



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

### COMPUTER NETWORKS LABORATORY

<b>IV Semester: CSE(CS)</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACCD03	Core	0	0	2	1	40	60	100
		<b>Practical Classes: 45</b>			<b>Total Classes: 45</b>			
<b>Contact Classes: Nil      Tutorial Classes: Nil</b>								
<b>Prerequisite: There are no prerequisites to take this course.</b>								

#### 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. Practical simulation ideas of data link framing methods and protocol techniques.
- II. Program network communication services for client/server and other application layouts
- 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:**

- CO 1 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
- CO 2 Make use of different types of bit errors and the concept of bit redundancy for error detection and error correction.
- CO 3 Identify the suitable design parameters and algorithms for assuring quality of service and internetworking in various internet protocols
- CO 4 Interpret transport protocols (TCP, UDP) for measuring the network performance
- CO 5 Illustrate the various protocols (FTP, SMTP, TELNET, EMAIL, and WWW) and standards (DNS) in data communications among network.
- CO 6 Compare various networking models (OSI, TCP/IP) in terms of design parameters and communication modes.

#### IV. COURSE CONTENT:

##### Week – 1: DATA LINK LAYER - BIT STUFFING

Design and simulate the data link layer framing methods such as bit stuffing using the python

##### Week – 2: DATA LINK LAYER - CHARACTER STUFFING

Design and simulate the data link layer framing method such as character stuffing.

##### Week – 3: DATA LINK LAYER - CHARACTER COUNT

Implement data link layer framing method ‘character count’ using python.

#### **Week – 4: CYCLIC REDUNDANCY CHECK (CRC)**

Implement data set characters of the three CRC polynomials – CRC 12, CRC 16, and CCIP using python

#### **Week – 5: SHORTEST PATH ROUTING ALGORITHM**

A. Simulate the Dijkstra's Algorithm to compute the shortest path through a given path using python

B. Implement the python program to find the shortest path between vertices using bellman-ford algorithm using python.

#### **Week – 6: DISTANCE VECTOR ROUTING ALGORITHM**

Design and implement python program to take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.

#### **Week – 7: BROADCAST TREE**

Implement the python program to broadcast tree for a given subnet hosts.

#### **Week – 8: ENCRYPTING DES**

Implement the python program that to take a 64 bit playing text and encrypt the same using DES algorithm.

#### **Week – 9: DECRYPTING DES**

Implement the python script for implement to break the DES coding using python

#### **Week – 10: RSA ALGORITHM**

Implement RSA algorithm encrypts a text data and decrypt the same using python

#### **Week – 11: FTP PROTOCOL**

Design and simulate to find the number of packets dropped using python

#### **Week – 12: UDP PROTOCOL**

Simulate the UDP protocol using python.

Simulate the TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present using python

#### **Week – 13: VPN CONNECTION**

Write a Python script to automate the configuration of a VPN connection, including setting up the VPN client with a given server address, username, and password

#### **Week – 14: ANALYZE NETWORK TRAFFIC**

Develop a Python script using the `pyshark` library to capture and analyze network traffic, extracting information such as source and destination IPs, protocol, and payload size.

### **V. REFERENCE BOOKS:**

1. Behrouz Forouzan, “Introduction to Data Communications and Networking”, Tata McGraw Hill, 5<sup>th</sup> edition, 2015.
2. Stallings, “Data and Computer Communications”, PHI, 10<sup>th</sup> edition, 2015.
3. William Schewber, “Data Communication”, McGraw Hill, 1987.
4. Tanenbaum, “Computer Networks”, PHI, 5rd Edition, 2011.

### **VI. WEB REFERENCES**

1. <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>
2. [http://www.tcpipguide.com/free/t\\_OSISReferenceModelLayers.htm](http://www.tcpipguide.com/free/t_OSISReferenceModelLayers.htm)
3. <http://iit.qau.edu.pk/books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf>
4. <http://www.networkdictionary.com/protocols/osimodel.php>
5. [www.niecdelhi.ac.in](http://www.niecdelhi.ac.in)
6. <https://www.linkedin.com/in/achin-jain-85061412>