BITS-Pilani, Hyderabad Campus

Second Semester 2019-2020

Course Handout (Part - II)

Date: 06/01/2020

In addition to Part I (General Handout for all courses appended to the Timetable) this portion gives further specific details regarding the course.

Course Number : **EEE ECE F343**
Course Title : **Communication Networks**
Instructor-in-charge : **Subhendu Kumar Sahoo**

1. Course Description:

The course initially deals with big picture of networks with discussion on evolution of network concepts in telegraph, telephone, and computer networks. Then the layered approach of information transmission is discussed in brief. Then some important layers are discussed in detail. These concepts are used to understand the next generation networks.

2. Scope and Objective:

A communication network is one of the fastest growing areas today. The course introduces the concepts and mechanisms underlying the modern telecommunication systems and networks. The course is designed in such a way that the course is accessible to students with minmum technical background in this area. The OSI model is used as a framework to introduce different protocols and standards. Then each layer is covered in detail. Finally some advanced concepts related to all layers are discussed. The course will prepare the student in the areas of telecommunication switching systems, computer networks, and internetworking.

3. Text Books:

Behrouz A. Forouzan; Data communications and networking;TMH; 5th Edition; 2013

4. Reference Book:

R1: Behrouz A. Forouzan; Data communications and networking;TMH; 4th Edition; 2006

R2. A. Leon-Garcia and I. Widjaja: Communication Networks; TMH, 2000.

R3. W. Stallings: Data and Computer Communication; Prentice-Hall, 1997.

R4. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Pearson 5th Ed

5. Course Plan / Schedule:

Lect. No.	Topic	Learning objective	Chapter in the Text Book
1.	Introduction	What is Communication Network? Over view of Communication Network, Data representation, Direction of data flow in Communication Network	1.1, 1.4, 1.5
2.	Networks	Network criteria, Physical structures, Physical topology, Categories of networks, The Internet	1.2,1.3
3.	Protocols and standards	Protocol in terms of CN, Need of a standard, Type of standard & steps to create a standard.	1.4
4.	Network models	Layering tasks, The OSI model, Detail discussion of Physical layer.	2 & R1: 2.1,2.2,2.3
5	Network models	Functions of Data link layer and Network layer.	2 & R1: 2.3
6	Network models	Functions of Transport, Session and Presentation layer	2 & R1 2.3
Lect.	**Topic**	**Learning objective**	**Ref. to Text**

No.			Book
7	Network models	Function of application layer, TCP/IP protocol suit	2 & R1:2.3
RAss.	Signal forms, Digital Signals and transmission impariments Performance parameters and Data rate limit of channel	Data and signal, Analog and digital signal, How the digital signal transimission is effected by various impariments. The limiting factors of a channel data rate.	3.1, 3.2, 3.3, 3.4, 3.5, 3.6
8	Analog Transmission	Modulation of digital data for transmitting in analog channel.	5.1
9	Telephone network for data transmission	Dial-up modems, Digital subscriber line (DSL)	R1: 9.2, 9.3
10	Cable network for data transmission	Technology for data transmission through cable TV network,	14.2
11	Multiplexing	Need of multiplexing, Classification, FDM, WDM, Synchronous TDM Statistical TDM, Spread spectrum, Transmission media	6.1, 6.2
RAss.	Transmission media	Guided and unguided media	7
12	Switching	Circuit switch, Packet switch, Structure of switch,	8.1, 8.2, 8.3, 8.4 & R2- 4.4
13	DLL	Introduction, Link Layer addressing	9.1, 9.2
14	Error detection	Types of error, Block coding	10.1, 10.2
15	Error correction	Cyclic codes, Checksum,	10.3, 10 .4
16	Error correction	Forward error correction	10.5
17	Data link control	Framing, Flow Control and Error Control, DLL Protocols	11.1,11.2
18	Data link control	HDLC, Point to point protocol	11.3, 11.4
19	Multiple access techniques	Random access, Controlled access	12.1,12.2
20	Multiple access techniques	Channelization	12.3
21	Wired LAN	Project 802, Standard Ethernet	13.1, 13.2
22	Wired LAN	Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet	13.3, 13.4, 13.5
23	Other wired networks	SONET	14.3
24	Other wired networks	ATM	14.4
25	Wireless LAN	IEEE 802.11(Wire less Ethernet)	15.1
26	Wireless LAN	Blue tooth (Complex technology For Small wireless LAN)	15.2
RAss.	Other wireless network	Wimax, Celular telephony, Satellite Network	16
27	Backbone Networks and Virtual LANs	Repeaters, Bridges, Routers, Gateway Use of these devices in Backbone Networks and Virtual LANs	17
28	Introduction to Network Layer	Network layer services, Packet switching, NL Performance	18.1, 18.2, 18.3
29	Network Layer	IPv4 addresses, Forwarding of IP packets	18.4, 18.5
30	Network Layer Protocols	Internet protocol, ICMPv4, Mobile IP	19.1, 19.2. 19.3
31	Unicast routing	Least cost routing, Routing algorithms	20.1, 20.2
32	Unicast routing	Unicast routing protocols	20.3
33	Multicast routing	Multicasting basics	21.1, 21.2
34	Next generation IP	IPv6 addressing and protocol	22.1, 22.2
35	Next generation IP	The ICMPv6 protocol	22.3,
36	Next generation IP	Transition from IPv4 to IPv6	22.4
37	Introduction to Transport Layer	TLP, UDP	23, 24.1,
38	Introduction to Transport Layer	UDP, TCP	24.2, 24.3
39	Application Layer	Introduction, Client server programing	25
40	Application Layer	Standard client server protocols, Networkmanagement	26, 27
41	Topics related to all layers	Quality of service, Cryptography and Network Security	30, 31

5. Evaluation Scheme:

Component	Duration	Weightage	Date and Time	Remarks
Midsem exam	1.5 hr	30%	2/3 11.00 -12.30 PM	Closed Book
Quiz		20%	Regular	
Assignment		5%	Will beannounced in class	Open book
Comprehensive	3 hrs	45%	1/5 AN	Closed Book (25%) Open Book (20%)
Total		100%		

6. Chamber Consultation Hour: To be announced in Class

7. Make-up Policy: Make-up will be given on extremely genuine grounds only. Prior application should be made for seeking the make-up examination.

8. **Notices**: Notices, if any, concerning the course will be put up on CMS only.

9. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.