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| **Course Code:CSE3003** | **Course Title: Computer Networks** | **TPC** | **3** | | **2** | **4** |
| **Version No.** | **1.0** | | | | | |
| **Course Pre-requisites/ Co-requisites** | CSE2005 | | | | | |
| **Anti-requisites (if any).** | SWE3001, ECE3003 | | | | | |
| **Objectives:** | 1. To introduce basic concepts in Computer Networks 2. To expose state-of-the-art technologies in computer network protocols, architectures, and applications. | | | | | |
| **Expected Outcome:** | 1. Independently understand basic computer network technology. 2. Understand and explain Data Communications System and its components. 3. Identify the different types of network topologies and protocols. 4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. 5. Identify the different types of network devices and their functions within a network 6. Understand and building the skills of subnetting and routing mechanisms. 7. Familiarity with the basic protocols of computer networks, and how they can be used 8. To assist in network design and implementation. | | | | | |
| **Module No. 1** | **Introduction** | | | **6 Hours** | | |
| Computer network and its history, progress and application, Internet, Network architecture, Networking devices. OSI Model, TCP/IP Protocol stack, Networking in different OS. | | | | | | |
| **Module No. 2** | **Physical Layer** | | | **8** **Hours** | | |
| Data communication technologies, Analog and digital communication. Encoding mechanisms, Packet Switching, Circuit Switching. | | | | | | |
| **Module No. 3** | **Data Link Layer** | | | **8 Hours** | | |
| Framing, HDLC, PPP, Error detection, Error Correction, MAC Protocols, Reliable Transmission, Ethernet, 802.3, 802.5, 802.11, PPP, ATM. | | | | | | |
| **Module No. 4** | **Network Layer** | | | **7 Hours** | | |
| IP addressing schemes, IPV4, Subnetting, IPV6, shift from IPV4 to IPV6, ICMP, DHCP, ARP.  Routing Protocols: Distance-vector and link-state routing. RIP, OSPF, BGP  Multicasting. | | | | | | |
| **Module No. 5** | **Transport Layer** | | | **8 Hours** | | |
| Connection Oriented and connection less service, TCP and UDP, Port Addressing, Remote Procedure Call, Flow Control vs Congestion Control, Quality of Service. | | | | | | |
| **Module No. 6** | **Application Layer Protocols** | | | **8 Hours** | | |
| Application Layer Protocols: World wide web and HTTP, HTTPS, Domain names: DNS, File Transfer: FTP, Electronic mail: SMTP, Peer to peer networking, Torrent, VPN. Session management, Data compression techniques. | | | | | | |
| **Text Books**   1. James F. Kurose, Keith W. Ross, “Computer Networking – A Top-Down Approach Featuring the Internet”, Pearson Education, Seventh Edition, 2017. | | | | | | |
| **References**   1. Nader. F. Mir, “Computer and Communication Networks”, Pearson Prentice Hall Publishers, Second Edition, 2015. 2. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, Mc Graw Hill Publisher, 2011. 3. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Morgan Kaufmann Publishers, Fifth Edition, 2011. 4. Narasimha Karumanchi “Elements of Computer Networking: An Integrated Approach (Concepts, Problems and Interview Questions)”, Career Monk Publisher, 2014. | | | | | | |
| **Lab Exercises**   1. Configuration of DNS Server. 2. Analysis of DNS Server. 3. Simulation & Analysis of Transport Layer Protocol (TCP): Using NetSimTM. 4. Understanding TCP Congestion Control Mechanism in LinuxTM Environment. 5. Simulation & Analysis of RIP Routing Protocols: Using NetSimTM. 6. Simulation & Analysis of OSPF Routing Protocols: Using NetSimTM. 7. Understanding Working of a Switched Ethernet. 8. Configuration of a Switched Ethernet. 9. Understanding and Simulation of select Network Protocols using Open Source Simulator(s). 10. Analyzing FTP Traffic using Wireshark. 11. Analyzing HTTP Traffic using Wireshark. | | | | | | |
| **Mode of Evaluation** | **Continuous Assessment Tests-60%, Lab Exercises-20%, Practical Assesment-20%**  Continuous Assessment Test-1 20%  Continuous Assessment Test-2 20%  Continuous Assessment Test-3 20%  Cumulative Lab Work Exercises 20%  Practical Assessment 20% | | | | | |
| **Recommended by the Board of Studies on** | 06.07.2018 | | | | | |
| **Date of Approval by the Academic Council** | 2nd Academic Council 21.07.2018 | | | | | |