Tribhuvan University

Central Department of Computer Science & Information Technology

Level : Bachelor **Full Marks:** 60+20+20
Course : BSc. CSIT **Pass Marks:** 24+8+8
Subject : Operating System
Subject code: CSC 203 **Year:** II
Credit Hour : 3 hours
Lecture Hour: 7 LH (3 Theory, 1 Tutorial, 3 Lab) **Semester:** I

Unit	Description	Lecture Hour
1.	Introduction	6
	1.1 History of Operating System: • The first generation of computer • The second generation of computer • The third generation of computer • The fourth generation of computer 1.2 Operating System Concept: • Real-Time & Time Sharing • Mainframe operating system • Personal computer (PC) operating system • Introduction to system calls • The shell 1.3 Operating System Structure: • Monolithic systems • Layered systems • Virtual machine • Client-server model	
2.	Process Management	14
	2.1 Introduction to Processes: • The process model • Implementation of processes • Threads • Thread model • Thread usage • Implementing thread in user space 2.2 Interprocess communication & synchronization: • Race Conditions • Critical Regions • Mutual Exclusion with busy waiting • Sleep & Wakeup • Semaphores • Introduction to message passing • The Dining Philosophers Problem	

	2.3 Process Scheduling: • Round Robin Scheduling • Priority Scheduling • Multiple Queues	
3	Memory Management	7
	3.1 Memory Management without Swapping or Paging: • Monoprogramming without swapping & paging • Multiprogramming and Memory usage • Multiprogramming and Fixed partition 3.2 Swapping: • Memory Management with Bit Maps • Memory Management with Linked Lists • Memory Management with Buddy System • Allocation of Swap Space • Analysis of Swapping System 3.3 Virtual Memory: • Paging • Page Tables • Example of Paging Hardware • Associative Memory 3.4 Page Replacement Algorithms: • The Optimal Page Replacement Algorithms • The FIFO • The Second Chance Page Replacement Algorithms • The Least Recently Used • Modeling Paging Algorithms (Stack Algo.) 3.5 Segmentation: • Implementation of Pure Segmentation • Segmentation with Paging: MULTIC • Segmentation with Paging: The Intel	
4	File System	6
	4.1 Files: • File naming • File structure • File types • File access • File attributes • File operations • Memory mapped files 4.2 Directories: • Hierarchical directory system • Path names • Directory operations 4.3 File System Implementation • Implementing files • Implementing directories	

	• Shared files • Disk space management • File system reliability • File system performance	
5	Device Management	12
	5.1 Principle of I/O Hardware: • I/O Device • Device Controller • Direct Memory Access 5.2 Principle of I/O Software: • Goals of I/O Software • Interrupt Handlers • Device Drivers 5.3 Disk Management: • Disk Structure • Disk Scheduling Algorithm • Error Handling and Formatting • Stable Storage Management 5.4 Terminals: • Terminal Hardware • Memory-Mapped Terminals • Input-Output Software	
6	Deadlocks	
	6.1 Deadlocks: • Conditions for Deadlock • Deadlock Modeling 6.2 Deadlock Detection, Recovery And Prevention: • Deadlock Detection with One Resource of Each Type • Deadlock Detection with Multiple Resource of Each Type • Deadlock Preventation	

Text Books:

1. Modern Operating System – Andrew S. Tanenbaum, 2nd Edition
2. An Introduction to Operating System Concepts and Practice – Pramod Chandra Bhatt, 2nd Edition
3. Operating System Concept – Silberschatz, Galvin and Gagne, 6th Edition

Laboratory Works:

Small Type of programming (using C programming) of:

- Process Creation
- Process Termination
- Process Deletion
- Process Communication
- Classical Interprocess Communication Problem
- Filing System
- I/O Handling

Assignments:

- 10 Assignments

Tests:

- Internal Tests

Teaching Techniques:

- Lectures
- Demonstration
- Assignment (after completion of a unit)
- Oral/Viva

Working Environment:

- Linux/Windows Based

Case Study:

- Any One Operating System