INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout Part II

Date: 03-08-2015

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 F346**
Course Title : **Data Communications and Networks**
Instructor-in-charge : **Sainath Bitragunta**

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*, 5th Edition, McGraw-Hill Publishing Company Ltd., New Delhi, 2013.

3. **Reference Books:**

I. Bertsekas and Gallager, *Data networks, 2nd Edition*, Pearson Education, Delhi.
II. Kurose and Ross, *Computer networking: A Top-Down Approach*, 6th Edition, Pearson Education.
III. Anurag kumar, D. Manjunath, Joy Kuri, Communication Networking, An Analytical Approach, 1st Edition, Morgan Kaufmann.
IV. Alberto Leon-Gracia, Indra Widjaja, *Communication Networks: Fundamental Concepts and Key Architectures*, 2nd Edition, Tata-McGraw Hill.
V. B. Dunsmore, T. Skandier, *Telecommunications Technologies Reference*, Cisco Press, Pearson Education.
VI. [Math] A. Papoulis, S. U. Pillai, Probability, Random variables, Stochastic processes, 4th Edition, Tata McGrawHill.
VII. [Math] Sheldon Ross, Introduction to probability models, 11th Edition, Academic Press.
VIII. Leonard Kleinrock, Queueing Systems - Vol. 1: Theory, Vol. 2: computer applications, Wiley.

4. **Course Plan.**

Lecture	Topic	Learning objective	Ref.
1-3	Motivation & Math	Probability (brief) overview and modeling, History of internet	VI,VII,VIII
4	Introduction	Data Communications - Components, Data Representation, Data Flow	1.1
5-6	Networks	Network Criteria, Physical Structures, Network Models, Categories of Networks, The Internet	1.2, 1.3
7	Protocols and Standards	Protocols, Standards, Standard Organizations & Internet Standards	1.4
8-12	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
13-14	Signals	Signal forms and their characteristics.	3.1, 3.2, 3.3
		Transmission Impairment, Data Rate limits, Performance	3.4, 3.5, 3.6
15	Analog to Digital conversion	Pulse code modulation, Delta modulation, Transmission modes	4.2, 4.3
16	Analog Transmission	Modulation of digital data for transmitting in analog channel	5.1
17	Telephone Network	Dial-up modems, Digital Subscriber Line (DSL)	9.2, 9.3
18-19	Multiplexing	Need, Classification, FDM, WDM, Synchronous TDM	6.1
		Statistical TDM, Spread Spectrum, Transmission media	6.1, 6.2, Ch-7
20	Switching	Structure of Switch, Switched network classification	8.1, 8.2, 8.3, 8.4
21-23	Error Detection	Types of error, Block coding	10.1, 10.2
		Linear block codes	10.3
		Cyclic codes, Checksum	10 .4, 10.5
24-25	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
26-27	Multiple Access Techniques	Random access, Controlled access, Channelization	12.1,12.2, 12.3
28-29	Wired LAN	Project 802, Standard Ethernet	13.1, 13.2
		Changes in the standard, Fast Ethernet, Gigabit Ethernet	13.3, 13.4, 13.5
30-32	Wireless LAN	IEEE 802.11(Wireless Ethernet)	14.1
		Blue tooth (Complex technology For Small wireless LAN)	14.2
33	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
34-35	SONET	Architecture, SONET layers, SONET frames	17.1, 17.2, 17.3
		STS multiplexing, SONET networks, Virtual tributaries	17.4, 17.5,17.6
36	Frame Relay and ATM	Basic Concept of Frame Relay and ATM	Ch-18
37-38	Network Layer: Logical Addressing	Need of network layer, IPv4 addresses, IPv6 addresses	19.1, 19.2
39-40	Transport Layer	Process to process delivery, UDP, TCP	23.1, 23.2, 23.3
41	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
42	Multimedia	Digitization of audio and video, and their compression	29.1, 29.2
		Voice Over IP	29.8

5. **Evaluation Scheme**

Component	Duration	Weightage (%)	Date & Time	Room No.	Remarks
Quiz(s)	**50 mins**	20	Details will be announced in the class		
Assignment(s)		10	Details will be announced in the class		
Mid-sem Test	90 mins	30	7/10 2:00 - 3:30 PM		CB
Comprehensive	3 hours	40	7/12 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 the Notice board of EEE Department only.

Instructor-in-charge
BITS F346