

CSC 251 - Operating System Outline

General Information

Course Number	CSC-251- Operating System
Credit Hours	4 (Theory Credit Hour = 3, Lab Credit Hour = 1)
Prerequisite	None
Course Instructor	Dr. Raheel Ahmed Memon

Course Objectives

The main objectives of the course are to give students the basic concepts of an operating system, types of an operating system, computer system structures, process management, CPU Scheduling, Process synchronization, Deadlock, Memory management and Virtual memory management. Furthermore, the students will learn the operating system design algorithms often based on those used in existing commercial operating systems. Our aim is to present these concepts and algorithms in general setting that are not tied to one particular operating system.

Grading Criteria

Mid Exam	30 Marks
Final Exam	50 Marks
Sessional	20 Marks (Project, Quizzes and Assignments)

Course Content

Week	Topics	Suggested Reading
1	Introduction to course What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Operations, Resource Management, Security and Protection, Virtualization, Distributed Systems, Kernel Data Structures, Computing Environments	Chapter 1
2-3	Operating-System Structures Operating-System Services, User and Operating-System Interface, System Calls, System Services, Linkers and Loaders, Why Applications are Operating-System Specific, Operating-System Design and Implementation, Operating-System Structure, Building and Booting an Operating System	Chapter 2
4-5	Processes Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, IPC in Shared-Memory Systems, IPC in Message-Passing Systems, Examples of IPC Systems, Communication in Client– Server Systems	Chapter 3
6-7	Threads & Concurrency Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues, Operating-System Examples	Chapter 4
8	CPU Scheduling Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multi-Processor Scheduling,	Chapter 5
9	Midterm Examination	

10	CPU Scheduling Real-Time CPU Scheduling, Operating-System Examples, Algorithm Evaluation	
11	Synchronization Tools The Critical-Section Problem, Peterson's Solution, Hardware Support for Synchronization, Mutex Locks, Semaphores, Monitors.	Chapter 6
13-14	Deadlocks System Model, Deadlock in Multithreaded Applications, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.	Chapter 8
15	Memory Management Contiguous Memory Allocation, Paging, Structure of the Page Table, Swapping.	Chapter 9
16	Virtual Memory Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing	Chapter 10
17	Revision	-
Final Examination		

Text Book

Operating System Concepts 10th Edition by Abraham Silbetchatz, Peter Bare Galvin, and Greg Gagne. Published by Willey

Reference Material

1. Operating Systems: Principles and Practice 2nd Edition by Thomas Anderson, Michael Dahlin
2. Operating Systems: Three Easy Pieces By Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau

Course Learning Outcomes

	Course Learning Outcomes (CLO)
1	Student will be able to explain the fundamental concepts of Operating Systems
2	Student will be able to design and develop the solution for some known problems
3	Based on performance evaluation criteria, student will be able to analyze the efficiency of well-known algorithms of operating systems for a particular situation and environment.

CLO-SO Map

	SO IDs											
CLO ID	GA 1	GA 2	GA 3	GA 4	GA 5	GA 6	GA7	GA 8	GA 9	GA 10	GA 11	GA 12
CLO 1	1	0	0	0	0	0	0	0	0	0	0	0
CLO 2	0	0	1	0	0	0	0	0	0	0	0	0
CLO 3	0	1	0	0	0	0	0	0	0	0	0	0

Approvals

Prepared by	Dr. Ahmed Waqas
Updated by	Dr. Raheel Ahmed Memon
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