

DATA COMMUNICATION AND COMPUTER NETWORKS

Subject Code: CS502PC

Regulations: R16 - JNTUH

Class: III Year B.Tech CSE I Semester



Department of Computer Science and Engineering
BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY
 Ibrahimpatnam - 501 510, Hyderabad

DATA COMMUNICATION AND COMPUTER NETWORKS
[CS502PC]
COURSE PLANNER

I.COURSE OVERVIEW:

At the end of the course the student should be in a position to

1. Describe communication protocols and layered network architectures.
2. Explain convention computer system interfacing standards and peer to peer data link communication protocols
3. Design basis network systems.
4. Analyze data communication technology.

II.PRE-REQUISITES:

It's expected to have basis knowledge of logic circuits and their applications in digital system.

III. COURSE OBJECTIVIES:

S.No	OBJECTIVE
1.	To introduce the fundamental various types of computer networks.
2.	To demonstrate the TCP/IP and OSI models with merits and demerits
3.	To explore the various layers of OSI Model.
4.	To introduce UDP and TCP Models.

IV.COURSE COUCOMES:

S.NO	Description	Bloom's Taxonomy Levels
1.	Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web Concepts.	Knowledge, Understand (Level1, Level2)
2.	Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.	Analyze (Level 4)

V.HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (PO)		Level	Proficiency assessed by
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems related to Computer Science and Engineering.	3	Mini Projects
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems related to Computer Science and Engineering and reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	1	Lectures, Assignments, Exams
PO3	Design/development of solutions: Design solutions for complex engineering problems related to Computer Science and Engineering and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	2	Mini Projects
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	2	--
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	2	--
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Computer Science and Engineering professional engineering practice.	3	--
PO7	Environment and sustainability: Understand the impact of the Computer Science and Engineering professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	2	Lectures, Assignments, Exams
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	2	
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	1	Mini Projects
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to	2	--

Program Outcomes (PO)		Level	Proficiency assessed by
	comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.		
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	2	Lectures, Assignments, Exams
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	2	Lectures, Assignments, Exams

VI. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSO)		Level	Proficiency assessed by
PSO1	Foundation of mathematical concepts: To use mathematical methodologies to crack problem using suitable mathematical analysis, data structure and suitable algorithm.	3	Lectures, Assignments
PSO2	Foundation of Computer System: The ability to interpret the fundamental concepts and methodology of computer systems. Students can understand the functionality of hardware and software aspects of computer systems.	2	Lectures, Assignments
PSO3	Foundations of Software development: The ability to grasp the software development lifecycle and methodologies of software systems. Possess competent skills and knowledge of software design process. Familiarity and practical proficiency with a broad area of programming concepts and provide new ideas and innovations towards research.	1	--

VII. SYLLABUS:

UNIT – I

Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies – Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT – II

Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT – III

Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT – IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT – V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

GATE SYLLABUS

Concept of layering. LAN technologies (Ethernet).flow and error control techniques,switching.IPV4/IPV6, routers and routing algorithms(distance vector, link state).TCP/UDP and sockets,congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP).Basics of Wi-Fi.

TEXT BOOKS:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH,2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

REFERENCES:

1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F.Kurose & Keith W. Ross, 3 rd Edition, Pearson Education.
5. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000.

VIII. LESSON PLAN:

S.NO	WEEK	TOPICS	Course Learning Outcomes	REFERENCES
UNIT-1				
1	I	INTRODUCTION TO DATA COMMUNICATION	Understand	T1
2		INTRODUCTION TO COMPUTER NETWORK	Describe	T1
3		Data Communications: Components	Define	T1
4		Direction of Data flow	Understand	T1
5	2	Networks	Describe	T1
6		Components and Categories	Describe	T1
7		Types of Connections	Understand	T1

8		Topologies	Define	T1
9	3	Protocols and Standards – ISO / OSI MODEL	Understand.	T1
10		Example Networks such as ATM	Understand	T1
11		Frame Relay	Describe	T1
12		ISDN Physical layer: Transmission modes	Describe	T1
13		Multiplexing	Describe	T1
14	4	Transmission Media	Understand	T1
15		Switching, Circuit Switched Networks	Define	T1
16		Datagram Networks	Understand.	T1
17		Virtual Circuit Networks.	Understand	T1
18	5	MOCK TEST-1		T1
19		<i>Tutorial/bridge class #1</i>		
UNIT-2				
20	5	Data link layer: Introduction, Framing	Understand.	T1, T2
21	6	Error – Detection and Correction	Understand	T1, T2
22		Parity – LRC– CRC Hamming code	Describe	T1, T2
23		Flow and Error Control	Define	T1, T2
24		Noiseless Channels, Noisy Channels	Understand	T1, T2
25		HDLC, Point to Point Protocols	Describe,	T1, T2
26	7	111 Medium Access sub layer: ALOHA	Describe	T1, T2
27		CSMA/CD	Understand	T1, T2
28		LAN– Ethernet IEEE 802.3	Understand	T1, T2
29		IEEE 802.5 – IEEE 802.11	Describe,	T1, T2
30	8	Random access	Describe	T1, T2
31		Controlled access, Channelization.	Understand	T1, T2
32		<i>Tutorial/bridge class #2</i>		
I-MID EXAMINATIONS(WEEK-9)				

