(17CS504) COMPUTER NETWORKS

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
40	60	100		3	1	-	3

Pre-Requisites: Data Communications

Course Objectives:
- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis

UNIT–I: Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT–II: Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing
Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

UNIT–III: The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-NA Protocol Using Selective Repeat

UNIT–IV: The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha- Carrier Sense Multiple Access Protocols-Collision-Free Protocols-Limited Contention Protocols.
Network Layer: Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Connection oriented vs Connection less services-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Distance Vector Routing, Link State Routing.

UNIT–V: Congestion Control Algorithms- Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding.
Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp**,** IPv4/IPv6.

UNIT–VI: Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers, Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, Application Layer protocols: DNS, SMTP, POP, FTP, HTTP.

Course Outcomes:

1	Conceptualize the data communication models using OSI/ISO and TCP/IP protocol architectures.	L2
2	Implement different switching techniques	L3
3	Analyze protocols implemented in data link layer for error and flow control	L4
4	Analyze the features of MACprotocols and routing mechanisms.	L4
5	Analyze the features and operations of protocols in transport layer.	L4
6	Analyze the features of application layer protocols	L4

Correlation of COs with POs & PSOs:

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	**1**	**2**	**3**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO-2	**1**	**2**	**3**	**2**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO-3	**1**	**3**	**3**	**3**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**2**
CO-4	**1**	**3**	**3**	**3**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO-5	**1**	**2**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**3**
CO-6	**1**	**2**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**

Text Books:

1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, Firouz Mosharraf, McGraw Hill Education

Reference Books:

1. Larry L. Peterson and Bruce S. Davie, "Computer Networks - A Systems Approach" (5th ed), Morgan Kaufmann/ Elsevier, 2011