

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Artificial Intelligence and Data Science, IV-Semester

AD405: Operating Systems

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:

- UNIT 1 Introduction to Operating Systems:** Function, Evolution, Desirable Characteristics and features of an O/S, Operating Systems Services: Types of Services, Different ways of providing these Services – Utility Programs, System Calls.
- UNIT 2 Process Management:** Concept of a process, Process State Diagram, Process based kernel, Dual mode of process execution, CPU scheduling algorithms, deterministic modeling, and System calls for Process Management, Concept of Threads: User level & Kernel level Threads. Process Management in UNIX & Windows
Inter Process Communication: Real and Virtual Concurrency, Mutual Exclusion, Synchronization, Critical Section Problem, Solution to Critical Section Problem : Semaphores and their Operations and their implementation. Deadlocks: Deadlock Problems, Characterization, Prevention, Avoidance, Recovery. IPC in UNIX & Windows
- UNIT 3 Memory Management:** Different Memory Management Techniques – Partitioning, Swapping, Segmentation, Paging, Paged Segmentation, Comparison of these techniques, Techniques for supporting the execution of large programs: Overlay, Dynamic Linking and Loading, Virtual Memory – Concept, Implementation by Demand Paging etc. Memory management in UNIX & Windows
- UNIT 4 File Systems Management:** File Concept, User's and System Programmer's view of File System, Disk Organization, Tape Organization, Different Modules of a File System, Disk Space Allocation Methods – Contiguous, Linked, Indexed. Directory Structures, File Protection, System Calls for File Management, Disk Scheduling Algorithms. File Systems in UNIX & Windows.
- UNIT 5 Input / Output Management :** Principles and Programming, Input/Output Problems, Different I/O operations: Program Controlled, Interrupt Driven, Concurrent I/O, Asynchronous Operations, Logical structure of I/O function, I/O Buffering, Kernel I/o Subsystem. Introduction to Network, Distributed and Multiprocessor Operating Systems. I/O management in UNIX & Windows

TEXT BOOKS RECOMMENDED:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", Wiley, 9/E
2. William Stalling, "Operating Systems", Pearson Education

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Modern Operating Systems", 3/e, Prentice Hall
2. Maurice J. Bach, "The Design of Unix Operating System", Prentice Hall of India,
3. Bovet & Cesati, "Understanding the Linux Kernel", O'Reilly, 2/E.

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 algorithms.
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.