FIRST SEMESTER 2016-2017
Course Handout Part II

Date: 02-08-2016

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

Course No. : **BITS C372**
Course Title : **Data Communications and Networks**
Instructor-in-charge : **RAHUL SINGHAL**

1. **Scope and Objective of the course**

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 without any special technical background in this area. The OSI model is used as a framework to introduce different protocols and standards. The course will prepare the student for advanced courses in the areas: telecommunication switching systems, computer networks, and internetworking etc.

2. **Text Book** (TB)

Behrouz A. Forouzan, *Introduction to Data Communications and Networking*, 4th Edition, McGraw-Hill Publishing Company Ltd., New Delhi, 2004.

3. **Reference Books:**

I. William Stallings, *Data and Computer Communications, Seventh Edition*, Pearson Education, Delhi.

II. Alberto Leon-Gracia, Indra Widjaja, *Communication Networks: Fundamental Concepts and Key Architectures*, Second Edition, Tata-McGraw Hill, 2004.

4. **Course Plan**

Lecture	Topic	Learning objective	Ref. to TB
1	Introduction	Data Communications - Components, Data Representation, Data Flow	1.1
2	Networks	Network Criteria, Physical Structures, Network Models, Categories of Networks, The Internet	1.2, 1.3
3	Protocols and Standards	Protocols, Standards, Standard Organizations & Internet Standards	1.4
4-7	Network models	Layered Tasks, The OSI model, Functions of Physical layer	2.1, 2.2, 2.3
		Functions of Data link layer and Network layer	2.3
		Functions of Transport, Session and Presentation layer	2.3
		Function of Application layer, TCP/IP Protocol Suite	2.3, 2.4
8-9	Signals	Signal forms and their characteristics.	3.1, 3.2, 3.3
		Transmission Impairment, Data Rate limits, Performance	3.4, 3.5, 3.6
10	Digital Transmission	Line Coding	4.1
11	Analog to Digital conversion	Pulse code modulation, Delta modulation, Transmission modes	4.2, 4.3
12	Analog Transmission	Modulation of digital data for transmitting in analog channel	5.1
13	Telephone Network	Dial-up modems, Digital Subscriber Line (DSL)	9.2, 9.3
14	Cable TV Network	Technology for data transmission through cable TV network	9.4, 9.5
15-16	Multiplexing	Need, Classification, FDM, WDM, Synchronous TDM	6.1
		Statistical TDM, Spread Spectrum, Transmission media	6.1, 6.2, Ch-7

17	Switching	Structure of Switch, Switched network classification	8.1, 8.2, 8.3, 8.4
18-20	Error Detection	Types of error, Block coding	10.1, 10.2
		Linear block codes	10.3
		Cyclic codes, Checksum	10 .4, 10.5
21-22	Data Link Control	Framing, Flow Control and Error Control, Protocols, Noise less channels	11.1,11.2,11.3, 11.4
		Noisy channels, HDLC	11.5, 11.6
23-24	Multiple Access Techniques	Random access, Controlled access, Channelization	12.1,12.2, 12.3
25-26	Wired LAN	Project 802, Standard Ethernet	13.1, 13.2
		Changes in the standard, Fast Ethernet, Gigabit Ethernet	13.3, 13.4, 13.5
27-28	Wireless LAN	IEEE 802.11(Wireless Ethernet)	14.1
		Blue tooth (Complex technology For Small wireless LAN)	14.2
29	Backbone Networks and Virtual LANs	Repeaters, Bridges, Routers, Gateway Use of these devices in Backbone Networks and Virtual LANs	15.1, 15.2, 15.3
30-31	SONET	Architecture, SONET layers, SONET frames	17.1, 17.2, 17.3
		STS multiplexing, SONET networks, Virtual tributaries	17.4, 17.5,17.6
32	Frame Relay and ATM	Basic Concept of Frame Relay and ATM	Ch-18
33-34	Network Layer: Logical Addressing	Need of network layer, IPv4 addresses, IPv6 addresses	19.1, 19.2
35-36	Transport Layer	Process to process delivery, UDP, TCP	23.1, 23.2, 23.3
37-38	Application Layer Protocols	Name space, Domain Name Space, Distribution of Name Space	25.1, 25.2, 25.3
		Remote login, Electronic Mail and File Transfer, HTTP, WWW	Ch-26
39-40	Multimedia	Digitization of audio and video, and their compression	29.1, 29.2
		Voice Over IP	29.8
41	Cryptography and its application	Basics of cryptography and its application for Message Security and User Authentication	Ch-30, Ch-31
42	Security Protocols in Internet	Security in different layers of Internet	Ch-32

5.**Evaluation Scheme**

EC. No.	Evaluation Component	Weightage	Duration	Date, Time & Venue	Nature of Component
1.	Mid Semester Test	30	90 min.	8/10 2:00 - 3:30 PM	CB/OB
2.	Quiz	15	Surprise Quiz (Best-3 out-of-4)		CB/OB
3.	Assignment	15	Details in Class		
4.	Comprehensive Exam	40	3 hrs.	14/12 FN	CB+OB

6. **Chamber Consultation Hour**: To be announced by the Instructor-in-charge.

7. **Notice**: Notices concerning this course will be displayed on EEE Notice Board or on *nalanda.bits-pilani.ac.in.*