

**VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY NAMBUR-522508 ANDHRA PRADESH, INDIA**

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| Course Code:  20CM5T03 | **Computer Networks**  **CSM** |
| Year and Semester: III Year I semester | |

# Course Objectives:

1. To understand OSI and TCP/IP reference models and Example networks, characteristics of transmission media and classify multiplexing techniques
2. To understand the Error Control, Flow Control and Medium Access Control Protocols
3. To compute optimal path using Routing Algorithms.
4. To understand the concepts of reliable unreliable transmission
5. To acquire the knowledge on various application layer protocols

**UNIT-I: Introduction to Computer Networks and Physical Layer**

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, Example Networks, Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel Guided Transmission Media, Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

**UNIT-II: Data Link Layer**

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Control Protocols, Sliding Window Protocols, HDLC, PPP, Channel Allocation problem, Multiple Access Protocols, IEEE standards for Local Area Networks, WLAN, Bluetooth

**UNIT– III: Network Layer**

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet Protocol Header, IP Addresses, sub netting and super netting.

**UNIT-IV: Transport Layer**

Transport Layer Design Issues, Connection Establishment, Connection Termination, Transport and User Datagram Protocols

**UNIT – V: Application Layer**

Design Issues, DNS, WWW, HTTP/HTTPS, E-mail, FTP

**Text Books:**

1. Computer Networks, Andrew S Tanenbaum, Pearson, 5 th Edition

2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw Hill, 4th Edition **Reference Book:**

1. TCP/IP Protocol Suite, Behrouz A Forouzan, Tata McGraw Hill Edition, 3rd Edition Web Resources:

**MICRO SYLLABUS OF COMPUTER NETWORKS**

**UNIT-I: Introduction and Physical Layer**

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, Example Networks, Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

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| **Unit** | **Module** | **Micro content** |
| Introduction to Computer networks and Physical Layer | Introduction | Uses of Computer Networks, Topologies, Types of Networks (LAN, MAN,WAN) Net-  work Hardware, Network Software |
| Reference Models | OSI and TCP/IP |
| Example Networks | ARPANet, Novell Netware, ATM Networks |
| Physical Layer | Design Issues, Maximum Data Rate of a Channel, Nyquist Theorem for a noiseless channel, Shannon Theorem for noisy channel |
| Transmission Media | Guided and Unguided Transmission media |
| Multiplexing | FDM,TDM,WDM,CDM |

# UNIT-II: Data Link Layer

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Control Protocols, Sliding Window Protocols, HDLC,PPP

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| **Unit** | **Module** | **Micro content** |
| **Data Link Layer** | Design Issues | Framing, Physical Addressing, Error Control,  Flow Control, Access Control, |
| Error Detection and  Correction | VRC, LRC, CRC, Checksum, Single  Bit Correction : Hamming Codes |
| Flow Control | Elementary Data Link Control Protocols: An un- restricted Simplex, Simplex Stop and Wait, Stop Wait ARQ Sliding Window Protocols: 1-bit Sliding Window, Sliding window using Go Back N, Sliding Window Using Selective Repeat |
| Example Data Link  Control Protocols | HDLC, PPP |
| Channel Allocation  Problem | Static Channel Allocation, Dynamic Channel Al-  location |
| Multiple Access Protocols | Aloha, CSMA, Collision Free Protocols, |
| IEEE standards LAN  Protocols | IEEE-802.3,802.4,802.5 |
| IEEE WLAN Proto-  cols | IEEE 802.11, Bluetooth |

# UNIT-III: Network Layer

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet Protocol Header, IP Addresses, sub netting and super netting.

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| **Unit** | **Module** | **Micro content** |
| **Network Layer** | Design Issues | Connection Oriented and Connection less service, Comparison of Virtual Circuit subnets and Datagram Networks |
| Routing Algorithms | Shortest path, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing  for Mobile Hosts |
| IP Headers | IPV4 and IPV6 |
| IP Addresses | Classful IP Addressing,  Classless IP Addressing, Types of IP Addresses Sub netting and Super netting |

# UNIT-IV: Transport Layer

Transport Layer Design Issues, Connection Establishment, Connection Termination, Transport and User Datagram Protocols,

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| **Unit** | **Module** | **Micro content** |
| **Transport Layer** | Design Issues | Design Issues, Process Addressing, Service Primitives |
| TCP Phases | Connection Establishment, Connection Termination,  Data Transfer |
| Protocols | TCP, UDP, RTP |

# UNIT-V: Application Layer

Design Issues, DNS, WWW, HTTP/HTTPS, E-mail, FTP,

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| **Unit** | **Module** | **Micro content** |
| **Application Layer** | Design Issues | File Transfer and Access Management Network Virtual Terminals  Mail Services |
| DNS | DNS Name space, Resource Records,  Name servers |
| WWW | Architecture and overview, Static/Dynamic  web pages, |
| HTTP/HTTPS | HTTP Request and Response headers and  methods |
| E-mail | Architecture, User Agents, Message formats, Message Transfer Agents, SMTP, S/MIME,  POP |
| FTP | Communication over control Connection, Communication Over Data Connection,  Anonymous FTP |

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