

Computer Networks and Distributed Computing

Purpose and Scope:

This course will review some of the computer networks concepts and then will involve an in-depth study of the TCP/IP protocol stack and the various protocols involved in the operation of the internet. It will then cover the basics of distributed computing, distributed shared memory, distributed scheduling, distributed file systems etc. There associated lab exercises will help to get hands-on experience with networking concepts.

Contents :

Module-A: OSI seven-layer model review. LAN concepts, protocols and standards for Medium Access Control (MAC). Application layer protocols – HTTP, SMTP, DNS, SFTP, POP3, NFS and NIS.

Module-B: Transport layer concepts – reliable and unreliable service. Flow control and Congestion control concepts. TCP and its internals. UDP datagram service. Socket programming introduction using Java.

Module-C: Network layer concepts and Routing Issues. IP datagram, addressing, CIDR, IP routing. IPv6 concepts. Routing algorithms. Autonomous systems. Interior and Exterior gateway protocols – RIP, OSPF and BGP.

Module-D: Architectures of distributed systems. Resource management in distributed file systems. Elements of distributed shared memory and distributed scheduling.

Module-E: Concurrency in Distributed Computing. Distributed Objects. Scalability. Fault Tolerance. Computing Taxonomies. Computer Clusters. Grid Computing. Distributed Computing Infrastructure.

Reference :

1. Computer Networks, Andrew Tanenbaum
2. Internetworking with TCP/IP vol. I, Douglas Comer
3. TCP/IP Illustrated vol. I, W.Richard Stevens
4. Computer Networking, Kurose and Ross
5. Networks for Computer Scientists and Engineers, Youlu Zheng and Shakil Akhtar
6. Computer Networking with Internet Protocols, William Stallings
7. Distributed Systems, Andrew Tanenbaum
8. Advanced Concepts in Operating Systems. Mukesh Singhal and Niranjana G. Shivaratri
9. Distributed Systems- Concepts and Design 3rd Edition. George Coulouris et.al, 2000
10. Distributed Computing: Principles and Applications by M.L. Liu (Paperback -- 2003)
11. Distributed Computing : Fundamentals, Simulations, and Advanced Topics (Wiley Series on Parallel and Distributed Computing) by Hagit Attiya, Jennifer Welch ,2004