MCC 303: COMPUTER NETWORKS

Module-I   **(12 hours)**
Introduction to Data Communications and Networking, Evolution of Computer Networks, General Principles of Network Design: Topologies, Network Models (ISO-OSI, TCP/IP), Network Architecture & Standardization (IEEE 802.x), Example Networks, Access Networks.
Physical Layer: Theoretical Basis for Data Communication-Data, Signals, Transmission (Digital vs Analog), Throughput, Bandwidth, Bit rate, Baud Rate, Data rate measurement-Nyquist formula & Shannon capacity, Multiplexing, Transmission Media (Guided Media, Unguided media: Wireless), Switching (Circuit , Message, Packet).

Module-II   **(16 hours)**
Data Link Layer: Data Link Layer Design Issues, Error detection and Correction, Data Link Control, Elementary Data Link Protocols, Sliding Window Protocols, Protocol Verification, MAC Sub layer: Channel Allocation Problems, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, Data Link Layer Switching, Network devices: Repeater, Hubs, Bridges, Switches, Routers, Gateways, Backbone networks and Virtual LANs, Wireless WANs, Virtual Circuit Networks: Frame Relay and ATM
Network Layer: Network Layer Design Issues, Logical Addressing, Internet Protocol, Address Mapping, Error Reporting and Multicasting, Delivery, Forwarding, Routing Algorithms.

Module-III   **(12 hours)**
Transport Layer: Transport Service, Elements of Transport Protocols, Process to Process Delivery—UDP, TCP, Congestion Control, Congestion Control Algorithms, Quality of Service.
Application Layer: DNS, Remote Logging, File transfer, SNMP, Multimedia, Ziff's law.
Security: Cryptography, Network Security, Kerberos, Internet Security: IPSec, SSL/TLS, PGP, VPN, Firewalls.

Text Books:
1. Behrouz A. **Forouzan**, "*Introduction to Data Communications and Networking*", Fourth Edition, 2007, McGraw-Hill Education (India), New Delhi.
2. Natalia **Olifer** & Victor **Olifer, "***Computer Networks: Principles, Technologies and Protocols*", First Edition, 2006, Wiley India Pvt. Ltd., New Delhi.

Reference Books:
1. Andrew S. **Tanenbaum**, "*Computer Networks*", Fourth Edition, 2003, PHI Learning Pvt. Ltd., / Pearson Education Inc., New Delhi.
2. James F. **Kurose,** Keith W. **Ross**, "*Computer Networking: A Top-Down Approach Featuring the Internet*", 4th Edition (2008), Pearson Education Inc., New Delhi.
3. Wayne Tomasi, "*Introduction to Data Communications and Networking*", First Edition, 2005, Pearson Education Inc., New Delhi.
4. Prakash **Gupta**, "*Data Communication and Computer Networks*", 2008, PHI Learning Pvt. Ltd., New Delhi.
5. Curt **White**, "*Data Communications and Networking*", First Edition, 2008, CENGAGE Learning India Pvt. Ltd., New Delhi.
6. L. L. Peterson & B. S. Davie," *Computer Networks*", Fourth Edition, Elsevier Inc,