**Computer Networks**

**ACCS – 16403**

**Internal Marks : 40 L T P**

**External Marks : 60 3 1 -**

**Total Marks : 100**

**Objectives:** This course provides knowledge about computer network related hardware and software using a layered architecture.

**Section – I**

**Introduction to Computer Networks:**

Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

**Section – II**

**Physical Layer:**

Concept of Analog & Digital Signal, Bandwidth, Encoding methods, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits : Nyquist formula, Shannon Formula, Multiplexing : Frequency Division, Time Division, Wavelength Division, Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching: Circuit Switching, Message Switching ,Packet Switching & their comparisons.

**Data Link Layer:**

Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.

**Medium Access Sub-Layer:**

Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Ethernet cabling, collision detection in 802.3, Binary exponential back off algorithm.

**Section – III**

**Network Layer**:

Design issues, IPv4 classsful and classless addressing, subnetting, Routing algorithms: distance vector and link state routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.

**Transport Layer** & **Application Layer**

Introduction to TCP/UDP protocols and their comparison.

World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP),

Introduction to Network security, Introduction to protocols like SMTP,TFTP,RPC, ICMP,IGMP,TELNET,DHCP,ARP,RARP,HTTP,HTTPs.

**Section - IV**

**Introduction to Wifi**

Wifi introduction, Its Components and layered architecture.

**References :**

1. Computer Networks, 4th Edition, Pearson Education by Andrew S. Tanenbaum

2. Data Communication & Networking, 2nd Edition, Tata McGraw Hill. By Behrouz A. Forouzan.

3. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross