

## Computer Networks(404182)

### Teaching Scheme:

Lectures:3 Hrs/ Week

### Examination Scheme:

In Semester Assessment:

Phase I : 30

End Semester Examination:

Phase II: 70

### Course Objectives:

- Understand state-of-the-art in network protocols, architectures, and applications
- To provide students with a theoretical and practical base in computer networks issues
- Define the basic terminology of computer networks
- Recognize the individual components of the big picture of computer networks
- Outline the basic network configurations
- List the layers of the TCP/IP and OSI model and describe the duties of each layer
- Understand the transmission methods underlying LAN and WAN technologies.

### Course Outcomes:

After successfully completing the course students will be able to

Understand fundamental underlying principles of computer networking

Describe and analyze the hardware, software, components of a network and the interrelations.

Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;

Have a basic knowledge of the use of cryptography and network security;

- Have a basic knowledge of installing and configuring networking applications.
- Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.

### Unit I : Physical Layer

(6L)

Data Communications, Networks, Network types, Protocol layering, OSI model, Layers in OSI model, TCP / IP protocol suite, Addressing, Guided and Unguided Transmission media.

Switching: Circuit switched networks, Packet Switching, Structure of a switch.

**Unit II : Data Link Layer (6L)**

Introduction to Data link Layer, DLC Services, DLL protocols, HDLC, PPP, Media Access Control: Random Access, Controlled Access, Channelization. Wired LAN:Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet.

**Unit III :Wireless LANS & Virtual Circuit Networks (6L)**

Introduction, Wireless LANS : IEEE 802.11 project, Bluetooth, Zigbee, Connecting devices and Virtual LANS: Connecting devices, Virtual LANS.

**Unit IV : Network Layer (6L)**

Network Layer Services, Packet Switching, Network layer performance, IPv4, addresses, Forwarding of IP packets, Network layer protocols: IP, ICMPv4, Mobile IP, Unicast Routing: Introduction, Routing Algorithms, Unicast Routing protocols, Multicast Routing Introduction, Next Generation IP:IPv6 Addressing, The IPv6 protocol, ICMPv6, Transition from IPv4 to IPv6.

**Unit V :Transport Layer (6L)**

Introduction, Transport layer protocols and services, Port numbers User Datagram Protocol (UDP), Transmission Control protocol (TCP), SCTP, Quality of services: Dataflow characteristics, Flow Control.

**Unit VI :Application Layer (6L)**

Introduction, World Wide Web and HTTP, FTP, Electronic mail, Telnet, Name System (DNS), Cryptography and Network Security: Introduction, Symmetric key ciphers and Asymmetric key Ciphers, Introduction to network security.

Behrouz A. Foruzan, "Data communication and Networking", Tata McGraw-Hill,5<sup>th</sup> Edition

2. James F. Kurose & W. Rouse, "Computer Networking: A Top down Approach", 6<sup>th</sup> Edition, Pearson Education.

**Reference Books**

1. Andrew S. Tannenbaum, "Computer Networks", Pearson Education, Fourth Edition, 2003
2. Wayne Tomasi, "Introduction to Data Communication and Networking", 1/e, Pearson Education
3. Greg Tomsho, Ed Tittel, David Johnson. "Guide to Networking Essentials", fifth edition, Thomson India Learning, 2007.
4. William Stallings, "Data and Computer Communication", Eighth Edition, Pearson Education, 2000.