

Tribhuvan University
Central Department of Computer Science Information Technology

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

Unit	Description	Lecture Hour	Remarks
1	INTRODUCTON	6 Hours	
	1.1 History of Operating System: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Real-Time & Time Sharing • Mainframe Operating System • Personal Computer (PC) Operating System • Introduction To System Calls • The Shell 1.3 Operating System Structure: <ul style="list-style-type: none"> • Monolithic Systems • Layered Systems • Virtual Machines • Client-Server Model 		
2	PROCESS MANAGEMENT	14 Hours	
	2.1 Introduction to Processes: <ul style="list-style-type: none"> • The Process Model • Implementation of Processes • Threads • Thread Model • Thread Usage • Implementing Thread In User Space 2.2 Interprocess Communication & Synchronization: <ul style="list-style-type: none"> • Race Conditions • Critical Regions • Mutual Exclusion with Busy Waiting 		

	<ul style="list-style-type: none"> • Sleep & Wakeup • Semaphores • Introduction To Message Passing • The Dining Philosophers Problem <p>2.3 Process Scheduling:</p> <ul style="list-style-type: none"> • Round Robin Scheduling • Priority Scheduling • Multiple Queues 		
3	MEMORY MANAGEMENT	7 Hours	
	<p>3.1 Memory Management without Swapping or Paging:</p> <ul style="list-style-type: none"> • Monoprogramming without Swapping & Paging • Multiprogramming and Memory Usage • Multiprogramming and Fixed Partition <p>3.2 Swapping:</p> <ul style="list-style-type: none"> • Memory Management with Bit Maps • Memory Management with Linked Lists • Memory Management with Buddy System • Allocation of Swap Space • Analysis of Swapping Systems <p>3.3 Virtual Memory:</p> <ul style="list-style-type: none"> • Paging • Page Tables • Example of Paging Hardware • Associative Memory <p>3.4 Page Replacement Algorithms:</p> <ul style="list-style-type: none"> • The optimal Page Replacement Algorithms • The First-in, First-out • The Second Chance Page Replacement Algorithms • The Least Recently Used • Modeling Paging Algorithms (Stack Algo.) <p>3.5 Segmentation:</p> <ul style="list-style-type: none"> • Implementation of Pure Segmentation • Segmentation with Paging: MULTIC • Segmentation with Paging: The Intel 		
4	FILE SYSTEM	6 Hours	

	<p>4.1 Files:</p> <ul style="list-style-type: none"> • File Naming • File Structure • File Types • File Access • File Attributes • File Operations • Memory Mapped Files <p>4.2 Directories:</p> <ul style="list-style-type: none"> • Hierarchical Directory System • Path Names • Directory Operations <p>4.3 File System Implementation:</p> <ul style="list-style-type: none"> • Implementing Files • Implementing Directories • Shared Files • Disk Space Management • File System Reliability • File System Performance 		
5	DEVICE MANAGEMENT	12 Hours	
	<p>5.1 Principle of I/O Hardware:</p> <ul style="list-style-type: none"> • I/O Device • Device Controller • Direct Memory Access <p>5.2 Principle of I/O Software:</p> <ul style="list-style-type: none"> • Goals of I/O Software • Interrupt Handlers • Device Drivers <p>5.3 Disk Management:</p> <ul style="list-style-type: none"> • Disk Structure • Disk Scheduling Algorithm • Error Handling and Formatting • Stable Storage Management <p>5.4 Terminals:</p> <ul style="list-style-type: none"> • Terminal Hardware • Memory-Mapped Terminals • Input/Output Software 		
6	DEADLOCKS		
	<p>6.1 Deadlocks: Conditions for Deadlock Deadlock Modeling</p>	45 Hours	

	6.2 Deadlock Detection, Recovery and Prevention: Deadlock Detection with One Resource of Each Type Deadlock Detection with Multiple Resource of Each Type Deadlock Prevention		
	Total Lecture Hour		

Text Books:

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

Laboratories Works:

Small type of programming (using C programming) of:

- Process Creation
- Process Termination
- Process Deletion
- Process Communication
- Classical Interprocess Communication Problems
- 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