C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: - Technology and Engineering
DEPARTMENT OF: - Computer Engineering
SEMESTER: - VIII
CODE: - **4TE08DSY1**
NAME: – **Distributed Systems**

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							Total
							Theory				Practical (Marks)			
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
4TE08DSY1	Distributed Systems	4	0	2	6	5	30	1.5	70	3	-	20	30	150

Objectives:

- The main objectives for offering the course Distributed Operating System are:
  - To gain experience of conducting research in the area of operating system.
  - To acquire and pursue deeper knowledge in the concept of distributed environments.

Prerequisites:

- Require the basic concepts of Operating System and Distributed Network.

Course outline:

Sr. No.	Course Contents	Total Hrs.
1	**Introduction to distributed Systems:** Definition and goals, Hardware and Software concepts, Design issues, Case Studies: www 1.0, www 2.0	6
2	**Communication in Distributed System:** Computer Network and Layered protocols, Protocols for Distributed System, Message passing and related issues, synchronization, Client Server model & its implementation, remote procedure call and implementation issues, Case Studies: SUN RPC, DEC RPC, Java RMI	10
3	**Synchronization in distributed systems:** Clock synchronization and related algorithms, mutual exclusion, Deadlock in distributed systems	6
4	**Processes and processors in distributed systems:** Threads, system model, processor allocation, scheduling in distributed systems: Load balancing and	8

		sharing approach, fault tolerance, Real time distributed systems, Process migration and related issues	
5		**Distributed Shared Memory:** Introduction, general architecture of DSM systems, design and implementation issues of DSM, granularity, structure of shared memory space, consistency models, replacement strategy, thrashing, Case Studies: Munin, Teamster	6
6		**Distributed File Systems:** Introduction, features & goal of distributed file system, file models, file accessing models, file sharing semantics, file caching scheme, file replication, fault tolerance, trends in distributed file system, case study: Google File System	6
7		**Naming:** Overview, Features, Basic concepts, System oriented names, Object locating mechanisms, Issues in designing human oriented names, Name caches, Naming and security, Case Studies: DNS	6
8		**Security:** Introduction of Security in Distributed OS, Overview of security techniques, features, Need, Access Control, Security Management, Case Studies: Kerberos	6
9		**Real-Time Distributed Operating System:** Real-Time Distributed Operating System, Design Issue, Real-Time Communication, Real-Time Scheduling, Case Studies: MARS	6
		Total	**60**

Learning Outcomes:

- The Upon completion of this course, students will be able to do the following:
  - Be familiar with the principles and approaches to deadlock and fault tolerance in distributed systems To understand and explain the design issues in transport services in face of applications and services requirements.
  - Be exposed to the basic concepts of data consistency and data consistency models.
  - Be familiar with principles and algorithms for distributed mutual exclusion security in distributed systems.

Books Recommended:

1. Distributed Operating Systems: Concepts and Design by **Pradeep. K. Sinha**, Prentice hall of India (1998)
2. Distributed Systems: Concepts and Design, **G. Coulouris, J. Dollimore, and T. Kindberg**, Pearson Education
3. Distributed Systems: Principles and Paradigms, 2nd Edition by **Andrew Tanenbaum** (2006)
4. Distributed computing by **Sunita Mahajan and Seema Shah**, Oxford University Press (2010)