

Course Title: Distributed Networking

Course no: CSC-454

Credit hours: 3

Full Marks: 60+20+20

Pass Marks: 24+8+8

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Course Synopsis: Design and development of distributed networking system.

Goal: The course covers about: the function and structure of communications sub-nets, network architectures and their protocols, approaches to the organisation of sub-nets and their architectures, processes of network and protocol design, role of network standards and their relationship to products, Network OS, Distributed Object Network and advance applications.

Course contents:

Unit 1: **8Hrs**

Protocols-functions, design, implementation and testing, Architectures, Standards and Protocols-TCP OSI/IP, connectionless and connection-oriented protocols, protocol stacks, Internetworking-bridges and routers, Internet design and evolution.

Unit 2: **8Hrs**

Network Design, Performance, Operation and Management-architecture, interoperability and open systems issues, Introduction to Distributed Systems-client/server model, workstations.

Unit 3: **8Hrs**

Inter-process Communication: API for Internet protocols, External data representation and Marshalling, Client server architecture, Peer-to-peer architecture, Client-Server communication and Group communication

Unit 4: **8Hrs**

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote Procedure Call, Remote Object Invocation, Message- and Stream-oriented communication, Distributed Web-Based Systems, Common Carrier Services

Unit 5: **8hrs**

Distributed OS: network operating systems, Distributed File systems, Distributed synchronization, Distributed object-based systems, Fault Tolerant Computing Systems.

Unit 6: **5hrs**

Advance Application: Grid Computing and Application, virtualization and cloud computing

Laboratory: the laboratories include the installation and configuration of Distributed (network) OS, implementation of Distributed Web based systems, RMI and RPC programming and implementation with JAVA and conceptualization of grid and cloud applications.

Reference Books:

1. Comer DE, (1995), Internet working with TCP/IP Vol. 1, 3e, Prentice-Hall.
2. Hagit Attiya, Jennifer Welch, Distributed Computing: Fundamentals, Simulations, and Advanced Topics, 2nd Edition, March 2004
3. Distributed Systems: Principles and Paradigms - Andrew Tanenbaum and Maarten van Steen, Prentice Hall, 2007

Prerequisite: Networking and Communications Fundamentals