operating system. Topics covered include process management, concurrency and synchronization, deadlock, memory management, file management, secondary storage management and I/O management. At the end of the course, the student shall have a clear understanding on the general concepts that underlie of an operating system.

Course Code	CSC351															
Course Title	Operating Systems															
Credit Hours	3+1															
Prerequisites by Course(s) and Topics	Data Structures and Algorithms															
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	SESSIONAL (Quizzes, Assignments, Presentations) =25 % Midterm Exam =25 % Final Exam = 50%															
Course Coordinator	Sundus Munir															
URL (if any)																
Current Catalog Description																
Textbook (or Laboratory Manual for Laboratory Courses)	Operating Systems Concepts, 9th edition by Abraham Silberschatz															
Reference Material	o Modern Operating Systems, 4th edition by Andrew S. Tanenbaum o Operating Systems, Internals and Design Principles, 9th edition by William Stallings o Davis, W.S. and Rajkumar, T.M. (2004) Operating Systems: A Systematic View. 3rd Ed.Harlow, Addison-Wesley.															
Course Goals	At the end of the course the students will be able to: 1. Understand the characteristics of different structures of the Operating Systems and identify the core functions of the Operating Systems. Analyze and evaluate the algorithms of the core functions of the Operating Systems and explain the major performance issues regarding the core functions. Demonstrate the knowledge in applying system software and tools available in modern operating systems.															
Course Learning Outcomes (CLOs):	<table><tr><td>At the end of the course the students will be able to:</td><td>Domain</td><td>BT Level*</td></tr><tr><td>Understand the characteristics of different structures of the Operating Systems and identify the core functions of the Operating Systems.</td><td>C</td><td>2</td></tr><tr><td>Analyze and evaluate the algorithms of the core functions of the Operating Systems and explain the major performance issues regarding the core functions.</td><td>C</td><td>3</td></tr><tr><td>Demonstrate the knowledge in applying system software and tools available in modern operating systems.</td><td>C</td><td>4</td></tr><tr><td colspan="3">* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain</td></tr></table>	At the end of the course the students will be able to:	Domain	BT Level*	Understand the characteristics of different structures of the Operating Systems and identify the core functions of the Operating Systems.	C	2	Analyze and evaluate the algorithms of the core functions of the Operating Systems and explain the major performance issues regarding the core functions.	C	3	Demonstrate the knowledge in applying system software and tools available in modern operating systems.	C	4	* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain		
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Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)	Week	Lecture	Topics Covered
	Week 1	1	Operating System Basics (History of OS from Legacy to current) MS-DOS, Windows
		2	Types of Operating System
	Week 2	3	System Calls, System Programs, System Structures
		4	Process Concept, Process State Diagram, Process Control Block, Schedulers (Long, Short, Medium)
	Week 3	5	Operation on Processes, Inter Process Communication
		6	Communication in Client-Server Systems (Sockets, RPCs, Pipes)
	Week 4	7	Thread Concepts, Thread Types, Thread Control Block
		8	Thread's Design, Multithreading Models, Threading Issues
	Week 5	9	CPU Scheduling (FCFS Algorithms, SJF)
		10	CPU Scheduling (SRTF, Round Robin)
	Week 6	11	CPU Scheduling (Priority Non-Preemptive, Priority Preemptive)
		12	CPU Scheduling (Multi-level Queues, Multi-level Queues Feedback)
	Week 7	13	Thread Scheduling, Multiple Processor Scheduling
		14	Real-Time Scheduling
	Week 8	1 hours	Mid Term
	Week 9	15	CPU Scheduling Algorithms
		16	Comparison of CPU Scheduling Algorithms
	Week 10	17	Process Synchronization, Race Conditions, Critical Section Issues Critical Section Problem Algorithms
		18	Bakery Algorithm,
	Week 11	19	Classical Problems of Synchronization (Bounded Buffer Problem), Readers Writers Problem, Dining Philosophers Problem,
		20	Sleeping Barbers Problems, Counting Semaphores, Binary Semaphores, Monitors, Condition Variables
	Week 12	21	Deadlocks, Deadlocks Example, Deadlock Characterization
		22	Deadlocks Prevention and Avoidance, Safe and Unsafe States
	Week 13	23	Resource Allocation Graphs
		24	Bankers Algorithms, Deadlock Detection and Recovery
	Week 14	25	Memory Management Contiguous and Non-Contiguous Allocations, Swapping, Paging, Paging Tables, Segmentation
		26	Virtual Memory, Demand Paging, Page Faults, FIFO, Optimal
	Week 15	27	LRU, MRU, Thrashing Work Set
		28	File System Management, File System Architecture, File Protection, Disk Structures, Directory Structures.
	Week 16	29	Operating System Security, Security Issues,
		30	Prevention, Detection, Correction,
	Week 17	2 hours	Final Term
Laboratory Projects/Experiments Done in the Course			
Programming Assignments Done in the Course			

Instructor Name	Sundus Munir
Instructor Signature	
Date	