Syllabus

Paper Code : 42

Paper Title : Operating System Concepts

Maximum Marks: 80

Number of Lecture: 90

(45 Minutes duration)

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Objective : *This course enables students to understand the concepts of Operating System. After the completion of this paper, student will be able to*

- *Manage various process and use scheduling algorithms.*
- *Handle the deadlock conditions.*
- *Mange the files on the disk with effective outcome.*

Note :

(i) *The Question Paper will consist of Four Units.*

(ii) *Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.*

(iii) *The students are required to attempt **ONE** question from each Unit and the Compulsory question.*

(iv) *All questions carry equal marks unless specified.*

UNIT – I

1. **Introduction to Operating System :** History, Structure of OS, Functions/ Operations of OS, Types: Single User, Multi-user, Simple Batch Processing, Multiprogramming, Multitasking, Parallel systems, Distributed system, Real time system.

2. **Process Management :** Process, Process state, Process Control Block; Process scheduling : Scheduling queues, Schedulers, Context switch; Operation on process: Process creation and termination; interrupt mechanism, threads, Scheduling Algorithms: Pre-emptive and non pre-emptive scheduling, FCFS, SJFS, RRS, priority scheduling, Multilevel

queue scheduling, Mltilevel feedback queue scheduling, Inter process communication: Shared memory systems, Message passing systes.

UNIT – II

3. **Process Synchronization:** Concurrent Process, Race condition, Shared data; Critical section problem: Mutual exclusion, Progress, Bounded waiting; Software solution: Busy from of waiting, lock and unlock primitives, Dekker's algorithm, Peterson's solution, Baker's Algorithm, Synchronization: Semaphores, Monitors, Reader Writer Problem, Producer Consumer Problem, Dinning Philosopher Problem.
4. **System Deadlock:** System Model; Dedlock Characterization: Necessary conditions, Resource Allocation Graph; Deadlock prevention: Mutual Exclusion, Hold and Wait, No Preemption, Circular wait; Deadlock Avoidance: Safe state, unsafe state, Resource Allocation graph Algorithm, Banker's Algorithm; Deadlock Detection & Recovery from deadlock: Wait-for-graph

UNIT- III

5. **Memory Management:** Hierarchy of memory types, Cache memory: Types: Associative memory, direct mapped, set associative
6. **Memory Allocation:** Address binding, Address Space, Memory Protection, Contiguous and Non-Contiguous allocation, Swapping, Fragmentation; Paging: Protection, Shared pages, Techniques for structuring of page table; Segmentation: Segmentation with paging; Virtual Memory: Demand paging; Page replacement Algorithms: FIFO, Optimal, LRU, LFU, MFU, Working set, Thrashing.

UNIT – IV

7. **Storage Management:** File(s): Attributes, Operations, Types, Structure; Access Methods: Sequential, Direct access, index; Directory Structure: Single level, Two level, Tree Structured, Acyclic Graph; File System mounting; File sharing; protection: Types of access, access control.
8. File system structure, File system implementation, Directory implementation, Allocation methods: Contiguous Allocation, Linked Allocation, Indexed Allocation; Disk scheduling: methods: Contiguous Allocation, Linked Allocation, Indexed Allocation; Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK; Disk management; Swap space management; RAID