Lesson Plan

T.E. (CE-B) (Semester V)

Subject: Computer Ne

Subject code: CSC503

Teacher-in-charge: Prof. Jagruti Nagaonkar

Academic Term: July – October 2022

Syllabus :

Module No.	Hrs	Topics	
1.0	4	**Introduction to Networking**	
		1.1 Introduction to computer network, network application, network software and hardware components (Interconnection networking devices), Network topology, protocol hierarchies, design issues for the layers, connection oriented and connectionless services 1.2 Reference models: Layer details of OSI, TCP/IP models. Communication between layers.	10%
2.0	3	**Physical Layer**	
		2.1 Introduction to Communication Electromagnetic Spectrum 2.2 Guided Transmission Media: Twisted pair, Coaxial, Fiber optics.	10%
3.0	8	**Data Link Layer**	
		3.1 DLL Design Issues (Services, Framing, Error Control, Flow Control), Error Detection and Correction (Hamming Code, CRC, Checksum), Elementary Data Link protocols, Stop and Wait, Sliding Window (Go Back N, Selective Repeat) 3.2 **Medium Access Control sublayer** Channel Allocation problem, Multiple access Protocol (Aloha, Carrier Sense Multiple Access (CSMA/CD)	20%
4.0	12	**Network layer**	
		4.1 Network Layer design issues, Communication Primitives: Unicast, Multicast, Broadcast. IPv4 Addressing (classful and classless), Subnetting, Supernetting design problems, IPv4 Protocol, Network Address Translation (NAT), IPv6 4.2 **Routing algorithms**: Shortest Path (Dijkstra's), Link state routing, Distance Vector Routing 4.3 **Protocols** - ARP, RARP, ICMP, IGMP 4.4 **Congestion control algorithms**: Open loop congestion control, Closed loop congestion control, QoS parameters, Token & Leaky bucket algorithms	30%
5.0	6	**Transport Layer**	
		5.1 The Transport Service: Transport service primitives, Berkeley Sockets, Connection management (Handshake), UDP, TCP, TCP state transition, TCP timers 5.2 TCP Flow control (sliding Window), TCP Congestion Control: Slow Start	15%
6.0	6	**Application Layer**	
		DNS: Name Space, Resource Record and Types of Name Server. HTTP, SMTP, Telnet, FTP, DHCP	15%
	39	**Total**	**100**

The high-level learning objective of this course can be summarized as follows:

• *Thinking in a networked world.* The world is more and more interconnected and the use of networks will continue to increase. Students must understand how the network behaves and the key principles behind the organization and the operation of the computer networks.

• *Continued study.* The networking domain is rapidly evolving and this first networking course should be a starting point to other more advanced courses like Mobile Computing, Network Security, Parallel and Distributed Systems, etc.

• *Principles and practice interact.* Networking is real and many of the design choices that involve networks also depend on practical constraints. Students should be exposed to these practical constraints by experimenting with networking, using tools, and writing networked software.

Course Learning Objectives:

1	To introduce concepts and fundamentals of data communication and computer networks.
2	To explore the inter-working of various layers of OSI.
3	To explore the issues and challenges of protocols design while delving into TCP/IP protocol suite.
4	To assess the strengths and weaknesses of various routing algorithms.
5	To understand various transport layer and application layer protocols.

Prerequisites: None

Course Outcomes:

Upon successful completion of this course students will be able to:

CSC503.1	*Comprehend the design issues and enumerate the functions of the different layers of Network Software Models.* (**B2 – Comprehension**)
CSC503.2	*Identify the characteristics of network devices and media used to design network.* (**B2 – Comprehension**)
CSC503.3	Analyze the design issues of DLL, NL, and Transport Layer (**B3 – Analysis**)
CSC503.4	Compare the state-of-the-art network protocols in Data Link Layer, Network Layer and Transport Layer (**B3 – Analysis**)
CSC503.5	*Explore protocols at application layer* (**B2 – Comprehension**)

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CSC503.1	2	2	2									2		
CSC503.2	3													
CSC503.3	3	3	2											
CSC503.4	2	3											2	
CSC503.5	3	2											2	

CO Assessment Tools:

Course Outcomes	*Indirect Method (20%)*							
	Unit Tests		Assignments		Quizzes		End Sem Exam	Course exit survey
	1	2	1	2	1	2		
CSC503.1	20%	--	20%	--	1	--	50%	100%
CSC503.2	20%	--	20%	--	1	--	50%	100%
CSC503.3	--	25%	--	25%	1	--	50%	100%
CSC503.4	--	20%	--	20%	--	10%	50%	100%
CSC503.5	--	20%	--	20%	--	10%	50%	100%

CO calculation= (0.8 *Direct method + 0.2*Indirect method)

Rubrics for assessing Course Outcome with each assessment tool:

Assignment:

Indicator				
Timeline (2)	More than two days late (0)	Two days late (1)	One day late (2)	On time (3)
Correctness (4)	All questions correct (4)	One point deducted for each incorrect answer		

Completion (4)	All questions answered (4)	One point will be deducted for each incomplete or un-attempted question

Curriculum Gap identified: (with action plan)

Concept of modulation is not introduced and advantages and significance of digital modulation is not covered.

