



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3144302
Semester – IV
Subject Name: Computer Networks

Type of course: Undergraduate

Prerequisite: Working experience of any one structured programming language

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Syllabus:

Sr. No.	Content	Total Hrs	% Weightage
1	Introduction to computer networks and Internet: Understanding of network and Internet, The network edge, The network core, Understanding of Delay, Loss and Throughput in the packet-switching network, protocols layers and their service model, History of the computer network	08	15
2	Application Layer: Principles of computer applications, Web and HTTP, E-mail, DNS, Socket programming with TCP and UDP	09	17
3	Transport Layer: Introduction and transport layer services, Multiplexing and Demultiplexing, Connectionless transport (UDP), Principles of reliable data transfer, Connection-oriented transport (TCP), Congestion control, TCP congestion control	12	25
4	Network Layer: Introduction to forwarding and routing, Network Service models, Virtual and Datagram networks, study of router, IP protocol and addressing in the Internet, Routing algorithms, Broadcast and Multicast routing	13	25
5	The Link layer and Local area networks: Introduction to link layer services, error-detection and correction techniques, Multiple access protocols, addressing, Ethernet, switches, VLAN	10	18

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
14	28	14	7	7	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)



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Course outcomes: Students will be able to

Sr. No.	CO statement	Marks % Weightage
1	Explain the basic terminologies used in networking and layered architecture of computer network.	15
2	Comprehend basic protocols of application layer and how they can be used to assist in network design and implementation.	17
3	Describe and implement the essential principles of a connectionless and connection-oriented protocols used for reliable data transfer, flow control and congestion control.	25
4	Design network architecture, assign IP addressing and apply various routing algorithms to find shortest paths for network-layer packet delivery.	25
5	Illustrate different link layer terminologies like error detection-correction, Multiple access protocol and Link layer addressing used in network.	18

Reference Books:

1. Computer Networking- A Top-Down approach (6th edition), Kurose and Ross, Pearson
2. Computer Networks- A Top-Down approach, Behrouz Forouzan, McGraw Hill
3. Computer Networks (5th edition), Andrew Tanenbaum, Prentice Hall
4. Computer Networking and the Internet (5th edition), Fred Halsall, Addison Wesley
5. Data Communications and Networking (5th edition), Behrouz Forouzan, McGraw Hill
6. TCP/IP Protocol Suite (4th edition), Behrouz Forouzan, McGraw Hill

List of Experiments:

1. Study of different network devices in detail.
2. Study of different types of network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
3. Study of basic network command and Network configuration commands
4. Implement different LAN topologies using Network Simulator.
5. Implement the concept of VLAN using Network Simulator.
6. Implement the concept of static routing.
7. Implement the concept of dynamic routing (RIP, OSPF, BGP).
8. Packet capture and header analysis by wire-shark (TCP,UDP,IP)

List of Open Source Software/learning website:

1. <http://swayam.gov.in/>
2. <https://www.netacad.com/courses/packet-tracer>