

### III/II

**Course Title:** Computer Networks

**Course Code:** CO515

**Year/Semester:** III/II

**Class Load:** 6 Hrs. per Week (Theory: 3 Hrs, **Tutorial: 1 Hr, Practical 2Hrs**)

**Evaluation:**

|                  | Theory | Practical | Total |
|------------------|--------|-----------|-------|
| Internal         | 50     | 25        | 75    |
| Final (External) | 50     | -         | 50    |
| Total            | 100    | 25        | 125   |

#### Course Objectives:

Computer Networks involves the study of computer systems, computer communications and computer networks. The course includes different kinds of networking topologies and their structure and design. This course also covers the telephone system, electronic email, data flows, networking protocols, and organization around ISO-OSI seven-layer architecture, with review of each layer.

- 1. Background study and Revision (1 hrs)**  
Introduction and necessity of computer Networking; Different types of multiplexing: Simplex, Duplex, Half Duplex
- 2. Introduction to Network Topologies (3 hrs)**  
Definition, use and prospect of LAN; Types of networking: LAN, WAN, MAN, Extra-Net, Intra-Net and Inter-Net
- 3. Network Architecture (3 hrs)**  
Star, Clustered Star, Bus, Ring: Logical and Physical, Client Server Network Model; Peer-to-peer Network architecture model; Wireless LAN
- 4. Reference Model (6 hrs)**  
Network software, Protocol Hierarchy and its need, Interfaces and Services; Introduction of OSI Reference Model
- 5. Physical layers and its Design issues (5 hrs)**  
Twisted Pair Cable; Co-axial Cable; Base-band Cable; Broad-band Cable; Fiber Optics; Wireless Networking; Physical Layer Devices (Hub, Repeaters); Introduction of Frame Relay, ATM, ISDN, PSTN and X.25.
- 6. Data Link Layers (6 hrs)**  
Services and Data Link Layer Devices (Switch, Bridge); Framing, Flow Control and Error Control; Elementary Data link Protocols; Sliding Window Protocols; HDLC, SLIP and PPP; Media Access Control Layer (Carrier Sense Multiple Access/Collision Detection)
- 7. TCP / IP Reference Model (6 hrs)**  
Introduction of TCP / IP Model; Comparison with OSI Reference Model; IPV4 Frame Format; IP Addresses and Classes; Subnet and Subnet mask; Introduction of IPV6
- 8. Network Layer and Internet Layer (6 hrs)**  
Network Layer and Design Issues; Virtual Circuit and Data grams Subject; Introduction of Routing- Shortest path Routing Algorithm, Flow Based Routing Algorithm, Distance Vector Routing Algorithm, Spanning Tree Routing; Congestion Control; Traffic Shaping and Leaky Bucket Algorithm
- 9. Network Severs and Protocols (3 hrs)**  
HTTP, DHCP; SMTP, DNS, PROXY, FTP, POP and IMAP; Examples of Clients, Servers Tools and Virtual private Networks
- 10. Network Management and Security: (3 hrs)**  
Introduction to Network management, Internet Network-Management framework (SMI & HIB) & SNMP protocol; Data encryption, Data Encryption standard; Principles of Cryptography (Symmetric Key & public key Encryption), Integrity & firewalls
- 11. Introduction to Socket Programming: (3 hrs)**  
*Clint/Server Computing*: - Distributed Applications (Web Technology), Distributed processing (Three-Tier Architecture); Introduction to socket calls & operating system calls; TCP socket calls & UDP Socket calls.