Content beyond syllabus:

Coverage of Multiplexing techniques, Data rates and Channel Utilization

Modes of content delivery

Modes of Delivery	Brief description of content delivered
Class room lecture	1. Introduction to Networking 2. Physical Layer 3. Data Link Layer 4. Network layer 5. Transport layer 6. Application layer
Assignments	Assignment 1: based on 1. Introduction to Networking,Physical layer and Data link layer Assignment 2: Network layer and Tranport layer Assignment3:Network,Transport and Application layer
Quizzes	Quiz 1: on Introduction to Networking and Data link layer Quiz 2: on Network layer and Transport layer

Text books:
1. A.S. Tanenbaum, Computer Networks,4 th edition Pearson Education.
2. B.A. Forouzan, Data Communications and Networking, 5 th edition, TMH.
3. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet,6th edition, Addison Wesley

Reference Books:

1. S.Keshav,An Engineering Approach To Computer Networking, Pearson
2. Natalia Olifer & Victor Olifer,Computer Networks: Principles, Technologies & Protocols Network Design, Wiley India, 2011.
3. Larry L.Peterson, Bruce S.Davie, Computer Networks: A Systems Approach, Second Edition ,The Morgan Kaufmann Series in Networking

Lesson Plan

TE Computer Engineering (B), Semester V		
July- October 2022		

Computer Network (CSC 503)

Lecture	**3**	
Practical		
Tutorial		

	Hours	*Marks*
Theory examination	3	80
Internal Assessment	--	20
Practical Examination	--	--
Oral Examination	--	--
Term work	--	--
Total	--	100

Day	*Time*
Monday	8.45-9.45am
wednesday	9.45-10.45am
Friday	9.45-10.45am

Lecture No	Date		Topic	Remarks
	Planned	**Actual**		
1	19-07-22	19-07-22	Syllabus discussion, Introduction to networking, History and development of computer network,	
2	22-07-22	22-07-22	Network software and hardware components, Different topologies	
3	25-07-22	25-07-22	Protocol hierarchies, design issues for the layers, connection oriented and connectionless services	
4	26-07-22	26-07-22	Reference models: layer details of OSI, TCP/IP	
5	1-08-22	1-08-22	Reference models: layer details of OSI, TCP/IP, Communication between layers	
Module 2: Physical layer				
6	3-08-22	3-08-22	Guided Transmission Media: Twisted pair, Coaxial	

7	5-08-22	5-08-22	Guided Transmission Media: Fiber Optics	
8	8-08-22	8-08-22	Unguided media (Wireless Transmission): Radio Waves,Bluetooth,Infrared, virtual LAN	

Module 3: Data link layer

9	10-08-22	10-08-22	DLL Design Issues (Services, Framing),	
10	12-08-22	12-08-22	Error Control, Flow Control	
11	17-08-22	17-08-22	Examples based on Error Detection and Correction (Hamming Code, CRC, Checksum)	
12	22-08-22	22-08-22	Examples based on Error Detection and Correction (Hamming Code, CRC, Checksum)	
13	26-08-22	26-08-22	Necessity of flow control, Flow control algorithms – Sliding Window, Stop & wait,	
14	29-08-22	29-08-22	Flow control algorithm-GoBack N,Selective repeat	31.8.22-4.9.22- Mid term Break,5.9.22-6.9.22 UT1
15	29-08-22	29-08-22	**Medium Access Control sublayer** Channel Allocation problem,	
16	12.9.22	12.9.22	Multiple access Protocol (Aloha, Carrier Sense Access (CSMA/CD), Elementary data link protocol (HDLC,PPP)	Assignment1

Module 4: Network layer

17	14.9.22	14.9.22	Network Layer design issues, Communication Primitives: Unicast, Multicast, Broadcast, IPv4 Protocol	Quiz 1
18	16.9.22	16.9.22	IPv4 Addressing (classful and classless)	
19	19.9.22	19.9.22	Subnetting, Supernetting design problems	
20	26.9.22	26.9.22	Network Address Translation (NAT), IPv6	
21	26.9.22	26.9.22	**Routing algorithms**: Shortest Path (Dijkstra's), Link state routing, Distance Vector Routing	

22	28.9.22	28.9.22	**Protocols** - ARP, RARP, ICMP, IGMP Open loop congestion control, Closed	
23	30.9.22	30.9.22	**Congestion control algorithms**: Open loop congestion control, Closed loop congestion control,	
24	3.10.22	3.10.22	QoS parameters, Token & Leaky bucket algorithms	Assignment2

Module 5: Application layer

25	7.10.22	7.10.22	The Transport Service: Transport service primitives,	
26	8.10.22	8.10.22	Berkeley Sockets	
27	9.10.22	9.10.22	Connection management (Handshake), UDP	
28	10.10.22	10.10.22	TCP, TCP state transition, TCP timers	
29	11.10.22	11.10.22	TCP Flow control (sliding Window), TCP Congestion Control: Slow Start	

Module 6: Transport layer

30	12.10.22	12.10.22	DNS, HTTP, SMTP,	
31	13.10.22	13.10.22	Telnet, FTP, DHCP	Assignment 3
32	14.10.22	14.10.22	University paper problem solving	UT2 :17.10.22 -19.10.22

Submitted By	**Approved By**
Prof. Monica Khanore	ii) Dr. Sujata Deshmukh Sign:
Sign:	ii) Dr. B. S. Daga Sign:
	iii) Prof. Merly Thomas Sign:
	iv) Prof. Roshni Padate Sign:
	v) Prof. Kalpana Deorukhkar Sign:
Date of Submission:	**Date of Approval:**
Remarks by DQAC (if any)	