**Advanced Computer Networks**

Course Code: CSE551

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| Unit I | |
| Next Generation IP: IPv6 Addressing: Representation, The IPv6 Protocol: Packet Format, Extension Header, The ICMPv6 Protocol: Error- Reporting Messages, Information Messages, Neighbor-Discovery Messages, Group Membership Messages, Transition From IPv4 to IPv6: Strategies, Use of IP 21 addresses. | Forouzan chap 22 |
| Multicast -Multicast Addresses, Multicast Routing (DVMRP, PIM, MSDP), Multiprotocol Label Switching (MPLS), Destination-Based Forwarding, Explicit Routing, Virtual Private Networks and Tunnels, Multipath routing. | Larry chap 4 |
| Unit II |  |
| Socket Programming with TCP and UDP, TCPNewReno,TCP with Selective Acknowledgments, Forward Acknowledgments, TCP Vegas. High Performance TCP: High-Bandwidth-Delay Products Round-Trip Estimation, Path MTU Discovery,Reducing End-System Overhead:Overhead, CPU Utilization, and Bandwidth, The Role of Application Processing,Sources of Overhead for TCP/IP.Copy Avoidance: Page Remapping, Scatter/Gather I/O, Remote Direct MemoryAccess and TCP Offload. | High performance TCP / IP Chap 11 and chap 13 |
| Overlay Networks Routing Overlays, Peer-to-Peer Networks, Content Distribution Networks | Larry chap 9.4 |
| Network Management: SNMP: Concept, Management Components, SMI, MIB, SNMP format, Messages. | Forouzan Chap 27 |
| Unit III |  |
| Wireless and Mobile Networks: Introduction, WiFi 802.11 Wireless LANs- The 802.11, Architecture, Mobility in the Same IP Subnet, Advanced Features in 802.11, Mobility Management Principles, Addressing, Routing to a Mobile Node, Mobile IP, Managing Mobility in Cellular Networks, Routing Calls to a Mobile User, Handoffs in GSM. Case studies using simulation environment. | Kurose  Chap 6 |
| Unit IV |  |
| Multimedia Networking: Multimedia Networking Applications: Types of Multimedia Network Applications, Content Distribution Networks, Voice-overIP: Limitations of the Best-Effort IP Service, Removing Jitter at the Receiver for Audio, Protocols for Real-Time Conversational Applications: RTP, SIP. Case studies related to multimedia applications. | Kurose  Chap 7 |
| Unit V |  |
| Quality of Service: Traffic Shaping or Policing, Resource Reservation, Admission Control, Integrated Services (Intserv), Differentiated Services (DFFSERV). | Forouzan chap 30 |
| Traffic Engineering Basics: Introduction to traffic Engineering, Requirement Definition for Traffic Engineering, Traffic Sizing , Traffic Characteristics, Protocols, Time and Delay Consideration, Connectivity, Availability, Reliability, and Maintainability, Throughput Calculation. | Ambawade Chapter 9 |

Reference Books:

1. Larry L. Peterson and Bruce S Davie: Computer Networks: A Systems Approach, Fifth Edition, Elsevier, 2011.
2. James F. Kurose and Keith W. Ross: Computer Networking: A Top-Down Approach, 6th edition, Addison-Wesley, 2013.
3. Forouzan: Data Communications and Networking, 5th edition, McGraw Hill Education 2013.
4. High performance TCP / IP networking - concepts, issues, and solutions.
5. Advance Computer Network, By Dayanand Ambawade, Dr. Deven shah, Prof. Mahendra Mehra, Wiley India

**Course outcomes:**

1. Describe the concepts of IPv6, Multicast addressing, and MPLS. (PO:1,2,3,4,PSO-1)
2. Illustrate various versions of TCP, overlay networks and SNMP.(PO:1,2,3,4,PSO-1)
3. Identify issues related to wireless networks and mobility in Internet and cellular networks. (PO:1,2,3,4,PSO-1)
4. Describe the concepts of multimedia networking.(PO:1,2,3,4,PSO-1)
5. Illustrate providing Quality of Service and traffic engineering. (PO-1,2,3, 4, PSO-1)