



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering Syllabus

Subject Code : 3144801

Subject Name : Fundamentals of Computer Networks

WEF Academic Year :	2022 - 23
Semester :	4
Category of the Course :	Professional Core

Prerequisite :	Basic understanding of computer science and knowledge of Internet.
Rationale :	This subject is designed to offer an understanding of the basic concepts related to computer networks, allowing students to grasp how communication between different devices occurs over a network.

Course Scheme :

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

Course Content :

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Computer Networks and the Internet : Data Communications, Networks, Protocols and Standards, What is the Internet?, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and Their Service Models.	10	18
2	Application Layer : Principles of Network Applications, The Web and HTTP, Electronic Mail, DNS, Peer-to-Peer Applications	10	17
3	Transport Layer : Introduction and Transport Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control	12	25
4	Network Layer : IPv4 and IPv6 Addressing, Forwarding and Routing, Network Service Models, The Internet Protocol (IP), Routing Algorithms, Routing in the Internet, Routing Among the ISPs.	12	25



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering Syllabus

Subject Code : 3144801

Subject Name : Fundamentals of Computer Networks

5	Link Layer : Introduction to the Link Layer, Error-Detection and Correction Techniques, Multiple Access Links and Protocols, Wired LANs - Ethernet	8	15
	Total	52	100

Reference Book :

1. Computer Networking- A Top-Down approach (7th edition), Kurose and Ross, Pearson
2. Data Communications and Networking (4th edition), Behrouz A. Forouzan, McGraw Hill
3. Computer Networks (5th edition), Andrew Tanenbaum, Prentice Hall
4. TCP/IP Protocol Suite (4th edition), Behrouz A. Forouzan, McGraw Hill

Course Outcome :

After Completion of the Course, Student will able to :

No.	Course Outcomes	RBT Level*
1	Explain basic concepts of computer networks and how the Internet works.	Understand
2	Discuss various application layer protocols along with their features and working principles.	Understand
3	Compare various transport layer protocols focusing on their functionalities and advantages.	Analyze
4	Select appropriate routing algorithms for computer networks based on factors like network size and topology.	Evaluate
5	Use error detection and correction techniques for ensuring the integrity of data transmission in computer networks.	Apply

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List :

1. To study types of computer networks, network topologies and transmission mediums.
2. To study TCP/IP protocol suite, networking devices and addressing mechanisms.
3. To test different networking commands.
4. To analyze HTTP and DNS traffic using Wireshark.
5. To analyze TCP and UDP traffic using Wireshark.



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering Syllabus

Subject Code : 3144801

Subject Name : Fundamentals of Computer Networks

6. To implement point-to-point topology to connect two computers using Cisco Packet Tracer.
7. To implement star topology with a hub and with a switch using Cisco Packet Tracer.
8. To implement a network with inter-VLAN routing using Cisco Packet Tracer.
9. To implement the concept of static routing using Cisco Packet Tracer.
10. To implement the concept of dynamic routing using RIP using Cisco Packet Tracer.
11. To implement the concept of dynamic routing using OSPF using Cisco Packet Tracer.
12. To implement the concept of dynamic routing using BGP using Cisco Packet Tracer.
13. To implement error detection techniques using any programming language.
14. To implement error correction techniques using any programming language.

List of Laboratory/Learning Resources Required :

1. Computers with Internet Facility
2. Cisco Packet Tracer
3. Wireshark
4. NPTEL MOOC Course - [Demystifying networking](#)
5. NPTEL MOOC Course - [Computer Networks and Internet Protocol](#)

* * * * *