# MCA301 COMPUTER NETWORKS

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**Course Objective:** For fundamental knowledge of computer networks and related concepts and theories.

**Introduction:** Organization of the Internet (Internet Service Providers, Content Providers, etc.), Network criteria, Categories of networks, Network performance and Transmission Impairments. Physical pieces of a network, including hosts, routers, switches, bridges, hubs, ISPs, wireless, LAN, access point, and firewalls. OSI Model and TCP/IP Protocol Suite. Layering principles (encapsulation, multiplexing), Switching techniques (e.g., circuit, packet).

**Networked Applications :** Naming and address schemes (DNS, IP addresses, Uniform Resource Identifiers, etc.), Distributed applications (client/server, peer-to-peer, cloud, etc.), HTTP as an application layer protocol, Electronic mail, File transfer, Remote login-introduction to protocol specification.

**Reliable Data Delivery:** Error control (retransmission techniques, timers), Flow control (Acknowledgements, sliding window), Performance issues (pipelining), Process-to-Process Delivery: UDP, TCP and SCTP. Multiplexing with TCP and UDP.

**Routing and Forwarding:** Routing versus forwarding, Static and dynamic routing, Unicast and Multicast Routing. Distance-Vector, Link-State, Shortest path computation, Dijkstra's algorithm, Network Layer Protocols (IP, ICMP), IP addressing, Address binding with ARP, Scalability issues (hierarchical addressing)

**Local Area Networks:** LAN topologies: Bus topology, Ring topology, Token passing rings, FDDI, Star topologies, Asynchronous transfer mode. Ethernet, IEEE standards 802.3, 802.5. Multiple Access Problem, Common approaches to multiple accesses (exponential-back off, TDM, etc). Virtual circuit switching including frame relay, X.25, and ATM.

**Resource Allocation:** Need for resource allocation, Fixed allocation (TDM, FDM, WDM) versus dynamic allocation, End-to-end versus network assisted approaches , Principles of congestion control, Approaches to Congestion, Quality of service, Flow characteristics, Techniques to improve QoS.

**Mobility:** Principles of cellular networks, Wireless LANs: IEEE 802.11 and Bluetooth, Issues in supporting mobile nodes (home agents).

**Recommended Books**

1. Forouzan, B.A., Data communication and Networking,McGraw Hill ,(2006) , 4th ed.

2. Tanenbaum ,A.S.,ComputerNetworks,Prentice Hall,( 2010) , 5th ed.

3. Kurose and Ross, Computer Networking: A Top Down Approach, Addison-Wesley, (2012) , 6th ed.

4. Stallings, W.,Computer Networking with Internet Protocols and Tech,Prentice Hall of India (2010), $9^{th}$ ed.