UNIT-3				
33	9	Network layer: Logical Addressing	Understand	T1,T2
34		Internetworking	Describe,	T1,T2
35		Tunneling	Describe	T1,T2
36		Address mapping	Understand	T1,T2
37	10	ICMP,IGMP	Understand	T1,T2
38		Forwarding	Describe,	T1,T2
39		Uni-Cast Routing Protocols	Describe	T1,T2
40		Multicast Routing Protocols	Understand	T1,T2
41	11	Multicast Routing Protocols	Describe	T1,T2
42		<i>Tutorial/bridge class #3</i>		
UNIT-4				
43	11	Transport Layer: Process to Process Delivery	Understand	T1,T2
44		UDP and TCP protocols	Describe,	T1,T2
45	12	Data Traffic,Congestion	Describe	T1,T2
46		Congestion Control,	Understand	T1,T2
47		QoS, Integrated Services	Understand	T1,T2
48		Differentiated Services	Describe,	T1,T2
49	13	QoS in Switched Networks.	Describe	T1,T2
50		QoS in Switched Networks.	Describe	T1,T2
51		<i>Tutorial/bridge class #4</i>		
52		<i>Tutorial/bridge class #5</i>		
UNIT-5				
53	14	Application Layer	Understand	T1,T2
54		Domain name space	Understand	T1,T2
55		DNS in internet	Understand	T1,T2
56		electronic mail	Understand	T1,T2

57	15	MOCK TEST-2	Understand	T1,T2
58		SMTP	Understand	T1,T2
59		FTP	Understand	T1,T2
60		WWW	Understand	T1,T2
61	16	HTTP	Understand	T1,T2
62		SNMP	Understand	T1,T2
63		<i>Tutorial/bridge class #6</i>		
64		<i>Tutorial/bridge class #7</i>		
II MID EXAMINATIONS (WEEK 17)				

X. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	2	2	2	3	2	2	1	2	2	3	2	3	2
2	2	2	3	2	2	2	2	1	1	2	3	3	3	2	2
3	3	1	2	2	3	3	2	1	2	2	3	2	2	3	2
4	3	2	3	2	3	3	2	1	1	2	2	2	3	3	2
5	2	1	2	2	2	3	2	3	1	2	1	1	2	2	2
AVG	3	1	2	2	2	3	2	2	1	2	2	2	2	3	2

XI. DESCRIPTIVE QUESTIONS

UNIT-1

Short Answer Questions

QUESTIONS	Blooms taxonomy level	Course outcomes
1.Explain different type of networks?.	Understand	2
2.Describe why are protocols needed?.	Understand	2
3.Define redundancy?.	Knowledge	2
4.Describe an internet and intranet?.	Knowledge	2,3
5.List the different types of transmission media?.	Knowledge	2
6.Define network?.	Knowledge	1

Long Answer Questions

1.Explain how are OSI and ISO related to each other	Understand	1
2.Explain ISO/OSI reference model with neat diagram?.	Understand	1
3.Define topology and explain and explain the topologies of networks?.	Knowledge	2
4.Explain the transmission modes in details?.	Understand	2
5.Define circuit switching networks in details?.	Knowledge	2
6.Define virtual circuit networks in details?.	Knowledge	2

UNIT-2

Short Answer Questions

QUESTIONS	Blooms taxonomy level	Course outcomes
1. Define ALOHA?.	Knowledge	4
2. Define MAC?.	Knowledge	5
3. Define bridge, hub, router?.	Knowledge	4,4,5
4. List the network applications?.	Knowledge	1
5. Define VRC, LRC, CRC?.	Knowledge	2
6. Define checksum?.	Knowledge	1

Long Answer Questions

1. State the functions of MAC?.	Knowledge	3
2. How performance is improved in CSMA/CD protocol compared to CSMA protocol? Explain?.	Understand	4
3. How CSMA/CA differ from CSMA/CD .explain in brief?.	Understand	5
4. Discuss the MAC layer functions of IEEE 802.11?.	Understand	4
5. Explain the frames format, operation and ring maintenance fracture of IEEE 802.5 MAC protocol	Understand	4

