ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : Computer Networks			B.Sc. (Hons.) Computer Science			
Semester	**Course Code**	**Course Title**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Credit (C)**
III	32341303	Core Course-VII (BHCS07)- Computer Networks	4 credit-4	0	4 credit-2	6
Teacher/Instructor(s)		Uma Ojha				
Session		2022-23				

Course Objective:

This course covers the concepts of data communication and computer networks. It comprises of the study of the standard models for the layered protocol architecture to communicate between autonomous computers in a network and also the main features and issues of communication protocols for different layers. Topics covered comprise of introduction to OSI and TCP/IP models also.

Course Learning Outcomes:

On successful completion of the course, the student will be able to:

1. Describe the hardware, software components of a network and their interrelations.
2. Compare OSI and TCP/IP network models.
3. Describe, analyze and compare different data link, network, and transport layer protocols.
4. Design/implement data link and network layer protocols in a simulated networking environment.

Lesson Plan:

Unit No.	Learning Objective	Week No.	Topics to be covered
I	Introduction of Computer Networks	1	Introduction to Computer Networks: Network definition, types of computer networks, Internet, intranet, network topologies, and network classifications. Network Performance issues and concepts: Putting network performance in perspective, balancing network performance with key non-performance characteristics.
	Performance measurements	2	Speed, bandwidth, throughput and latency; simplex, half duplex and full duplex operation; Quality of service.
II	Network Architecture Models		Layered Approach, OSI Reference Model, TCP/IP Reference Model.
III	Modulation Techniques	3	Analog Signals, Digital Signals, maximum data rate of a channel, Line encoding techniques, Analog transmission encoding techniques (ASK, PSK, FSK, QAM).
	Multiplexing and Transmission Media	4	Multiplexing: Frequency division multiplexing, time division multiplexing and wavelength division multiplexing. Transmission Media: Guided transmission media, wireless transmission, satellite communication
	Network Devices	5	Network devices: hubs, switches, bridges, routers, gateways. Physical Layer: Analog signal, digital signal.
IV	Switching Techniques and Framing	6	Circuit, packet and message switching. Data link layer services, framing and flow control.
	Error Detection and correction Techniques	7	Error-detection- CRC and correction techniques- Hamming code. Error recovery protocols (stop and wait (for noiseless and noisy environment)).
	Error Recovery protocols	8	Error recovery protocols (stop and wait, go back n, selective repeat)
	Multiple access protocols	9-10	Multiple access protocols, (CDMA, CSMA/CD,

			CSMA/CA), Data link and MAC addressing, Ethernet, data link layer switching, point-to-point protocol.
V	Network layer	11	Inter networks, virtual circuits and datagrams, addressing- sub netting, Routing- distance vector and link state routing,
	Network Layer Protocols	12-13	Network Layer Protocols- ARP, IPV4, ICMP, IPV6.
VI	Transport Layer		Transport Layer: Process to process Delivery- client server paradigm, connectionless versus connection oriented service, reliable versus unreliable; user datagram Protocol- well-known ports, user datagram.
	TCP and UDP	14	Transport Layer: UDP Operation, use of UDP, TCP/IP protocol - well-known ports, TCP Service, features. TCP connection establishment and release, Flow Control.
VII	Application Layer	15	Application Layer: WWW and HTTP, Architecture- Client server model, Uniform Resource Locator, HTTP- Transaction, HTTP operational model and client server communication, HTTP message format.

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hrs.	75

Details of the Course		
Unit	**Contents**	**Contact Hours**
I	Introduction: Types of computer networks, Internet, Intranet, Network topologies, Network classifications.	3
II	Network Architecture Models: Layered architecture approach, OSI Reference Model, TCP/IP Reference Model.	3
III	Physical Layer: Analog signal, digital signal, digital modulation techniques (ASK, PSK, QAM), encoding techniques, maximum data rate of a channel, transmission media (guided transmission media, wireless transmission, satellite communication), multiplexing (frequency division multiplexing, time division multiplexing, wavelength division multiplexing).	10
IV	Data Link MAC Layer: Data link layer services, error-detection and correction techniques, error recovery protocols (stop and wait, go back n, selective repeat), multiple access protocols, (TDMA/FDP, CDMA/FDD/CSMA/CD, CSMA/CA), Data link and MAC addressing, Ethernet, data link layer switching, point-to-point protocol.	23
V	Network layer: Networks and Inter networks, virtual circuits and datagrams, addressing, sub netting, Routing- (Distance vector and link state routing), Network Layer Protocols- (ARP, IPV4, ICMP, IPV6).	10
VI	Transport and Application Layer: Process to process Delivery- (client server paradigm, connectionless versus connection oriented service, reliable versus unreliable); User Datagram Protocols, TCP/IP protocol, Flow Control.	6
VII	Protocols: FTP (File Transfer protocol), SMTP (Simple, Mail Transfer Protocol), Telnet and remote login protocol, WWW (World Wide Web), HTTP (Hyper Text Transfer protocol), Uniform Resource Locator, HTML and forms.	5
	Total	**60**
Suggested Books:		

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1.	Forouzan, B. A. Data Communication and Networking, 5th Edition. McGraw-Hill Education	2013
2.	Tanenbaum, A.S. & Wethrall,D.J. Computer Networks, 5th Edition. Pearson Education	2011
Mode of Evaluation:	Internal Assessment / End Semester Exam	