

# **BITS-Pilani, Hyderabad Campus**

**First Semester 2022-2023**

## **Course Handout (Part - II)**

**Date: 29/08/2022**

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** : CSF303  
**Course Title** : Computer Networks  
**Instructor-in-charge** : Gopal Krishna Kamath M

### **1. Course Description:**

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

### **2. Scope and Objective:**

Computer networks are one of the fastest growing areas today. The course introduces the concepts and mechanisms underlying modern telecommunication systems and networks. The course is designed in such a way that the course is accessible to students with minimum technical background in this area. The OSI model is used as a framework to introduce different protocols and standards. Each layer is covered in sufficient 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:**

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

T2: Dimitri Bertsekas and Robert Gallager; Data Networks; PHI; Second Edition; 2009.

### **4. Reference Book:**

R1: Andrew S Tanenbaum; Computer Networks; Pearson; Fourth Edition; 2006

R2: L. Peterson and B. Davie; Computer Networks: A Systems Approach; MK; Fourth Edition; 2007.

### **5. Course Plan / Schedule:**

<b>SI No.</b>	<b>Topics to be covered</b>	<b>Learning Objectives</b>	<b>Reference</b>	<b>No. of lectures</b>
1	Introduction: Uses of computer networks, Network hardware: network edge, network core, access networks	Usage of computer networks and its hardware structure	<b>T1(1)</b>	2

2	ISPs and Internet backbone, delay and loss in packet switched networks, network software: protocol hierarchies and their service models	Internet architectures, performance bottlenecks and software architecture	<b>T1(1)</b>	2
3	Reference Models (OSI, TCP/IP)	Example protocol stacks	<b>T1(1)</b>	1
4	Application layer: Hypertext Transfer Protocol, HTTP message format, cookies, conditional GET	World Wide Web and its application layer protocol	<b>T1(2)</b>	2
5	Simple Mail Transfer Protocol, Domain Name Systems (DNS)	Email application and domain name systems	<b>T1(2)</b>	2
6	Socket Programming with TCP and with UDP	Socket API for building applications	<b>T1(2)</b>	2
7	Transport layer fundamentals: reliable and unreliable principles	Transport layer: multiplexing, demultiplexing, UDP, principles of reliable data transfer	<b>T1(3), R1(6)</b>	2
8	TCP: segment structure, RTT estimation and timeout, TCP flow control	Flow control mechanism and round trip time estimation	<b>T1(3), R1(6), R2(5)</b>	2
9	Understanding the principles behind reliable packet delivery	TCP error control and congestion control	<b>T1(3), R2(6)</b>	2
10	Network layer: Virtual circuits and datagram networks. What is inside a router? Forwarding and addressing in the Internet	Learning various types of services at network layer	<b>T1(4), R1(5)</b>	2
11	Routing algorithms: shortest path, flooding, link state, distance vector and hierarchical routing	Learning different approaches to find paths within a subnet	<b>T1(4), R1(5)</b>	3
12	Routing in the Internet: RIP, OSPF, Border Gateway Protocol and multicasting	Example routing in real Internet	<b>T1(4), R1(5)</b>	3
13	Data link layer: services, error detection and correction techniques	Features of data link layer and its importance in a network stack	<b>T1(5), R1(3)</b>	2
14	Multiple Access Protocols: ALOHA, Slotted ALOHA, CSMA, Local Area Networks	Various protocols at MAC layer to control access to the broadcast medium	<b>T1(5), R1(4)</b>	3
15	Physical Media: Theoretical basis for data	Physical layer characteristics and link	<b>R1(2)</b>	1

	communication	types		
16	Delay models in data networks: Little's theorem, Kendall's notation, M/M/1 and M/G/1 queueing systems	Queueing-theoretic analysis of computer networks	<b>T2(3)</b>	11

### **5. Evaluation Scheme:**

<b>Component</b>	<b>Duration</b>	<b>Weightage</b>	<b>Marks</b>	<b>Date &amp; Time</b>	<b>Nature of Component</b>
Mid-semester Exam	90 mins	25%	75	03/11 11.00 - 12.30PM	Closed Book
Assignment+Seminar	TBA	40%	120	TBA	Open Book
Comprehensive Exam	120 mins	35%	105	24/12 AN	Closed Book
Total		100%	300		

**6. Chamber Consultation Hour:** In IC chamber (I-202). Schedule to be announced in class.

**7. Make-up Policy:** Make-up will be given only for genuine reasons upon receipt of appropriate proof. For foreseeable circumstances, prior application should be made for seeking the make-up examination.

**8. Notices:** All notices concerning the course will be put up on CMS.

**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.

**INSTRUCTOR IN-CHARGE  
CS F303**