CSE222: Operating Systems

Programme: B.Tech (CSE) Year: II Semester: IV
Course: Core Credits: 4 Hours: 40

Course Context and Overview (100 words):

The course aims to provide a basic understanding of concepts relating to operating systems, such as concurrency and control of processes, deadlocks, memory management, disk scheduling and management and file system organization.

Prerequisite Courses: CSE216: Computer Organization & Architecture

Course Outcomes (COs):

The Outcomes of this Course are
CO1 Ability to understand fundamental concepts associated with operating systems
CO2 Ability to understand and analyze theory and implementation of process management concepts including scheduling, synchronization and deadlocks
CO3 Demonstrate an understanding of multithreading
CO4 Demonstrate an understanding of different memory management techniques
CO5 Ability to understand issues related to file systems and disk management

Course Topics:

Topics	Lecture Hours
UNIT – I **Overview of Operating Systems (OS)**	2
Definition, OS operations, OS services, OS structure, System calls	
UNIT – II **Process Management**	
1. Process concept, Process states, Interprocess communication	3
2. Threads – Multithreading models, Thread libraries	3
3. Process Synchronization – Critical section problem, Peterson's solution, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Monitors	5
4. CPU scheduling – Algorithms, Thread scheduling, Multiple-processor scheduling, Real-time CPU scheduling	4
5. Deadlocks – Prevention, Avoidance, Detection	3
UNIT – III **Memory Management**	
Swapping, Continuous memory allocation, Segmentation, Paging, Demand paging, Page replacement, Thrashing	6
UNIT – IV **Storage Management**	
1. I/O Systems – Disk scheduling, Disk management, RAID structure, Interrupts, Direct memory access	6

2. File System – File concept, Access methods, Directory and Disk structure, File-system mounting, File sharing	6
UNIT – V **Protection and Security**	2
Principles of protection, Access matrix, Access control, The security problem, Program, system threats	

Textbook references (IEEE format):
Text Book:

1. Silberschatz, P.B. Galvin and G. Gagne, *Operating System Concepts*, 8th ed. Wiley, 2009.

Reference books:

1. Tanenbaum, *Modern Operating Systems,* 3rd ed. Prentice Hall, 2007.
2. W. Stallings, *Operating Systems*, 2nd ed. Prentice Hall, 1995.
3. W. R. Stevens, *Advanced Programming In The Unix Environment*, 2nd ed. Addison-Wesley Professional, 2005.

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):
NPTEL lectures

Evaluation Methods:

Item	Weightage (%)
Internal Assessment (*Quizzes, Assignments, Project*)	35
Mid-Term Examination	25
End-Term Examination	40

Prepared By:
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