

Computer Network

BEG374CO

Year: III

Semester: II

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	-	3	Theory	Practical	Theory	Practical	150
			20	50	80	-	

Course Objective

To be familiar with the basics of data communication, various types of computer networks, designing communication protocols and exposed to the TCP/IP protocol suit.

1. Introduction to Computer Networks

4 Hours

- 1.1. Definition, advantages, disadvantages, applications
- 1.2. Network structure and topologies
- 1.3. Network architecture and OSI model
- 1.4. Connection oriented and connectionless services
- 1.5. Network examples: Public network, APRNET

2. Local Area Networks

4 Hours

- 2.1. LAN primer: Network server, Network workstation
- 2.2. NETWORK HARDWARE: NIC, Cables, Hub, Storage, Backup, RAID, Local and Network Printers.
- 2.3. LAN scheme: CSMA/CD and IEEE 802.3, Wireless LAN, IEEE 802.11x

3. Transmission and Channel Control: The Physical Layer

5 Hours

- 3.1. Transmission media; Twisted pair, Coaxial, Fiber optic, Line-of-site, Satellite
- 3.2. Analog transmission; Telephone, Modem, RS 232
- 3.3. Digital transmission; PCM, Encoding
- 3.4. Channel allocation and switching: Multiplexing, Circuit switching, Packet switching

- 4. The Data Link Layer and Medium Access Sub-layer: 5 Hours**
- 4.1. Error detection and correction: CRC, Checksum, Hamming code
 - 4.2. Sliding windows protocol: one-bit sliding, go back N, Selective repeat
 - 4.3. IEEE standard 802 for LANs: 802.3, 802.4, 802.5
 - 4.4. FDDI
 - 4.5. Satellite Networks: SPADE, ALOHA
- 5. Internetworking 9 Hours**
- 5.1. Routing algorithms: Adaptive, Nonadaptive algorithms, Shortest path first, Flooding, Distance vector Routing, Link state routing
 - 5.2. Congestion control algorithms: congestion prevention policies, congestion control in datagram subnet, warning bit, choke packet, Hop-by-hop choke packet, load shedding, jitter control, Leaky Bucket Algorithm, Token bucket algorithm
 - 5.3. Bridges, Routers and Gateways
- 6. Overview of TCP/IP 8 Hours**
- 6.1. TCP/IP and the Internet
 - 6.1.1. TCP/IP Features
 - 6.1.2. Protocol Standards
 - 6.2. A data communication model
 - 6.3. TCP/IP protocol Architecture
 - 6.4. Network Access Layer
 - 6.5. Internet Layer
 - 6.5.1. Internet Protocol
 - 6.5.2. The Datagram
 - 6.5.3. Routing Datagrams
 - 6.5.4. Fragmenting Datagrams
 - 6.5.5. Passing Datagrams to the Transport Layer
 - 6.6. Internet Control Message Protocol:
 - 6.6.1. Flow control
 - 6.6.2. Detecting unreachable destinations
 - 6.6.3. Redirecting routes
 - 6.6.4. Checking remote hosts
 - 6.7. Transport Layer
 - 6.7.1. User Datagram Protocol (UDP)

- 6.7.2. Transmission Control Protocol (TCP)
- 6.8. Application Layer
 - 6.8.1. HTTP, FTP, SMTP, POP3, IMAP

7. Delivering the Data

4 Hours

- 7.1. Addressing, Routing and Multiplexing
- 7.2. The IP Address
- 7.3. Address Depletion (Reduce)
- 7.4. Subnets
- 7.5. Address Resolution
- 7.6. Ports and Sockets

8. Properties of secure communication

4 Hours

- 8.1. Cryptography (Substitution and Transposition cipher)
- 8.2. Firewall
- 8.3. Concept of digital signature

Laboratory Exercises

- Network cabling and Trouble-Shooting
- Peer to Peer
- Client-Server network
- Primary Domain Controller (PDC)
- Backup Domain Controller (BDC)
- Resource Server (DNS, DHCP, File & Print Server)

References

1. Black, “ Computer Networks”
2. A. Tanenbaum, “ Computer Networks” Prentice Hall
3. C. Hunt “TCP/IP Network Administration” O’Reilly & Associates
4. Rosch, “Hardware Bible”
5. William Stallings, “Data and Computer Communication”; PHI

Marking System

S. No.	Chapter	Hours	Marks
1	Introduction to Computer Networks	4	8
2	Local Area Networks	4	8
3	Transmission and Channel Control: The Physical Layer	5	10
4	The Data Link Layer and Medium Access Sub-layer	5	10
5	Internetworking	9	16
6	Overview of TCP/IP	8	12
7	Delivering the Data	4	8
8	Introduction to Network Security	2	8
Total			80