Course Title : **Distributed Operating Systems**
Course Code : COM 605.3
Credit : 3
Class Load : 3 hours
Evaluation :

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	100	-	100

Course Objective:

To provide the students a comprehensive exposure to the concepts and techniques necessary for understanding how the operating systems are designed and implemented for efficient operation of pervasive distributed computer system.

Course Contents:

1. **Introduction** **(3 hrs)**
   Distributed System, System Models (Architecture and Fundamental Models), Multiprocessors and Multicomputers, Network OS, True Distributed system, Design Issues, Transparency, Flexibility, Reliability, Performance, Scalability.

2. **Communication in Distributed Systems** **(7 hrs)**
   Layered Protocols and Seven Layer, ATM Networks, Client Server Model; Addressing, Blocking vs nonblocking primitives, Buffered vs Unbuffered primitives, Reliable vs unreliable primitives, Implementation, RPC; Operation, parameter passing, dynamic binding, implementation issues; Events & Notification, Group Communication,

3. **Synchronization in Distributed Systems** **(6 hrs)**
   Clock Synchronization Logical and Physical Clocks, Clock Sychronization Algorithms, Mutual exclusion, Centralized, Distributed, and Token Ring Algorithms and their comparision, Election Algorithm, Transaction Model, Concurrency Control and Implementation, Deadlock in Distributed Systems.

4. **Processes and Processors in Distributed Systems** **(8 hrs)**
   Thread concept, Thread usage, Design for Thread Packages, Threads and RPC, System model, Workstation model, Processor Pool model, Hybrid Model, Processor Allocation Algorithms and Issues, Scheduling, Faults and Various Fault Tolerance methods, Real-time systems and issues

5. **Distributed File Systems & Name Services** **(6 hrs)**
   Distributed File System Design, File Service Architecture, File sharing, File System Implementation, File usage, System Structure, Caching, Replication, Trends in Distributed File System, New Hardware, Scalability, Networking, Mobile Users, Fault Tolerance, Multimedia, Name Services and DNS, Directory and Discovery Services.

6. **Distributed Shared Memory** **(9 hrs)**
   Shared Memory, On-chip memory, Bus-based, Ring based and Switched Multiprocessors, NUMA Multiprocessors, Consistency Models, Strict, Sequential, Causal, PRAM, Weak,

Release, Entry Consistency, Page Based Distributed Shared Memory, Basic design, Replication, Granularity, Achieving Sequential Consistency, Finding the Owner, Finding the Copies, Page Replacement and Synchronization, Shared Variable Distributed Shared Memory, Object Based Distributed Shared Memory

Case Studies **(6 hrs)**

AMOEBA, MACH, CHORUS, DCE

References :

1. Andrew S. Tanenbaum, *Distributed Operating Systems*, 2001, Pearson
2. Abraham Silberschatz and Peter Baer Galvin, *Operating System Concepts*, Fifth Edition, 2001, John Wiley & Sons
3. George Coulouris, Jean Dollimore, Tim Kindberg,*Distributed Systems – Concepts and Design*, Third Edition, 2002, Pearson
4. Garry Nutt, *Operating Systems – A Modern Perspective*, Second Edition, 2001, Pearson