# 22CS2T1: COMPUTER NETWORKS

| Course Name | Computer Networks | | | L | T | P | C | CIA | SEE | TM |
|---|---|---|---|---|---|---|---|---|---|---|
| Course Code | 22CS2T1 | | | 4 | 0 | 0 | 4 | 30 | 70 | 100 |
| Year of Introduction: 1991 | | Year of Offering: 2022 | Year of Revision: 2022 | | | Percentage of Revision: 10 | | | | |
| **L**-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks | | | | | | | | | | |

**Course Description and Purpose:**
Computer Networks is a course that will exemplifies basic concepts of *Computer Networks*, *Functionality of Layered Architecture*, *Error Correction and Detection Code* and *Various Protocols used in Layers and Protocols*, *Functionality of Medium Access Control Sub Layer*, *Various Routing Strategies used in inter networking using IPAddresses*, *Different Services* and *Protocols of Transport Layer* and *Various Application Layer Protocols* used over the internet.

**Course Objectives:**
This course will help the students t o understand and learn importance of *Protocols in a Network*, *The usage of the Protocols in Layered Architecture* and brief information of functionality of all the *Five Layers and their Protocols*.

**Specific objectives include:**
- To understand functionality of *Layered Architecture*.
- To understand Ethernet, *Bluetooth and Data Link Layer Switching.*
- To learn Network Layer Design issues and Routing Algorithm used.
- To learn *Transport Services and TCP and UDP.*
- To understand the Protocols and services of *Applications Layer*.

**Course Learning Outcomes:**
Upon successful completion of the course, the student will be able to:
**CO1:** Understand *Functionality of Layered Architecture*, *Error Correction and Detection Codes* and *Various Protocols used in Layers*.
**CO2:** Understand functionality of *Medium Access Control* Sub Layer.
**CO3:** Understand the various *Routing Strategies* used in internet working using *IP Addresses*.
**CO4:** Understand different Services and Protocols of *Transport Layer*.
**CO5:** Understand the various *Application Layer Protocols* used over internet.

## UNIT I (12 Hours)

**Introduction:** Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues, Connection Oriented and Connectionless Services, Service Primitives, The relationship of Services to Protocols, ***Reference Models*:** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP Reference Model.
**Physical Layer:** ALOHA, CSMA, CSMA/CA
**Data Link Layer:** ***Data Link Layer Design Issues***: Services Provided to the Network Layer, Framing, Error Control, Flow Control, ***Error Correcting Codes***, ***Error Detecting Codes***, ***Elementary Data Link Protocols***: An Utopian Simplex Protocol, A Simplex *Stop and Wait* Protocol, A Simplex Protocol for a Noisy Channel, ***Sliding Window Protocols*:** A One Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol using Selective Repeat

## UNIT II (12 Hours)

**The Medium Access Control Sub Layer:** ***Ethernet***: Ethernet Cabling, Manchester Encoding, The Ethernet MAC sub layer Protocol, The Binary Exponential Backoff Algorithm, ***Bluetooth***: Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layers, The Bluetooth Frame Structure, ***Data Link Layer Switching***: Uses of Bridges, Learning Bridges ,Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways, Virtual LANs.

**UNIT III (12 Hours)**

**The Network Layer:** ***Network Layer Design Issues***: Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram subnets. ***Routing Algorithms*** **:** The Optimality Principle, Shortest Path Routing, Flooding , Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts ***The Network Layer in the Internet*****:** The IP Version 4 Protocol, IP Address, IPV6 Features and Advantages.

**UNIT IV(12 Hours)**

**The Transport Layer:** ***The Transport Service*****:** Services provided to the Upper Layers, Transport Services Primitives, Berkeley Sockets. ***Elements of Transport Protocols***: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.

**The Internet Transport Protocols:** Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Sliding Window, TCP Congestion Control, Comparison of TCP and UDP.

**UNIT V (12 Hours)**

**Wireless TCP:** Classical improvement in WTCP.

**The Application Layer:** ***DNS*****:** The Domain Name System: The DNS Name Space, Resource Records, Name Servers. ***Electronic Mail***: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery. **The** ***World Wide Web****:* Architecture Overview, Static Web Pages, Dynamic Web Pages**.** ***Streaming Audio and Video***: Digital Audio, Digital Video, Streaming Stored Media, Streaming Live Media, Real Time Conferencing.

**Reference Text books:**


1. Andrew S. Tanenbaum, ComputerNetworks, Sixth Edition, Pearson, 2021
2. Andrew S. Tanenbaum, ComputerNetworks, Fifth Edition, Pearson, 2011
3. James F.Kurose, Keith W Ross, Computer Networking, 3rd Edition, Pearson Edition
4. Michael A. Gallo, William M. Hancock, Data Communications and Networking, 4th Edition, TMH


**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), Second Semester

**Course Name:** Computer Networks

**Course Code:** 22CS2T1

**(w.e.f admittedbatch2022-23)**

**Time: 3 Hours** **Max Marks: 70**

**SECTION-A**

**Answer ALL Questions. All Questions Carry Equal Marks. (5×4=20Marks)**

1.(a) What are the Uses of Computer Networks. (CO1,L1)

(or)

(b) Write about ALOHA (CO1,L1)

2. (a) Explain about The Binary Exponential Backoff Algorithm. (CO3,L2)

(or)

(b) Explain about Virtual LANs. (CO3,L2)

3. (a) What is Store and Forward Packet Switching. (CO2,L1)

(or)

(b) What are the Features of IPV6. (CO2,L1)

4. (a) Explain about Berkeley Sockets. (CO3,L2)

(or)

(b) Explain TCP Congestion Control. (CO3,L2)

5. (a) Explain about WTCP. (CO5,L5)

(or)

(b) Explain about URLs. (CO5,L5)

**SECTION-B**

**AnswerALLquestions. AllQuestionsCarryEqualMarks.(5×10=50Marks)**

6. (a) Explain the OSI Reference Model with a neat diagram. (CO1,L2)

(or)

(b) Explain Sliding Window Protocols. (CO1,L2)

7. (a) List the operations of Ethernet.(CO2,L4)

(or)

(b) Analyze Bluetooth Architecture with Bluetooth Application. (CO2,L4)

8. (a) Model Shortest Path Routing Algorithm.(CO2,L3)

(or)

(b) Select IP Addressing Techniques. (CO2,L3)

9. (a) Explain about Connection Establishment and Connection Release. (CO3,L5)

(or)

(b) Explain about TCP. (CO3,L5)

10.(a) Discuss Domain Name System. (CO3,L6)

(or)

(b) Discuss Electronic Mail System. (CO3,L6)