



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

COMPUTER NETWORKS								
IV Semester: CSE / CSE (AI & ML) / CSE (CS) / IT								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AITD04	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 48		Tutorial Classes: Nil		Practical Classes: Nil		Total Classes: 48		
Prerequisite: There is no prerequisite to take this course								

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 basic computer networks.

II. COURSES OBJECTIVES:

The students will try to learn

- I. The fundamental concepts of computer networking, different types of topologies, and protocols
- II. Error correction and detection examples and applications in data link layer and uses of other media access control.
- III. The data transmission through protocols across the network in wired and wireless using routing algorithms.

III. COURSE OUTCOMES:

At the end 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 bit 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 networks.
- CO6 Compare various networking models (OSI, TCP/IP) in terms of design parameters and communication modes.

IV. COURSE CONTENT:

MODULE –I: INTRODUCTION (09)

Introduction: Networks, network types, internet history, standards and administration; Network models: Protocol layering, TCP/IP protocol suite, the OSI model Transmission media: Introduction, guided media, unguided media; Switching: Introduction, circuit switched networks, packet switching.

MODULE –II: DATA LINK LAYER (10)

Introduction: Link layer addressing; Error detection and correction: Cyclic codes, checksum, forward error correction; Data link control: DLC services, data link layer protocols, media access control: Random

access, virtual LAN.

MODULE –III: NETWORK LAYER (10)

Network layer design issues, routing algorithms, congestion control algorithms, quality of service, and internetworking.

The network layer on the internet: IPv4 addresses, IPv6, internet control protocols, OSPF (Open Shortest Path First), IP(Internet Protocol).

MODULE –IV: TRANSPORT LAYER (10)

The transport service, elements of transport protocols, congestion control; The internet transport protocols: UDP (User Datagram Protocol), TCP (Transport Control Protocol), performance problems in computer networks, network performance measurement.

MODULE-V: THE LINK LAYER LAYER and LANs (09)

Introduction to the link layer, services provided by the Link layer, DOCSIS-The Link layer protocol for cable internet access, Link virtualization, Multiprotocol label switching (MPLS),Data Centre networking.

V. TEXT BOOKS:

1. Behrouz A. Forouzan, “Data Communications and Networking with TCPIP Protocol Suite”, Tata McGraw-Hill, 6th edition, 2022.
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. Kurose, James F,” Computer Networking”: a top-down approach,” : 7th edition. Hoboken, New Jersey: Pearson, 2017.

VII. ELECTRONICS RESOURCES:

1. <http://computer.howstuffworks.com/computer-networking-channel.htm>
2. <https://www.geeksforgeeks.org/layers-osi-model/>
3. https://www.wikilectures.eu/w/Computer_Network
4. <https://technet.microsoft.com/en-us/network/default.aspx>

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech-talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)