

## Course Syllabi: UEI622 Data Networks (L : T : P :: 3 : 1 : 0)

1. **Course number and name:** UEI622; Data Networks

2. **Credits and contact hours:** Credits: 3.5; Hours: 4

3. **Text book, title, author, and year**

- *Dimitri, P., Gallager, B., Data Networks, Prentice–Hall of India Private Limited (2004).*
- *Tanenbaum, A.S., Computer Networks, Prentice–Hall of India Private Limited (2005).*
- *Dumas, M.B., Principles of Computer Networks and Communications, Prentice–Hall of India Private Limited (2003).*
- *Steven, W.R., TCP/IP Illustrated (Vol. 2): The Implementation, Addison Wesley, (2002).*

a. Other supplemental materials

- Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

**Introduction to Computer Networks:** Uses of computer networks, Types of networks, Connection oriented and connectionless services.

**Layered Network Architecture:** The OSI Reference model, The TCP/IP reference model, Comparison of OSI and TCP reference models.

**Physical Layer:** Overview of communication channels, Maximum Data Rate of a channel, Transmission media, Twisted pair, Coaxial, Fiber optics, Microwave, Satellite etc., Telephone system, Trunks and Multiplexing (PDH, SDH), Switching, Packet switching and circuit switching, N-ISDN, Broadband ISDN and ATM, Virtual circuits Vs Circuit switching, Transmission in ATM networks, Frame relay.

**Data Link Layer:** Error detection and correction, ARQ, Flow control and framing in data link layer, Sliding windows protocols, HDLC, Data link layer in Internet, Data layer in ATM.

**Medium Access Sublayer:** Queuing models, Little's theorem, M/M/1, M/M/m and M/G/1, Queuing systems. Static and dynamic allocation of channels in LANs, Multiple access protocols, Throughput, Delay and stability of ALOHA systems. CSMA and CSMA/CD Systems, IEEE 802 standards for Ethernet, Token bus and token ring, High speed LANS-FDDI.

**Network Layer:** Routing algorithms, Dijkstra algorithm, Bellman Ford algorithm, Optimality principle, Congestion control algorithms, Internetworking, The network layer in Internet, Network layer in ATM.

**Transport Layer:** Internet Transport Protocols (TCP and UDP), ATM adoption layer, performance of computer networks.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Explain the concept of computer networks and OSI reference model.
- Describe the working of physical layer components/devices.
- Elaborate the working of different protocols of computer networks.
- Explain the routing algorithms, error detection and correction in data networks.

6. **Brief list of topics to be covered**

- Introduction to Computer Networks

- Layered Network Architecture
- Physical layer
- Data link layer
- MAC layer
- Network layer
- Transport layer