

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

COMPUTER NETWORKS LABORATORY								
VI Semester: CSE (DS)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACCD03	Core	L	Т	Р	С	CIA	SEE	Total
		0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		
Prerequisite: Operaring Systems								

I. COURSE OVERVIEW:

The main emphasis of this course is on the organization and management of local area networks (LANs) wide area networks (WANs). The course includes learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks. Topics include layered network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, and web and email protocols. The applications of this course are to design, implement and maintain a basic computer networks.

II. COURSE OBJECTIVES:

The students will try to learn:

- I. How computer network hardware and software can operate.
- II. Investigate and understand the fundamental concepts of computer networking.
- III. The data transmission through protocols across the network in wired and wireless using routing algorithms.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO1 Outline the basic concepts of data communications including the key aspects of networking and their interrelationship, packet, circuit and cell switching as internal and external operations, physical structures, types, models, and internetworking
- CO2 Make use of different types of of b i t errors and the concept of bit redundancy for error detection and error correction.
- CO3 Identify the suitable design parameters and algorithms for assuring quality of service and internetworking in various internet protocols
- CO4 Interpret transport protocols (TCP, UDP) for measuring the network performance.
- CO5 Illustrate the various protocols (FTP, SMTP, TELNET, EMAIL, and WWW) and standards (DNS) in data communications among network.
- CO6 Compare various networking models (OSI, TCP/IP) in terms of design parameters and communication modes.

IV. COURSE CONTENT:

WEEK 1: Bit Stuffing

1.1 Bit Stuffing in Computer Network

1.2 Bit Stuffing in python

WEEK 2: Character stuffing

2.1 Character stuffing in computer Network2.2 Character stuffing in Python2.3 Character destuffing in Python

WEEK 3: Data Count

3.1 Character Count3.2 Basic Character Count3.3 Case-Insensitive Character Count3.4 Word Character Count3.5 Character Frequency Percentage

WEEK 4: CRC polynomials

4.1 Cyclic Redundancy Check4.2 CRC at server side4.3 CRC at client side

WEEK 5: Shortest path

5.1 Shortest path in graph5.2 Shortest path by Dijkstra's algorithm5.3 Basic Floyd-Warshall Implementation5.4 Path Reconstruction

WEEK 6: Subnet of graph

6.1 Distance Vector Routing (DVR) Protocol6.2 Distance Vector Algorithm6.3 Subnet Calculator

WEEK 7: Broadcast Tree

7.1 Broadcast Tree in computer networks7.2 Basic Broadcast Tree Construction7.3 Broadcast Message Propagation7.4 Dynamic Broadcast Tree

WEEK 8: Encryption

8.1 DES Algorithm8.2 Key Generation8.3 Initial and Final Permutation8.4 F-function (Feistel Function)8.5 DES Encryption

WEEK 9: Decryption

9.1 DES Decryption algorithm9.2 DES Decryption Function9.3 File Decryption

WEEK 10: RSA Encryption and Decryption

10.1 RSA Algorithm 10.2 Key Generation 10.3 Encryption 10.4 Decryption

WEEK 11: Packets

11.1 packet loss11.2 Simple Packet Drop Simulation11.3 Packet Drop with Threshold11.4 Adaptive Packet Drop Simulation11.5 Network Packet Drop Simulator

WEEK 12: UDP AND TCP

12.1 Basic UDP Echo Server12.2 Basic UDP Echo Client12.3 Implementing a Simple File Transfer12.4 Implementing a Simple File Transfer12.5 Simple TCP Server12.6 Simple TCP Client

WEEK 13: VPN AND IP

13.1 Public IP13.2 Simulate Network Traffic

WEEK 14: Network Traffic Analysis

14.1 Network Basic Statistics14.2 Visualize Network Traffic

V. TEXT BOOKS

- 1. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 5th Edition, 2012
- 2. Andrew S. Tanenbaum, David.j.Wetherall, "Computer Networks", Prentice-Hall, 5th Edition, 2010.

VI. REFERENCE BOOKS:

- 1. Douglas E. Comer, "Internetworking with TCP/IP", Prentice-Hall, 5th Edition, 2011.
- 2. Peterson, Davie, Elsevier, "Computer Networks", 5th Edition, 2011
- 3. Comer, "Computer Networks and Internets with Internet Applications", 4th Edition, 2004.
- 4. Chwan-Hwa Wu, Irwin, "Introduction to Computer Networks and Cyber Security", CRC Publications, 2014.

VII. WEB REFERENCES

1. https://www.geeksforgeeks.org/computer-network-tutorials/

VIII. MATERIALS ONLINE

- 1. Course Content
- 2. Lab Manual