UNIT-3

Short Answer Questions

QUESTIONS	Blooms taxonomy level	Course outcomes
1. Explain design issues of network layer?.	Understand	6
2. Illustrate shortest path?.	Apply	6
3. Define flooding?.	Knowledge	4,4,5
4. Explain congestion control?.	Understand	7
5. Define virtual circuit?.	Knowledge	6
6. State circuit switching?.	Knowledge	7

Long Answer Questions

1. Explain network layer logical addressing?.	Understand	3
2. Illustrate internetworking and tunneling?.	Knowledge	4
3. Explain in details of ICMP, IGMP?	Understand	5
4. Explain uni-cast routing protocols in details?.	Understand	4
5. Explain multicast routing protocols in details?.	Understand	4

UNIT-4

Short Answer Questions

QUESTIONS	Blooms taxonomy level	Course outcomes
1. List out functions of transport layer?.	Knowledge	9
2. List out duties of the transport layer?.	Knowledge	8
3. Define quality of services?.	Knowledge	8
4. Explain how checksum is calculated in tcp?.	Understand	9
5. Explain about transport layer services?.	Understand	8

Long Answer Questions

1. Explain in detail about process to process delivery?.	Understand	3
2. Difference between UDP and TCP protocols?.	Knowledge	4
3. Illustrate the congestion control in details?.	Understand	5
4. Explain quality of services in switching networks?.	Understand	4

5.Explain data traffic congestion in detail?.	Understand	4
---	------------	---

UNIT-5

Short Answer Questions

QUESTIONS	Blooms taxonomy level	Course outcomes
1.State advantages of stateless server of HTTP?.	Knowledge	5
2.Difference between FTP&HTTP?.	APPLY	4
3.Explain DNS name space?.	Knowledge	1
4.Define SMTP?.	Understand	1
5.Define FTP?.	Understand	1

Long Answer Questions

1.Explain in details of domain name space?.	Understand	3
2.Explain in details of electronic mails?.	Understand	4
3.Explain in details of SMTP?.	Understand	5
4.Explain in details of WWW?.	Understand	4
5.Explain in details of SNMP?.	Understand	4

OBJECTIVE QUESTIONS:

UNIT-1

1.Protocols are?

- (a)Agreements on how communication components and DTE's are to communicate
- (b)Logical communication channels for transferring data
- (c)Physical communication channels used for transferring data
- (d)None of above

ANS:A

2.Computer Network is

- A. Collection of hardware components and computers
- B. Interconnected by communication channels
- C. Sharing of resources and information
- D. All of the Above

3.What is a Firewall in Computer Network?

- A. The physical boundary of Network
- B. An operating System of Computer Network
- C. A system designed to prevent unauthorized access
- D. A web browsing Software

4.How many layers does OSI Reference Model has?

- A. 4
- B. 5
- C. 6
- D. 7

5.DHCP is the abbreviation of

- A. Dynamic Host Control Protocol
- B. Dynamic Host Configuration Protocol
- C. Dynamic Hyper Control Protocol
- D. Dynamic Hyper Configuration Protocol

6.IPV4 Address is

- A. 8 bit
- B. 16 bit
- C. 32 bit
- D. 64 bit

- 7.DNS is the abbreviation of
- Dynamic Name System
 - Dynamic Network System
 - Domain Name System
 - Domain Network Service
- 8.What is the meaning of Bandwidth in Network?
- Transmission capacity of a communication channels
 - Connected Computers in the Network
 - Class of IP used in Network
 - None of Above
- 9.ADSL is the abbreviation of
- Asymmetric Dual Subscriber Line
 - Asymmetric Digital System Line
 - Asymmetric Dual System Line
 - Asymmetric Digital Subscriber Line
- 10.What is the use of Bridge in Network?
- to connect LANs
 - to separate LANs
 - to control Network Speed
 - All of the above
- 11.Router operates in which layer of OSI Reference Model?
- Layer 1 (Physical Layer)
 - Layer 3 (Network Layer)
 - Layer 4 (Transport Layer)
 - Layer 7 (Application Layer)

[Click Here for Answers](#)

