



**STANLEY**  
**COLLEGE OF ENGINEERING & TECHNOLOGY FOR WOMEN**  
( Approved by AICTE , New Delhi | Affiliated to Osmania University ,Hyderabad)  
Address : Chapel Road, Abids ,Hyderabad

**CS401**

## **DISTRIBUTED SYSTEMS**

### **UNIT I**

#### **Characterization of Distributed Systems**

Introduction, Examples of distributed systems, Resource sharing and the web, Challenges

#### **System Models**

Introduction, Architectural models, Fundamental models.

#### **Operating System Support Introduction**

The operating system layer, Protection, Processes and threads, Communication and invocation, Operating system architecture.

### **UNIT II**

#### **Interprocess communication**

Introduction, The API for the internet protocols, External data representation and marshalling. Client Server communication, Group Communication, Case study:

#### **Interprocess communication**

Introduction UNIX. Distributed objects and Remote Invocation Introduction, Communication between distributed objects, Remote procedure call, Events and notifications, Case study: Java RMI. Name Services Introduction, Name services and the Domain Name System, Directory services, Case study of the X.5000 Directory Service.

### **UNIT III**

#### **Time and Global States**

Introduction, Clocks events and process states, Synchronizing physical clocks, Logical clocks, Global states, Distributed debugging.

#### **Coordination and Agreement**

Introduction, distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.

## UNIT IV

### **Transactions and Concurrency Control**

Introduction, Transactions, Nested transactions, Locks Optimistic concurrency control. Timestamp ordering, Comparison of methods for concurrency control.

### **Distributed Transactions**

Introduction, Flat and nested distributed transactions, Atomic commit process, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

### **Replication**

Introduction, System model and group communication, Fault-tolerant services. Case study: The gossip architecture, CODA.

## UNIT V

### **Distributed Shared Memory**

Introduction, Design and implementation issues, Sequential consistency and Ivy case study. Release consistency and Munin case study, Other consistency model.

### **Distributed File Systems**

Introduction, File service architecture, Case study: Sun Network File System. Enhancements and further developments.

### **Suggesting Readings:**

1. Colouris, Dollimore, Kindberg, “ Distributed Systems concepts and Design” - 5th Ed. Pearson Education, 2011
2. Andrew S. Tanenbaum, Van Steen, “ Distributed Systems “, Pearson Education , 2010.
3. Singhal M, Shivratri N.G, “Advanced Concepts Introduction, Operating Systems” McGraw Hill, 2001.
4. Pradeep K Sinha, “ Distributed Operating Systems: Concepts and Design”, Pearson Education Asia India, 2007.