



BIT 305

OPERATING SYSTEMS

UNIT-I

Introduction: Computer system organization & Architecture, Operating System Structure & Operations, Process, Memory and Storage Managements, Protection and Security, Distributed and Special-Purpose Systems, Computing Environments.

System Structures: Operating-System Services, User Operating System Interface, System calls, Types of System Calls, System Programs, Operating-System Structure, Virtual Machines, Operating – System Generation, System Boot.

Process Concept: Overview, Process Scheduling, Operations on Processes, Interprocess communication, Examples of IPC Systems, Communication in Client/Server Systems.

Multithreaded Programming: Overview, Multithreading Models, Thread Libraries, Threading Issues, Operating-System Examples.

UNIT II

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multi-Processor Scheduling, Thread Scheduling, Operating System Examples, Algorithm Evaluation.

Process Coordination and Synchronization: Background, The Critical-Section Problem, Peterson’s Solution, Synchronization, Monitors, Synchronization Examples, Atomic Transactions.

Deadlocks: System Model, Deadlock characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.

UNIT III

Memory-Management Strategies: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Example: The Intel Pentium.

Virtual Memory Management: Background, Demand paging, Copy-on-write, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Other Considerations, Operating-System Examples.

Storage Management: File System, File Concept, Access Methods, Directory Structure, File-System Mounting, File sharing, Protection.

UNIT IV

Implementing File Systems: File System-Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, Log-Structured File Systems, NFS, Example: The WAFL File System.

Secondary –Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure.

I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystems, Transforming I/O Request to Hardware Operations, STREAMS, Performance.

UNIT V

Protection and Security: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of access rights, Capability- based Systems, Language-based protection.

System Security: The security problem, program Threats, System and System Network Threats, Cryptography as a Security tool, User Authentication, Implementing Security Defenses, Firewalling to protect Systems and Networks, Computer Security Classification, An Example: Windows XP.

Suggested Reading:

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System principles, seventh Edition, John wiley & sons publication,2006 .
2. A.Tanenbaum-Modern Operation Systems. Third edition, Pearson Education,2008.
3. William Stallings-Operating Systems, Fifth Edition, Pearson Education,2005.
4. Ida M.Flynn, Understanding Operating Systems, Sixth Edition, Cengage,2011 .