1 – D / 2 – C / 3 – D / 4 – B / 5 – C / 6 – C / 7 – A / 8 – D / 9 – A / 10 – B

UNIT-2

- 1.Each IP packet must contain
- Only Source address
 - Only Destination address
 - Source and Destination address
 - Source or Destination address
- 2.Bridge works in which layer of the OSI model?
- Appliation layer
 - Transport layer
 - Network layer
 - Datalink layer
3. ___ provides a connection-oriented reliable service for sending messages
- TCP
 - IP
 - UDP
 - All of the above
- 4.Which layers of the OSI model are host-to-host layers?
- Transport, Session, Persentation, Application
 - Network, Transport, Session, Presentation
 - Datalink, Network, Transport, Session
 - Physical, Datalink, Network, Transport
- 5.Which of the following IP address class is Multicast

- A. Class A
 - B. Class B
 - C. Class C
 - D. Class D
6. Which of the following is correct regarding Class B Address of IP address
- A. Network bit – 14, Host bit – 16
 - B. Network bit – 16, Host bit – 14
 - C. Network bit – 18, Host bit – 16
 - D. Network bit – 12, Host bit – 14
7. The last address of IP address represents
- A. Unicast address
 - B. Network address
 - C. Broadcast address
 - D. None of above
8. How many bits are there in the Ethernet address?
- A. 64 bits
 - B. 48 bits
 - C. 32 bits
 - D. 16 bits
9. How many layers are in the TCP/IP model?
- A. 4 layers
 - B. 5 layers
 - C. 6 layers
 - D. 7 layers
10. Which of the following layer of OSI model also called end-to-end layer?
- A. Presentation layer
 - B. Network layer
 - C. Session layer
 - D. Transport layer

[Click Here for Answers](#)

1 – C / 2 – D / 3 – A / 4 – A / 5 – D / 6 – A / 7 – C / 8 – B / 9 – A / 10 – D

UNIT-3

3-1. Why IP Protocol is considered as unreliable?

- A. A packet may be lost
- B. Packets may arrive out of order
- C. Duplicate packets may be generated
- D. All of the above

3-2. What is the minimum header size of an IP packet?

- A. 16 bytes
- B. 10 bytes
- C. 20 bytes
- D. 32 bytes

3-3. Which of following provides reliable communication?

- A. TCP
- B. IP
- C. UDP
- D. All of the above

3-4. What is the address size of IPv6 ?

- A. 32 bit

- B. 64 bit
 - C. 128 bit
 - D. 256 bit
- 3-5. What is the size of Network bits & Host bits of Class A of IP address?
- A. Network bits 7, Host bits 24
 - B. Network bits 8, Host bits 24
 - C. Network bits 7, Host bits 23
 - D. Network bits 8, Host bits 23
- 3-6. What does Router do in a network?
- A. Forwards a packet to all outgoing links
 - B. Forwards a packet to the next free outgoing link
 - C. Determines on which outgoing link a packet is to be forwarded
 - D. Forwards a packet to all outgoing links except the originated link
- 3-7. The Internet is an example of
- A. Cell switched network
 - B. circuit switched network
 - C. Packet switched network
 - D. All of above
- 3-8. What does protocol defines?
- A. Protocol defines what data is communicated.
 - B. Protocol defines how data is communicated.
 - C. Protocol defines when data is communicated.
 - D. All of above
- 3-9. What is the uses of subnetting?
- A. It divides one large network into several smaller ones
 - B. It divides network into network classes
 - C. It speeds up the speed of network
 - D. None of above
- 3-10. Repeater operates in which layer of the OSI model?
- A. Physical layer
 - B. Data link layer
 - C. Network layer
 - D. Transport layer

[Click Here for Answers](#)

1 – D / 2 – C / 3 – A / 4 – C / 5 – A / 6 – C / 7 – C / 8 – D / 9 – A / 10 – A

UNIT-4

- 4-1. What is the benefit of the Networking?
- A. File Sharing
 - B. Easier access to Resources
 - C. Easier Backups
 - D. All of the Above
- 4-2. Which of the following is not the Networking Devices?
- A. Gateways
 - B. Linux
 - C. Routers
 - D. Firewalls
- 4-3. What is the size of MAC Address?
- A. 16-bits
 - B. 32-bits
 - C. 48-bits

D. 64-bits

4-4. Which of the following can be Software?

- A. Routers
- B. Firewalls
- C. Gateway
- D. Modems

4-5. What is the use of Ping command?

