Dr. Ambedkar Institute of Technology, Bengaluru-56

Department of Computer Science & Engineering

Scheme and Syllabus - CSE – 2022 -2023

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| Course Title | COMPUTER NETWORKS | | | | | | |
| Course Code | **21CST502** | | | | | | |
| Category and Type | **Integrated Professional Core Course** | | | | | | |
| Scheme and Credits | No. of Hours/Week | | | | | Total teaching hours | Credits |
| L | T | P | SS | Total |
| **03** | **00** | **02** | **00** | **05** | **60** | **04** |
| **CIE Marks: 50** | **SEE Marks: 50** | | **Total Max. marks=100** | | **Duration of SEE: 03 Hours** | | |

**COURSE OBJECTIVES:**

1. Understand the fundamentals of data communication networks.
2. Designing the Network Topologies.
3. Analysing the Network algortihms.
4. Study about Transport and Internet Routing protocols.
5. Discussing about the Application Layer services.

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| **UNIT I 9 hours**  Introduction to networks: Introduction Data communications, Networks, Internet, protocols and standards layered tasks, layered tasks, layers in the OSI Model, TCP/IP protocol suite, Introduction to NS2.  **Laboratory Component (C/C++ program/Simulation NS2)**   * Write and execute to simulate Network Topology - Star, Bus, Ring structures. * Write and execute NS2 code to create scenario and study the performance of token bus protocol through simulation. * Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and determine   collision across different nodes. |
| **UNIT II 8 hours**  The Data link layer: Introduction(Types of Errors, Redundancy, Detection Versus Correction) Block Coding (Error Detection and correction, Hamming Distance ),Cyclic Codes(Cyclic Redundancy Check) Checksum(Internet Checksum)  **Laboratory Component (C/C++ program/Simulation NS2)**   * Write and execute a C/C++ program for parity detection. * Write and execute a C/C++ program for Hamming Code * NS2 code to simulate and to study stop and Wait protocol * Simplification of given 4-variable logic expression using K-Map and realize using basic gates and universal gates. |
| **UNIT III 8 hours**  The Network Layer: Network Layer Design Issues, Routing Algorithms (Distance vector and Link state) Congestion Control Algorithms (leaky Bucket), IPV4–addressing, header format, subnet addressing, fragmentation and reassembly; IPV6-addressing, header format.  **Laboratory Component (C/C++ program/Simulation NS2)**   * Write a program for distance vector algorithm to find suitable path for transmission. * From a given vertex in a weighted connected graph, find shortest paths to other   vertices using Link state algorithm. |
| **UNIT IV 9 hours**  The Transport Layer: User datagram protocol; Transmission control protocol; TCP congestion control; Internet routing protocols (RIP,OSPF).  **Laboratory Component (C/C++ program/Simulation NS2)**   * Write and Execute a four node point-to-point network with the links connected as follows: n0 –n2, n1 – n2 and n2 – n3. Apply TCP agent between n0-n3 and FTP between n1-n3.   Apply relevant applications over TCP and FTP agents changing the parameter and  determine the number of packets sent by TCP / FTP.iven a Boolean expression implementation using basic/universal gates.   * Simulate a four node point-to-point network with the links connected as follows: n0 –   n2, n1 – n2 and n2 – n3. Apply TCP agent between n0-n3 and UDP between n1-n3.  Apply relevant applications over TCP and UDP agents changing the parameter and  determine the number of packets sent by TCP / UDP.   * Write a program for congestion control using leaky bucket algorithm |
| **UNIT V 8 hours**  Application Layer: Domain Name Space, Electronic Mail, File Transfer, Web Documents and HTTP,Network Management System.  **Laboratory Component (C/C++ program/Simulation NS2)**   * Using TCP/IP sockets, write a client – server program to make the client send the file   name and to make the server send back the contents of the requested file if presentGiven a Boolean expression implementation using basic/universal gates. |

**TEACHING LEARNING PROCESS: Chalk and Talk, PowerPoint presentation, animations, videos**

**OUTCOMES:** On completion of the course, student should be able to:

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| **Course Outcomes** | **Statements** | **Blooms Level** |
| **CO1** | Understand Basics of Networking models. | **L1** |
| **CO2** | Design and Develop various Network Topologies . | **L3** |
| **CO3** | Describe the IP addess,Transport Layer Protocols | **L2** |
| **CO4** | Analyze and evaluate networks | **L3** |

**TEXT BOOKS:**

1. Behrouz A. Forouzan,: Data Communication and Networking, 5th Edition Tata McGraw-Hill,ISBN-13, 9780073250328,2014.- units,1,2,3

2. Alberto Leon-Garcia and Indra Widjaja: Communication Networks - Fundamental concepts and Key architectures, 2nd Edition, Tata McGraw-Hill, ISBN-13:978-0-07-0595019, 2014.

Shortest-path routing, units 4, 5

**REFERENCE BOOKS:**

1. Computer-Networks- Andrew S. Tanenbaum and David J. Wetherall, Pearson Education, 5 th Edition. ([www.pearsonhighered.com/tanenbaum](http://www.pearsonhighered.com/tanenbaum))
2. Larry L Peterson and Brusce S Davie, Computer Networks, fifth edition, ELSEVIER

**WEBLINKS AND VIDEO LECTURES (E-RESOURCES):**

**1.** <https://www.digimat.in/nptel/courses/video/106105183/L01.html>

2. http://www.digimat.in/nptel/courses/video/106105081/L25.html

3. <https://nptel.ac.in/courses/106105081>

4. VTU e-Shikshana Program

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| **COURSE COORDINATOR: Dr.Smitha Shekar B, Dr.Madhu B, Dr.Ravikumar J** |