GUJARAT TECHNOLOGICAL UNIVERSITY

Master in Computer Application (Integrated MCA)

Year III – (Semester-V) (W.E.F. June 2015)

Subject: Fundamentals of Networking (FON)

Subject Code: 4450603

1. **Learning Objectives:**

☐ To introduce the basics of Computer Networks
☐ To understand the functionality of each layer of OSI and TCP/IP models and interactions between them
☐ To gain basic insight of programming for network solutions

2. **Prerequisites:**
C Programming, Basic Knowledge of Linux OS, Java Programming (Core Java)

3. **Course Contents:**

Unit No.	Course Content	No Of Lectures
1	**Introduction to Computer Networks** Need to share resources, Concepts of Layering, Distributed System and Networks, Prerequisites, Definition, Categories and Components, Connections, Layers and Services, Applications of Computer Networks, Data Communication Fundamentals- Introduction, Frequency and Band, Analog and Digital Signals and Transmission, Coding Mechanism, Modulation, Multiplexing and De-multiplexing, TDM, FDM, Switching and Routing, Transmission and Errors	9
2	**Physical Layer** Introduction, Duties of Physical Layer, Infrared and Millimeter Waves, ISM Bands, Optical Lights and Free Space Optics, Wired Physical Layer, Wireless Physical Layer	8
3	**The Data Link Layer** Duties of Data Link Layer, The Error, The Protocols	5

4	**The Medium Access Sub layer** Introduction, Wired MAC Layer, The LLC Layer, Wireless MAC, The MAC Layer, The Generic Frame Structure, Connecting Device at Data Link Layer, Virtual LAN.	10
5	**The Network Layer** Introduction, Duties of Network Layer, Connection Oriented Forwarding using Virtual Circuits, Connection Less Forwarding using Datagram, Connection Oriented Vs Connectionless Forwarding, Forwarding Examples, Routing Algorithms, Congestion, Network Layer Switching	7
6	**The Transport Layer** Introduction, Duties of Transport Layer Connection Management at Transport Layer, Congestion Control, Comparison with Data Link Layer	5
7	**The Application Layer** Introduction, Domain Name System: Name Space, Registration Process, Name Servers, Resource Records, Types of Resource Records, Dynamic DNS, WWW and HTTP, Bluetooth	4

4. Text Book (Theory):

1. Bhushan H Trivedi ,"Computer Networks", Oxford University Press

5. Other Reference Book (Theory):

1. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, Fourth Edition
2. Andrew S. Tanenbaum, "Computer Networking", Prentice Hall, Fourth Edition

6. Chapter Wise Coverage from Text Book:

Unit No.	Topics/Subtopics	No of Lectures
1	1.1,1.2.1,1.2.2,1.2.3,1.2.4,1.2.5,1.2.6,1.2.7,1.2.8.1.2.10,1.3 2.1 to 2.4 3.1, 3.2, 3.3,3.4, 3.5, 3.6, 3.8,3.9,3.10,3.11, 3.12	9
2	4.1 to 4.7.10	8
3	5.1.1 to 5.1.2, 5.2.1 to 5.2.11, 5.3.1 to 5.3.10	05
4	6.1 to 6.6, 6.8, 6.11	10
5	7.1 to 7.7,7.11, 7.12	07
6	8.1 to 8.5	05
7	9.1, 9.2.1 to 9.2.5, 9.3.1 to 9.3.9, 9.12.1 to 9.12.8	04
	Total Number of Lectures	48

Students are not required to reproduce the entire algorithms/protocol code in the theory exam for any protocols and routing algorithms. Concepts based on these algorithms/protocols should be asked in theory exam.

7. Accomplishments of the student after completing the course :

Students will be able to describe functions of each layer, they should be able to judge which task is accomplished by which layer, the should be able to debug network related issues based on their ability to judge and associate problems with layers. They should be able to study and solve protocol related issues.

8. Suggestions for Lab Sessions :

Students should be given assignments based on error detection and correction, framing, network related protocols, application layer protocols, routing and forwarding related problems.