**UNIT I**

Introduction: Definition of Distributed Systems, Goals: Connecting Users and Resources, Transparency, Openness, Scalability, Hardware Concepts: Multiprocessors, Homogeneous Multicomputer systems, Heterogeneous Multicomputer systems, Software Concepts: Distributed Operating Systems, Network Operating Systems, Middleware, The client-server model: Clients and Servers, Application Layering, Client-Server Architectures.

**UNIT II**

Communication: Layered Protocols, Lower-Level Protocols, Transport Protocols, Higher-Level Protocols, Remote Procedure Call: Basic RPC Operation, Parameter Passing. Extended RPC Models, Remote Object

Invocation: Distributed Objects, Binding a Client to an Object; Static verses Dynamic Remote Method Invocations, Parameter Passing, Message Oriented. Communication: Persistence and synchronicity in Communication, Message Oriented Transient Communication, and Message-Oriented’ Persistent Communication, Stream Oriented Communication: Support for Continuous Media, Streams and Quality of Service, Stream Synchronization.

**UNIT III**

**PROCESS:** Threads: Introduction to Threads, Threads in Distributed Systems, Clients: user Interfaces, Client-Side Software for Distribution Transparency, Servers: General Design Issues, Object Servers, Software Agents: Software Agents in Distributed Systems, Agent Technology, Naming: Naming Entities: Names, Identifiers, and Address, Name Resolution, The Implementation of a Name System, Locating Mobile Entities: Naming verses Locating Entities, Simple Solutions, Home-Based Approaches, Hierarchical Approaches.

**UNIT IV**

**Distributed Object based Systems:** CORBA: Overview of CORBA, Communication, Processes, Naming, Synchronization, Caching and Replication, Fault Tolerance, Security, Distributed COM: Overview of DCOM, Communication, Processes, Naming, Synchronization, Replication, Fault Tolerance, Security, GLOBE: Overview of GLOBE, Communication, Process, Naming, Synchronization, Replication, Fault Tolerance, Security, Comparison of CORBA, DCOM, and Globe: Philosophy, Communication, Processes, Naming, Synchronization, Caching and Replication, Fault Tolerance, Security.

**UNIT V**

**Distributed Multimedia Systems:** Introduction and Characteristics of Multimedia Data.

Quality of Service Management: Quality of Service negotiation, Admission Control.

Resource Management: Resource Scheduling.

**Suggessted Readings:**

1. Andrew S. Tanenbaum and Van Steen “Distributed Systems”. PHI, 2nd Edition.

2. Colouris G.. Dollimore Jean, Kindberg Tim, “Distributed Systems Concepts and Design”. 3rd Edition Pearson education 2002.