**Distributed Operating System**

**(Syllabus)**

**Unit I:** Fundamentals: Introduction, Models and Features, Concept of Distributed Operating system, Issues in Design of a Distributed Operating System. Foundations of Distributed System: Limitations of Distributed Systems, Lamport’s logical clocks, Vector clocks, Causal ordering of messages, Global state recording, Cuts of a Distributed Computation, Termination Detection.

**Unit II**: Distributed Mutual Exclusion: Requirement of Mutual Exclusion Algorithm, Non Token Based Algorithms: Lamport’s Algorithm, Ricard-Agrawala Algorithm, Maekawa’s Algorithm, Token Based Algorithms: Suzuki-Kasami’s Broadcast Algorithm, Singhal’s Heuristic Algorithm, Raymond’s Tree-Based Algorithm, Comparative Performance Analysis.

**Unit III:** Distributed Deadlock Detection: Introduction, Deadlock Handling strategies in Distributed System, Centralized and Distributed Deadlock Detection Algorithms. Agreement protocols: Introduction, System Model, Classification of Agreement Problems, Solutions to the Byzantine Agreement Problem.

**Unit IV:** Distributed File system: Introduction to Distributed File System, Architecture, and Mechanism for Building Distributed File System. Distributed Shared Memory: General Architecture of DSM systems, Algorithm for Implementing DSM, Memory coherence and Coherence Protocols.

**Unit V:** Distributed Scheduling: Introduction, Issues in Load Distributing, Components of a Load Distributing Algorithm, Load Distributing Algorithms: Sender-Initiated Algorithm, Receiver-Intiated algorithm, Symmetrically Initiated 27 Algorithm, Adaptive Algorithm, Requirements for Load Distributing Task Migration, Issues in Task Migration.

**Unit VI:** Failure Recovery: Recovery in concurrent systems, Consistent set of Checkpoints, Synchronous check pointing and Recovery, Asynchronous check pointing and Recovery. Fault Tolerance: Introduction, Commit Protocols, Static Voting Protocol, Dynamic Voting Protocol.

**Text Books:** 1. Advanced Concepts in Operating Systems, Mukesh Singhal and Niranjan Shivaratri, Tata McGraw Hill, 2001.

2. Distributed Systems - Concepts and Design, Coulouris, Dollimore and Kindberg, 5th Edition, Addison-Wesley, 2012.

**Reference Books:** 1. Distributed Operating System, Andrew S. Tanenbaum, Pearson Education, 2003.