BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]

2IT09: OPERATING SYSTEM
CREDITS – 4 (LTP:3,0,1)

Course Objective:
To give the comprehensive knowledge of various operating system's inherent functionalities and processing of program execution.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
				Theory		Practical		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction:** Basics of Operating Systems: Definition & Working, Generations of Operating systems, Types of Operating Systems, Operating System Concepts, System Calls, Operating System Structure.	03
2	**Process Management:** Processes: Definition, Process Model, Process Creation & Termination, Process Hierarchies, Process States, Implementation of process. Threads: Concept of multithreads, Thread Usage, Thread Model, Thread Implementation. Inter-process Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation , Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem. Process Scheduling: Introduction to Scheduling, Definition, Scheduling Objectives, Scheduling Algorithm Goals, Scheduling in Batch Systems, Scheduling in Interactive Systems, Scheduling in Real-Time Systems, Thread Scheduling.	12
3	**Deadlocks:** Definition, Deadlock Characteristics, Deadlock Detection and Recovery. Deadlock Avoidance, Deadlock Prevention, Two-Phase Locking, Starvation.	04
4	**Memory Management:** Introduction: Memory Management with and without abstraction, Swapping, Managing Free Memory. Virtual Memory: Paging, Page Tables, TLB, Multilevel Page Tables, Inverted Page Table. Page Replacement Algorithms: Optimal, NRU, FIFO, Second-Chance, Clock, LRU, Simulating LRU in software, Working Set, WS Clock. Design and Implementation Issues for Paging Systems: Local versus Global Allocation Policies, Page Size, Page Fault Handling. Segmentation.	12
5	**File Systems:** Files: Naming, Structure, Types, Access, Attributes, Operations. Directories: Single-level, Hierarchical Directory Systems, Path names, Operations. File System Implementation: File system layout, Implementing Files,	06

Unit No.	Topics	Teaching Hours
	Implementing Directories, and Shared Files. File System Management: File System Backups, File System Consistency Example of File Systems: MS-DOS, UNIX.	
6	**Input/output Management:** Principles of I/O Hardware: I/O devices, Device controllers, Direct memory access. Principles of I/O Software: Goals of I/O Software, Interrupt handlers, Device drivers. Disks: Disk Hardware, RAID, Disk Arm Scheduling Algorithm.	05
7	**Case Study:** Linux OS, Windows OS, different versions of Windows OS, Mac OS, Android OS.	03
	Total	**45**

List of References:

1. Andrew S Tanenbaum, "*Modern Operating Systems*", Third Edition, Prentice Hall India, 2008.
2. D.M. Dhamdhere, "*Operating Systems*", Second Edition, Tata McGraw Hill
3. Silberschatz, Peter B. Galvin and Greg Gagne, "*Operating System Concepts*", Eighth Edition, Wiley- Indian Edition, 2010.
4. B. Mohamed Ibrahim, "*Linux A Practical Approach*", Firewall Media.
5. Sumitabha Das,"*UNIX Concepts and Applications*", Tata McGraw Hill
6. Yashwant Kanetkar, "*Unix Shell Programming*", BPB publications.

Course Outcomes (COs):

At the end of this course students will be able to …

1. Assess how operating system handles various functions.
2. Analyze functional architecture of an operating system.
3. Interpret various process management concepts including scheduling, synchronization and deadlock problems and their solutions.
4. Examine concepts of memory management including virtual memory and input-output functionalities.
5. Examine various file management functionalities.
6. Experiment various commands in Linux and study working of different operating system like UNIX/LINUX.