PVP 23

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(AI&ML)

III B Tech – I Semester

Computer Networks

Course Code	23AM3502	**Year**	III	**Semester**	I
Course Category	PCC	**Branch**	CSE (AI&ML)	**Course Type**	Theory
Credits	3	**L – T – P**	3 – 0 - 0	**Prerequisites**	Data structures and Digital Logic & Computer Organization
Continuous Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		
CO1	**Describe** the foundational concepts of computer networks such as network types, topologies, reference models, and transmission media to develop a conceptual understanding for analyzing and designing basic network architectures.	L2
CO2	**Apply** data link layer and media access control (MAC) sublayer mechanisms, including their protocols, to **determine** suitable techniques for efficient and reliable data transmission.	L3
CO3	**Use** network layer concepts, including routing algorithms, IP addressing schemes, congestion control techniques, and protocol mechanisms, to **develop** efficient network communication strategies.	L3
CO4	**Analyze** the functionalities of transport and application layer protocols, including TCP, UDP, DNS, HTTP, and email systems, to **assess** their role in achieving secure, reliable, and efficient end-to-end communication.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations **(3: Substantial, 2: Moderate, 1: Slight)**

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2												
CO2	3												
CO3	3												
CO4		2									2		

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Syllabus		
Unit No.	**CONTENTS**	**Mapped CO**
I	**Introduction:** Network Types, LAN, MAN, WAN, Network Topologies Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, OSI Vs TCP/IP. **Physical Layer –**Introduction to Guided Media- Twisted-pair cable, Coaxial cable and Fiber optic cable and introduction about unguided media.	**CO1**
II	**Data link layer:** Design issues, Framing: fixed size framing, variable size framing, flow control, error control, error detection codes, CRC, services provided to Network Layer, Elementary Data Link Layer protocols: simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol:** One bit, Go back N, Selective repeat-Stop and wait protocol.	**CO1, CO2**
III	**Media Access Control: Random Access**: ALOHA, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, **Controlled Access:** Reservation, Polling, Token Passing, **Channelization:** frequency division multiple Access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA)	**CO1, CO2**
IV	**The Network Layer Design Issues** – Store and Forward Packet Switching- Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-shortest path, Flooding, Distance vector, Link state, Hierarchical, Congestion Control algorithms- General principles of congestion control, Congestion prevention polices, Fragmentation, network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format, IP addresses, Class full Addressing, CIDR, Subnets-IP Version 6-The main IPV6 header, Transition from IPV4 to IPV6, Comparison of IPV4 & IPV6.	**CO1, CO3**
V	**The Transport Layer:** Transport layer protocols: Introduction-services-port number-User data gram protocol-User datagram-UDP services-UDP applications-Transmission control protocol: TCP services- TCP features-Segment- A TCP connection- windows in TCP- flow control-Error control, Congestion control in TCP. **Application Layer** –- World Wide Web: HTTP, Electronic Mail-Architecture- web based mail- email security- TELENET-local versus remote Logging-Domain Name System.	**CO1, CO4**

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Learning Resources
Text Books
1. Computer Networks, Andrew S. Tanenbaum and David J. Wetherall, 5th Edition, 2011, Pearson Education. 2. Data Communications and Networking, Behrouz A. Forouzan, 5th Edition, 2013, Tata McGraw-Hill Education.
References
1. Data and Computer Communications, William Stallings, 10th Edition, 2013, Pearson Education. 2. TCP/IP Protocol Suite, Behrouz A. Forouzan, 4th Edition, 2009, McGraw-Hill Education. 3. Computer Networks - A Systems Approach, Larry L. Peterson, Bruce S. Davie, Fifth Edition, 2018, Morgan Kaufmann.
E-Recourses and other Digital Material
1. https://nptel.ac.in/courses/106/105/106105183/ 2. https://nptel.ac.in/courses/106/105/106105081/ 3. https://www.youtube.com/playlist?list=PLEAYkSg4uSQ2NMmzNNsEK5RVbhxqx0BZF 4. https://www.scalar.com/topics/course/free-computer-networks-course 5. https://www.udemy.com/topic/cisco-ccna/ 6. Material https://www.youtube.com/playlist?list=PLEAYkSg4uS02NMmzNNsEK5RYbhxqxOBZF