Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2021-2022

Course Handout Part II

Date: 15.01.2022

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

Course No. : **CS F303**
Course Title : **Computer Networks**
Instructor in Charge : Dr Suvadip Batabyal
Instructors : Dipanjan Chakraborty, Rajib R. Maiti, Paresh Saxena, Nikumani Choudhury

Scope and Objectives of the Course:

- This course will give you a breakdown of the applications, communications protocols, and network services that make a computer network work.
- We will follow a bottom-up approach to computer networking, which will enable you to learn the basics and then built upon them. This will also enable us to understand each layer independent of the layer above and the services that a layer provides to its next upper layer.
- Most of the time our example network will be the Internet.
- Real-life examples with suitable demonstration through various tools (such as cisco packet tracer) will be provided in order to understand how network and internetwork operates.

Textbooks:

1. [T1] James F. Kurose and Keith W. Ross. Computer Networking: A Top-Down Approach. Sixth Edition, 2013, Pearson.

Reference books

1. [R1] Behrouz A. Forouzan. Data Communications and Networking. McGraw Hill Pub., 5th edition, 2013.
2. [R2] Andrew S. Tanenbaum. Computer Networks. Fourth Edition, Pearson Education, 2006.
3. [R3] L. Peterson and B. Davie. Computer Networks: A Systems Approach. Fourth Edition, MK, 2007.

Course Plan:

Sl. No.	Learning objectives	Topics to be covered	Chapter in the Text Book	Lectures
1.	To understand the need, evolution, current status of computer networks. To understand the types of computer networks	Introduction to computer networks, history of internet, standards.	T1 (Ch. 1)	3
2.	To understand the network layered architecture, models and	Protocol layering.	T1 (Ch. 1)	2

	development standards.			
3.	To understand the operations of physical layer and signal transmission. To understand coding techniques for digital transmission.	Physical Media characteristics, bandwidth Limited Signals, Maximum Data Rate. Basic modulation and multiplexing techniques.	Chapter notes, R1 (Ch. 3, 4)	2
4.	To understand the connection architectures of network devices.	Introduction to Switched networks	Chapter notes, R1 (Ch. 8)	2
5.	To understand the performance evaluation of switched networks.	Delay and Loss in Switched Networks.	Chapter notes	2
6.	To understand the channel access protocols for shared medium. To understand the different flow control mechanisms.	Multiple Access Protocol: Slotted ALOHA, ALOHA, CSMA, Local Area Networks. Flow control protocols.	Chapter notes, R1 (Ch. 12, 11)	3
7	To understand the error control protocols.	Data Link Layer: Services, Error Detection and Correction Techniques (Parity Checks, Checksums, CRC).	T1 (Ch. 5)	2
8.	To understand the link layer protocol data unit and its structure.	Link Layer Addressing: MAC Addresses, ARP, DHCP; Ethernet: Frame Structure. Interconnections: Hubs, and Switches.	T1 (Ch. 5)	2
9.	To understand internet connection models. To understand how devices are identified in the internet.	Network Layer: Virtual Circuits and Datagram Networks, what is Inside a Router? Forwarding and Addressing in the Internet.	T1 (Ch. 4)	2
10.	To understand how packets are routed in the internet.	Routing Algorithms: Shortest Path, Flooding, Link State, Distance Vector, and Hierarchical Routing.	T1 (Ch. 4)	3
11.	To understand the error mitigation at the transport layer.	TCP Error Control and Congestion Control.	T1 (Ch. 3)	2
12.	To understand how to estimate the congestion characteristics.	TCP: Segment structure, RTT Estimation and Timeout, TCP Flow Control.	T1 (Ch. 3)	3
13.	To understand the flow control protocol at the transport layer.	Transport Layer: Multiplexing, Demultiplexing, UDP, Principles of Reliable Data Transfer (Go-Back-N, and Selective Repeat).	T1 (Ch. 3)	2
14.	To understand the syntax of transport layer programming.	Socket Programming with TCP and with UDP.	Chapter notes, R1 (Ch. 25)	2
15.	To understand SMTP.	Simple Mail Transfer Protocol, File transfer protocol, Domain Name Systems (DNS).	T1 (Ch. 2)	3
16.	To understand HTTP.	Application Layer: Hypertext Transfer Protocol, HTTP Message Format, Cookies, Conditional GET.	T1 (Ch. 2)	2
17.	To understand the local wireless network standard.	Wireless Networks: Wireless Links and Network Characteristics, Wi-Fi: 802.11 Wireless LAN Architecture and Protocol	T1 (Ch. 2)	3
18.	To understand how to handle network connectivity under mobility.	Mobile Networks: Mobility management, Mobile IP.	T1 (Ch. 6)	2

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Comprehensive examination	120 min	35%	09/05 FN	Closed book
Mid-term examination	90 min	30%	11/03 9.00am to10.30am	Open book
Quiz (2 Nos.)	30 minutes	10%	TBA	Open book
Lab Test (2 Nos.)	TBA	20%	TBA	Open book
Continuous lab evaluation	TBA	5%	TBA	Open book

For Comprehensive exam and Mid-semester Test, the mode (offline/online) and the duration are subject to changes as decided by the AUGSD/Timetable division in future.

Details:
One Quiz and one lab-test will be conducted before the mid-sem; remaining after the mid-sem.

Chamber Consultation Hour: TBA

Notices: To be put up on the department notice board and CMS.

Make-up Policy:
Make up will be allowed only in extreme situations and institute rules will apply. However, *prior permission* from the IC is compulsory.

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.

INSTRUCTOR-IN-CHARGE
CS F303