Syllabus

Course Code	Course/Subject Name	Credits
CSC802	**Distributed Computing**	4

Objectives :

1. To provide students with contemporary knowledge in distributed systems.
2. To equip students with skills to analyze and design distributed applications.
3. To provide master skills to measure the performance of distributed synchronization algorithms.

Outcomes : On successful completion of course learner will be able to:

1. Demonstrate knowledge of the basic elements and concepts related to distributed systemtechnologies ;
2. Illustrate the middleware technologies that support distributed applications such as RPC, RMI andObject based middleware.
3. Analyze the various techniques used for clock synchronization and mutual exclusion.
4. Demonstrate the concepts of Resource and Process management and synchronization algorithms.
5. Demonstrate the concepts of Consistency and Replication Management.
6. Apply the knowledge of Distributed File System to analyze various file systems like NFS, AFS andthe experience in building large-scale distributed applications

Module No.	Unit No.	Topics	Hours
1.0	**Introduction to Distributed Systems**	1.1 **Characterization of Distributed Systems :** Issues, Goals, and Types ofdistributed systems, Distributed System Models, Hardware concepts,Software Concept.	06
		1.2 **Middleware :** Models of Middleware, Services offered by middleware,Client Server model. **(Refer Chapter 1)**	
2.0	**Communication**	2.1 **Layered Protocols, Interprocess communication (IPC) :** MPI, RemoteProcedure Call (RPC), Remote Object Invocation, Remote MethodInvocation (RMI)	10
		2.2 Message Oriented Communication, Stream Oriented Communication,Group Communication **(Refer Chapter 2)**	
3.0	**Synchronization**	3. 1 Clock Synchronization, Logical Clocks, Election Algorithms, MutualExclusion, Distributed Mutual Exclusion-Classification of mutualExclusion Algorithm, Requirements of Mutual Exclusion Algorithms,Performance measure.	

Module No.	Unit No.	Topics	Hours
		3.2 Non Token based Algorithms : Lamport Algorithm, Ricart–Agrawala'sAlgorithm, Maekawa's Algorithm	10
		3.3 Token Based Algorithms : Suzuki-Kasami'sBroardcast Algorithms,Singhal'sHeurastic Algorithm, Raymond's Tree based Algorithm,Comparative Performance Analysis **(Refer Chapter 3)**	
4.0	**Resource and Process Management**	**4.1** Desirable Features of global Scheduling algorithm, Task assignmentapproach, Load balancing approach, load sharing approach.	06
		4.2 Introduction to process management, process migration, Threads.Virtualization, Clients, Servers, Code Migration. **(Refer Chapter 4)**	
5.0	**Consistency, Replication and Fault Tolerance**	**5.1** Introduction to replication and consistency, Data-Centric and Client-Centric Consistency Models, Replica Management.	08
		5.2 Fault Tolerance: Introduction, Process resilience, Reliable client-server andgroup communication, Recovery. **(Refer Chapter 5)**	
6.0	**Distributed File Systems and Name Services**	**6.1** Introduction and features of DFS, File models, File Accessing models,File-Caching Schemes, File Replication, Case Study: Distributed FileSystems (DSF), Network File System (NFS), Andrew File System (AFS)	12
		6.2 Introduction to Name services and Domain Name System, DirectoryServices, Case Study: The Global Name Service, The X.500 DirectoryService	
		6.3 Designing Distributed Systems: Google Case Study **(Refer Chapter 6)**	
		Total	52

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Module 1

Module 2

Module 3

Chapter 3 : Synchronization 3-1 to 3-28

Module 4

Module 5

Module 6

Chapter 6 : Distributed File Systems and Name Service 6-1 to 6-30

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