CSC 251 -Operating SystemsOutlines

General Information

Course Number	**CSC-251-Operating Systems**
Credit Hours	4 (Theory Credit Hour = 3, Lab Credit Hour =0)
Prerequisite	None
Course Coordinator	Nooruddin Noonari

Course Objectives

This course is an introductory course for junior or senior undergraduate level or at the first year graduate level. Operating systems are an essential part of any computer system. Similarly a course on an operating system is an essential part of any computer science education. This field is undergoing change and breathtakingly rapid rate, as computers are now prevalent in virtually every application, from games for children through the most sophisticated planning tools for governments and multi-nationalfirms. Yet the fundamental concepts remain fairly clear, and it is on these we base this course. This course provides the clear description of the concepts that underlie operating systems. As prerequisite, we assume that the students are familiar with basic data structures, computer organization, and a High level language such as C. 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. We present the large number of examples that pertain to the most popular operating systems, including Sun Microsystems, Solaris2, LINUX, MS DOS, Windows NT, Windows 2000 and Apple Macintosh operating system.

Catalog Description

CSC-251

Course Content

SessionNo.	WeekNo.	Topics	SuggestedReadings (Chapters)
01-03	1	• What Operating Systems Do • Computer-System Organization • Computer-System Architecture • Operating-System Structure • Operating-System Operations • Process Management	Ch1

04-06	2	• Memory Management • Storage Management • Protection and Security • Kernel Data Structures • Computing Environments • Open-Source Operating Systems	Ch1
07-09	3	• Operating-System Services • User and Operating-System Interface • System Calls • Types of System Calls	Ch2
10-12	4	• System Programs • Operating-System Design and Implementation • Operating-System Structure	Ch2, Ch3
13-15	5	• Process Concept • Process Scheduling • Operations on Processes • Inter process Communication • Examples of IPC Systems	Ch3
First MidExams			
16-18	7	• Overview • Multicore Programming • Multithreading Models • Thread Libraries • Implicit Threading • Threading Issues	Ch4
19-21	8	• Basic Concepts • Scheduling Criteria • Scheduling Algorithms • Thread Scheduling •	Ch5
22-24	9	• Multiple-Processor Scheduling • Real-Time CPU Scheduling • Operating-System Examples • The Critical-Section Problem • Synchronization Hardware • Mutex Locks	Ch5, Ch6

25-27	10	• Semaphores • Classic Problems of Synchronization • Synchronization Examples	Ch6
28-30	11	• System Model • Deadlock Characterization • Methods for Handling Deadlocks	Ch7
Second Mid Exams			
31-35	13	• Deadlock Prevention • Deadlock Avoidance • Deadlock Detection • Recovery from Deadlock	Ch7
	14	• Background • Swapping • Contiguous Memory Allocation • Segmentation • Paging	Ch8
35,40	15	• Background • Demand Paging • Copy-on-Write • Page Replacement • Allocation of Frames • Thrashing	Ch9
Onwards	16	• File Concept • Access Methods • Directory and Disk Structure • File-System Mounting • File Sharing • Protection	Ch10
FinalExams			

Text Book

OPERATING SYSTEM CONCEPTS 10th Edition by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne

Reference Material

- Operating System design , 8th Edition by William Stallings

Course Learning Outcomes

	Course Learning Outcomes (CLO)
1	To describe basic concepts of Operating System
2	To understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
3	To demonstrate concept of operating system through project deliverable

CLO-SO Map

	SO IDs										
CLO ID	**a**	**b**	**C**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
CLO 1	1	0	0	0	0	0	0	0	0	0	0
CLO 2	0	1	0	0	0	0	0	0	0	0	0
CLO 3	0	0	0	1	1	0	0	0	0	0	0