CS-5002 OPERATING SYSTEM

Rationale: The purpose of this subject is to cover the underlying concepts Operating System .This syllabus provides a comprehensive introduction of Operating System, Process Management, Memory Management, File Management and I/O management.
PREREQUISITE:- The students should have general idea about Operating System Concept, types of Operating System and their functionality.

Unit I
Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling . Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multiprogramming, time-sharing system.

Unit II
File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization ,sharing & implementation issues, Disk & Drum Scheduling, I/0 devices organization, I/0 devices organization, I/0 buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations. Device Driver: Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine. File system in Linux & Windows

Unit III
Process: Concept, Process Control Blocks(PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling, operations on processes, threads, inter process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

Unit IV
Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of Page table.Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

Unit V
Distributed operating system:-Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory(DSM), Basic Concept of Parallel Processing & Concurent Programming Security & threats protection: Security violation through Parameter, Computer Worms Virus, Security Design Principle, Authentications, Protection Mechanisms. introduction to Sensor network and parallel operating system. Case study of Unix, Linux & Windows,

Suggested Reading:
1. Silberschatz ,"Operating system", Willey Pub.
2. Dhamdhere, "Operating System",TMH.
3. Tannanbaum, "Modern operating system",PHI Learning
4. Achyut S Godbole,"Operating System", TMH.
5. William stalling, "operating system" Pearson Edu.
6. Deitel & Deitel, "Operating Systems", Pearson Edu.
7. Haldar, "Operating System", Pearson Edu.

List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.

2. Write a program to implement SJF CPU scheduling algorithm.

3. Write a program to implement Priority CPU Scheduling algorithm.

4. Write a program to implement Round Robin CPU scheduling algorithm.

5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.

6. Write a program to implement classical inter process communication problem(producer consumer).

7. Write a program to implement classical inter process communication problem(Reader Writers).

8. Write a program to implement classical inter process communication problem(Dining_Philosophers).

9. Write a program to implement & Compare various page replacement algorithm.

10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms

11. Write a program to implement Banker's algorithms.

12. Write a program to implement Remote Procedure Call(RPC).

13. Write a Devices Drivers for any Device or peripheral.