III Year I Semester L T P C

Code: 20CS5658 3 0 0 3

ADVANCED OPERATING SYSTEMS (Honors)

Course Objectives:

The course objectives of Operating Systems are to discuss and make student familiar with the

- 1. The architectures of distributed systems.
- 2. The mutual exclusion algorithms
- 3. Get the knowledge on Distributed Deadlock Detection techniques.
- 4. Multiprocessor System Architectures.
- 5. Understand Distributed Scheduling Distributed Shared Memory

Course Outcomes:

By the end of the course, the student will:

- 1. Understand the design approaches of advanced operating systems architectures.
- 2. Analyse the design issues of distributed mutual exclusion algorithms.
- 3. Analyse the deadlock situation in distributed systems.
- 4. Identify the requirements of distributed shared memory architectures and distributed file system.
- 5. Formulate the solutions to schedule the real time applications using load distributed algorithms and distributed shared memory algorithms.

UNIT - I

Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT - II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms *Non-Token –Based Algorithms:* Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, *Token-Based Algorithms:* Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm, Raymond's Heuristic Algorithm.

UNIT - III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms.

UNIT - IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.

Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT - V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration.

Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, and design Issues.

Text Books:

- 1. Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001
- 2. Operating Systems Concepts & design Milan Milenkovic, TMH

Reference Books:

- 1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, Edition 2, 2007
- 2. Pradeep K.Sinha," Distributed operating system-Concepts and design", PHI, 2003.
- 3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003.