Andhra Pradesh State Council of Higher Education
M.Sc. Computer Science Syllabus

MCS 204-COMPUTER NETWORKS

UNIT – I

Introduction: Uses of Computer Networks: Business Application, Home Applications, Mobile Users – Social Issues. Network Hardware: Local Area Networks – Metropolitan Area Networks – Wide Area Networks –Wireless Networks – Home Networks – Internetworks. Network Software: Protocol Hierarchies – Design Issues for the Layers – 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 – A Critique of the OSI Model and Protocols – A Critique of the TCP/IP reference model. Example Networks: The Internet – Connection Oriented Networks: x.25, Frame Relay, and ATM – Ethernet – Wireless LANs Network Standardization: Who's who in the Telecommunication World – Who's who in the International Standards World – Who's who in the Internet Standards World.

Physical Layer: Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics

Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer – Framing – Error Control – Flow Control. Error Detection and Correction: Error correcting Codes – Error Detecting Codes. Elementary Data Link Protocols: An unrestricted 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. Example Data Link Protocols: HDLC – The Data Link Layer in the Internet.

UNIT – II

The Medium Access Control Sublayer : Ethernet : Ethernet Cabling –Manchester Encoding – The Ethernet MAC sublayer Protocol – The Binary Exponential Backoff Algorithm – Ethernet Performance – Switched Ethernet – Fast Ethernet – Gigabit Ethernet – IEEE 802.2: Logical Link Control – Retrospective on Ethernet. Wireless Lans: The 802.11 Protocol Stack - The 802.11 Physical Layer - The 802.11 MAC sublayer Protocol - The 802.11 Frame Structure. Bluetooth: Bluetooth Architecture – Bluetooth Applications – The Bluetooth Protocol Stack – The Bluetooth Radio Layer – The Bluetooth Baseband Layer – The Bluetooth L2CAP layer – The Bluetooth Frame Structure. Data Link Layer Switching: Bridges from 802.x to 802.y – Local Internetworking– Spanning Tree Bridges – Remote Bridges – Repeaters, Hubs, Bridges, Switches, Routers and Gateways – Virtual LANs.

UNIT – III

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 –32 Shortest Path Routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Multicast Routing – Routing for Mobile Hosts. Internet Working : How NetworkDiffer – How Networks can be connected – Concatenated Virtual Circuits – Connectionless Internetworking – Tunneling – Internet work Routing – Fragmentation. The Network Layer in the Internet: The IP Protocol – IP address – Internet Control Protocols – OSPF – The Internet Gateway Routing Protocol – BGP – The Exterior Gateway Routing Protocol.

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 :UDP Introduction to UDP – Remote Procedure Call – The Real Time Transport Protocol. The Internet Transport Protocols: TCP 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 Transmission Policy – TCP congestion Control – TCP Timer Management – Wireless TCP and UDP – Transactional TCP.

UNIT – IV:

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 Documents – Dynamic Web Documents – HTTP – The Hyper Text Transfer Protocol – Performance Enhancements – The Wireless Web. Multimedia: Introduction to Digital Audio – Audio Compression – Streaming Audio – Internet Radio – Voice Over IP –Introduction to Video – Video Compression – Video on Demand.

Prescribed Book:

Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, PHI.

Chapters: 1.1 to 1.6, 2.2, 3.1 to 3.4, 3.6, 4.3, 4.4, 4.6,
4.7, 5.1, 5.2.1 to 5.2.9, 5.5, 5.6.1 to 5.6.5,
6.1.1 to 6.1.3, 6.2, 6.4, 6.5, 7.1 to 7.4

Reference Books:

1. James F.Kurose, Keith W.Ross, "Computer Networking",
Third Edition, Pearson Education
2. Behrouz A Forouzan, "Data Communications and Networking",

Fourth Edition, TMH (2007)
3. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, Cengage Learning (2008)