

**Objective(s)**

This course addresses the principles, architectures and protocols that have gone into the development of the Internet and modern networked applications. The course examines network design principles, underlying protocols, technologies and architectures such as naming, data transport, routing and algorithms for networked applications including messaging, encryption and authentication.

**UNIT I**

The importance of Networking, Types of Networking, Network Topology, Transmission Media, Data communication: Concepts of data, signal, channel, bandwidth, bit-rate and baud-rate; Maximum data-rate of channel; Analog and digital communications, asynchronous and synchronous transmission.

**UNIT II**

Network adapters card, Multiplexer (FDM, TDM, STDM), Hub, Repeater. Network References Models: Layered architecture, protocol hierarchies, interface and services.

**UNIT III**

ISO-OSI references model, TCP/IP reference model; Datalink layer function and protocols: Framing, error-control, flow control; sliding window protocol; HDLC, SLIP and PPP protocol.

**UNIT IV**

Network layer - routing algorithms, congestion control algorithms; Internetworking: bridges and gateway; Transport layer - connection management, addressing; Flow control and buffering, multiplexing, Session layer – RPC; Presentation layer - abstract syntax notation.

**UNIT V**

Application layer - File Transfer Protocol (FTP), Telnet, Simple Mail Transfer Protocol(SMTP); World Wide Web(WWW) - Wide Area Indexed Servers (WAIS), WAP; Network Security; Data compression and cryptography.

**Reference Book(s):**

1. W. Stallings, "Data and Computer Communications", Prentice Hall of India.
2. B. A. Forouzan, "Data Communications and Networking", McGraw Hill.
3. Arick, M.R. *The TCP/IP Companion - A Guide for Common User*. Shroff Publishers and Distributors Pvt. Ltd., Mumbai.
4. Freer, J. *Computer Communication and Networks*. Affiliated East West Press, New Delhi.
5. Hayes, J. *Modelling and Analysis of Computer Communication Networks*. Khanna Publishers, New Delhi.
6. Tanenbaum, A.S. *Computer Networks*, Prentice Hall of India, New Delhi.

**Practical(s):**

1. An Overview of Campus Networks Design
  - a. Router
  - b. Workgroup Switch
  - c. High-End Switch
  - d. Multilayer Switch with Route Processor
2. Introduction to LAN with its cables, connectors and topologies
3. To connect two personal computer with straight and cross over twisted pair

- 4. Introduction to Motherboard & Installation of LAN Card**
- 5. Case Study of Ethernet(10 base 5,10 base 2,10 base T)**
- 6. Create a simple network with two PCs using a hub**
  - a. identify the proper cable to connect the PCs to the hub
  - b. Configure workstation IP address information
  - c. Test connectivity using the ping command
- 7. Installation & working of Remote desktop**
- 8. Installation and working of Telnet (Terminal Network)**
- 9. Switch configuration and management (Telnet, SNMP, HTTP)**
- 10. Installation of Windows server**
- 11. Installation of Dynamic Host Configuration Protocol (DHCP)**
- 12. To study DNS Server Case Study and to install DNS Server and its Configuration**
- 13. Optical Fiber Splicing Machine experiment**
- 14. To understand end-user network performance using “One touch at network assistant”**
- 15. UTM Basic Firewall Configuration**
- 16. Router configuration and management**