Course code BCA-10
Operating System

Unit 1: Introduction to Operating System
What is an operating system, batch system, multi-programmed system, time-sharing system, personal computer operating system, parallel systems, distributed systems, real-time systems.

Unit 2: Processes
Process (process models, process hierarchies, process states), Threads (what is thread and its use, design issues of thread).

Unit 3: Interprocess Communication
What is interprocess communication, race conditions, critical-sections, mutual exclusion, solution to race condition, disabling interrupt, peterson's solution, sleep & wake up (The Producer Consumer Problem) and Semaphores.

Unit 4: Scheduling
Basic concepts, primitive and non-primitive scheduling, scheduling algorithms, types of scheduling - batch, interactive and real-time, goals of scheduling algorithms, first come first serve, shortest job first and round robin scheduling.

Unit 5: Deadlocks

What is deadlock, principles of deadlock (deadlock conditions & modeling), deadlock detection, recovery & prevention, deadlock avoidance (Banker's algorithm)

Unit 6: Memory Management
Multiprogramming(with fixed partitions, relocation and protection).What is swapping and its basic concepts. Virtual Memory – Basic Concepts, Paging, Page Tables. Page replacement algorithms: - Optimal, Not Recently Used, First In First Out, Least Recently Used.

Unit 7: File System
What is file, file naming, file types(directory, regular, device), sequential access and random access files, file attributes, operations on file, hierarchical directory structure, path name(relative and absolute), operation on directories. File System Implementation Techniques.

Unit 8: I/O Management
Basic principles I/O Hardware, I/O Devices, Device controllers, DMA. Principles of I/O Software, its goals, Interrupt Handlers, Device Drivers, Device Independent I/O Software(its functions)

Unit 9: Security and Protection
Security threats and goals, Authentication, Protection and Access control, Formal model of protection, Cryptography.

Unit 10: Multiprocessor Systems
Multiprocessor Interconnections, types of Multiprocessor Operating Systems, Multiprocessor OS Functions and Requirements, Multiprocessor Synchronization.

Unit 11: Distributed Operating Systems
Algorithms and Distributed Processing, Coping with Failures Models of Distributed systems, Remote procedure calls, distributed Shared Memory, Distributed File Systems.

Suggested Readings:
1. Operating System Concepts, S. Galvin, AWL
2. **Modern Operating System, A.S. Tanenbaum, PHI**