- A. To test a device on the network is reachable
- B. To test a hard disk fault
- C. To test a bug in a Application
- D. To test a Printer Quality

4-6. MAC Address is the example of

- A. Transport Layer
- B. Data Link Layer
- C. Application Layer
- D. Physical Layer

4-7. Routing tables of a router keeps track of

- A. MAC Address Assignments
- B. Port Assignments to network devices
- C. Distribute IP address to network devices
- D. Routes to use for forwarding data to its destination

4-8. Layer-2 Switch is also called

- A. Multiport Hub
- B. Multiport Switch
- C. Multiport Bridge
- D. Multiport NIC

4-9. Difference between T568A and T568B is

- A. Difference in wire color
- B. Difference in number of wires
- C. Just different length of wires
- D. Just different manufacturer standards

4-10. The meaning of Straight-through Cable is

- A. Four wire pairs connect to the same pin on each end
- B. The cable Which Directly connects Computer to Computer
- C. Four wire pairs not twisted with each other
- D. The cable which is not twisted

[Click Here for Answers](#)

1 – D / 2 – B / 3 – C / 4 – B / 5 – A / 6 – B / 7 – D / 8 – C / 9 – D / 10 – A

UNIT-5

1. Which of the following is not the External Security Threats?

- A. Front-door Threats
- B. Back-door Threats
- C. Underground Threats
- D. Denial of Services

2. What is the Demilitarized Zone?

- A. The area between firewall & connection to an external network
- B. The area between ISP to Military area
- C. The area surrounded by secured servers
- D. The area surrounded by the Military

3. What is the full form of RAID ?

- A. Redundant Array of Independent Disks
 - B. Redundant Array of Important Disks
 - C. Random Access of Independent Disks
 - D. Random Access of Important Disks
4. What is the maximum header size of an IP packet?
- A. 32 bytes
 - B. 64 bytes
 - C. 30 bytes
 - D. 60 bytes
5. What is the size of Host bits in Class B of IP address?
- A. 04
 - B. 08
 - C. 16
 - D. 32
6. What is the usable size of Network bits in Class B of IP address?
- A. 04
 - B. 08
 - C. 14
 - D. 16
7. In which type of RAID, data is mirrored between two disks.
- A. RAID 0
 - B. RAID 1
 - C. RAID 2
 - D. RAID 3
8. What do you mean by broadcasting in Networking?
- A. It means addressing a packet to all machine
 - B. It means addressing a packet to some machine
 - C. It means addressing a packet to a particular machine
 - D. It means addressing a packet to except a particular machine
9. Which of the following is/are Protocols of Application?
- A. FTP
 - B. DNS
 - C. Telnet
 - D. All of above
10. Which of the following protocol is/are defined in Transport layer?
- A. FTP
 - B. TCP
 - C. UDP
 - D. B & C

[Click Here for Answers](#)

1 – C / 2 – A / 3 – A / 4 – D / 5 – C / 6 – C / 7 – B / 8 – A / 9 – D / 10 – D

Fill in the blanks:

- 11. ----- bridge operates in promiscuous mode
- 12. Source routing bridges in the same LANs must have ----- bridge number
- 13. To create a -----, combine crossbar switches in stages.
- 14. Local cable TV Network is an example for -----
- 15. ----- transmission has more suitable for indoor wireless LANs.
- 16. The physical layer of Novell Netware consists of ----- protocol.
- 17. The connection oriented transport protocol in Novell Netware is -----

18. When packets are small and all are equal sized then they are called-----.
19. Accounting functions are responsibility of ----- Layer.
20. -----layer contains network

WEBSITES:

1. WWW.acm.org/sigcomm/sos.html.
2. WWW.ietf.org/
3. WWW.osi.org/
4. WWW.ietf.org/rfc.html
5. [WWW.saketsoft.in/learn/computer networks.aspx](http://WWW.saketsoft.in/learn/computer_networks.aspx)
6. www.wikipedia.com
7. www.google.com
8. www.ask.com

JOURNALS:

- 1.ELSEVER.COM(INTERNATIONAL JOURNAL OF COMPUTER AND COMMUNICATION NETWORKING)
- IAENG (International Association of Engineers)
- 3. www.iaeng.org

Experts in the subject:

1. SimonS Lam (lam@cs.utexas.edu)
2. Dr.Shankar Balachandran,IIT Madras(Shankar_at_cse_dot_iitm_dot_ac_in)
Bezawada Bruhadeswar(bezawada@iiit.ac.in)

LIST OF THE SEMINAR TOPICS:

1. Internet
2. Network security
3. www and http
4. network management system
5. Organization of networks
6. Wireless Wans: Cellular Telephone and virtual networks.
7. SONET
8. Layered architectures(OSI and TCP/IP)
9. Multiple access techniques in networks
10. Wireless Lans.
11. Network models
12. Ethernet
13. Switching
14. HTTP
15. FTP
16. Satellite networks
17. SNMP
18. Global systems for mobile applications
19. Application layer
20. Transport layer