Birla Institute of Technology & Science, Pilani
Hyderabad Campus
Department of Computer Science and Information Systems
Second Semester 2012-2013 Course Handout (Part II)

Date: 8th Jan 2013

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. : CS C461/IS C461
Room: F106 (M, W, F 2nd hr)

Computer Networks

Instructors: **Chittaranjan Hota (hota@bits-hyderabad.ac.in) I/C**
   Abhishek Thakur, Gokul Kannan S
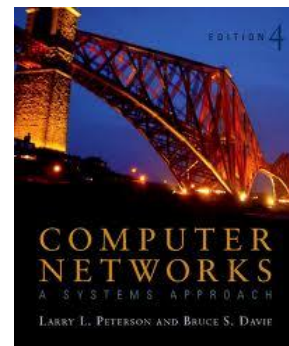
Scope and Objectives:
This course will give you a breakdown of the applications, communications protocols, and network services that make a computer network work. We will closely follow the top down approach to computer networking, which will enable you to first understand the most visible part i.e. the applications, and then seeing, progressively, how each layer is supported by the next layer down. Most of the time our example network will be the Internet. Also, a chapter on wireless and mobile networks will be covered as currently users access the Internet from offices, from homes, while on move, and from public places wirelessly. Overview of Security threats on Computer networks will be also be covered. We also plan to have several programming assignments to provide practical skills and insights using Ethereal, a network protocol analyzer tool, NetSim a Network simulator, and Unix Socket API.

TEXT BOOK
[T1]   L. Peterson and B. Davie, Computer Networks: A Systems Approach, Fourth Edition, Morgan Kaufmann, 2007.

REFERENCE BOOKS
[R1]   Andrew S. Tanenbaum, Computer Networks, Fourth Edition, Pearson Education, 2006.

[R2]   William Stallings, Computer Networking with Internet Protocols and Technology, Pearson Education, 2004.

[R3]   James F. Kurose and Keith W. Ross: Computer Networking: A Top-Down Approach Featuring the Internet, Third Edition, Pearson Education, 2006.

[R4]   S. Keshav, An Engineering Approach to Computer Networking: ATM Networks, the Internet, and the Telephone Network, Pearson Education, 1997.

[R5]   Alberto Leon-Garcia and Indra Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, Second Edition, Tata McGraw-Hill, 2005.

[R6] Natalia Olifer and Victor Olifer, Computer Networks: Principles, Technologies and Protocols for Network Design, Wiley-India Edition, Wiley, 2006.

[R7]   B A Forouzan, and F Mosharraf, Computer Networks: A Top Down Approach, TMH, SiE, 2012.

PLAN OF STUDY:

Sl. No.	TOPIC	CHAPTER Ref	Lect.s
1.	*Introduction*: Uses of Computer Networks, Network Hardware: The Network Edge, The Network Core, Access Networks.	R3 (1), R1 (1), T1(1)	2
2.	*Physical Media*: The theoretical basis for data communication (Fourier Analysis, Bandwidth Limited Signals, Maximum Data Rate of a Channel), Guided physical media.	R3 (1), R1 (2), T1(1)	2
3.	ISPs and Internet Backbones, Delay and Loss in Packet Switched Networks, Network Software: Protocol Hierarchies, and their Service Models.	R3 (1), R1 (1), T1(1)	2
4.	Reference Models (OSI, TCP/IP)	R1 (1)	1
5.	*Application Layer*: Hypertext Transfer Protocol, HTTP Message Format, Cookies, Conditional GET.	R3 (2), R2 (4), T1(9)	2
6.	Simple Mail Transfer Protocol, Domain Name Systems (DNS).	R3 (2), R2 (3,4), T1(9)	2
7.	Socket Programming with TCP and with UDP.	R3 (2)	2
8.	*Transport Layer*: Multiplexing, Demultiplexing, UDP, Principles of Reliable Data Transfer (Go-Back-N, and Selective Repeat).	R3 (3), R1 (6), T(5), T(6)	2
9.	TCP: Segment structure, RTT Estimation and Timeout, TCP Flow Control.	R3 (3), R1 (6), T1(5), T1(6)	2
10.	TCP Error Control, and Congestion Control.	R3 (3), T1(6)	2
11.	*Network Layer*: Virtual Circuits and Datagram Networks, What is Inside a Router? Forwarding and Addressing in the Internet.	R3 (4), R1 (5), T1(3)	2
12.	Routing Algorithms: Shortest Path, Flooding, Link State, Distance Vector, and Hierarchical Routing.	R3 (4), R1 (5), T1(4)	3
13.	Routing in the Internet: RIP, OSPF, Border Gateway Protocol, and Multicasting.	R3 (4), R1 (5), T1(4)	3
14.	*Data Link Layer*: Services, Error Detection and Correction Techniques (Parity Checks, Checksums, CRC).	R3 (5), R1 (3), T1(2)	2
15.	Multiple Access Protocol: TDM, FDM, Slotted ALOHA, ALOHA, CSMA, Local Area Networks.	R3 (5), R1 (4), T1(2)	3
16.	Link Layer Addressing: MAC Addresses, ARP, DHCP; Ethernet: Frame Structure, CSMA/CD.	R3 (5), R1 (4),T1(2)	2
17.	Interconnections: Hubs, and Switches.	R3 (5), R2 (15),T1(3)	1
18.	Link Virtualization: Asynchronous Transfer Mode (ATM), Multiprotocol Label Switching (MPLS).	R3 (5), T1(3)	2
19.	*Wireless Networks*: Wireless Links and Network Characteristics, CDMA, Wi-Fi: 802.11 Wireless LAN Architecture and Protocol, Cellular Internet access.	R3 (6), R5 (6)	2
20.	*Mobile Networks*: Mobility management, Mobile IP.	R3 (6)	1
21.	*Network Security:* Overview of Cryptography, Key Exchange, Authentication, and Perimeter Security.	T1(8)	2

EVALUATION SCHEME:

Sl. No.	Component & Nature	Duration	Weightage	Date and Time
1.	Evaluative tutorials (best 3 out of 4)	*	25%	*
2.	Test I (Closed Book)	50 mins	20%	25/02/2013 (1st hr)
3.	Test II (Closed Book)	50 mins	20%	30/03/2013 (1st hr)
4.	Compre. Exam (Part Open)	3 hrs	35%	14/05/2013 (AN)

Note: All course notices will be displayed on the CSIS Notice Board.
Chamber Consultation Hour: Would be announced in the class.

Instructor-In-Charge