

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering Subject Code: 3150710 Semester – V Subject Name: Computer Networks

Type of course: Undergraduate

Prerequisite: Working experience of any one structured programming language

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks			Total	
T	T	ъ	C	Theory Marks		Practical Marks		Marks
L	1	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	Marks
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		
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