



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc), 6th Semester
Branch: Software Development
Subject Name: Computer Network Security
Subject Code: 21160203

Type of course: Core

Prerequisite: Data Structure, Operating System

Rationale: To understand the basic concepts of computer network and firm foundation for understanding how data communication occurring using computer network. It is based around the OSI Reference Model which deals with the major issues and related protocol studies in the various layers (Physical, Data Link, Network, Transport, Session, Presentation and Application) of the model. This course provides the student with fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area. The subject covers various important topics concern to information security like symmetric and asymmetric cryptography and digital signature.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE(E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Content	Teaching Hrs.	Module % Weightage
1.	UNIT-I Network Concept, Benefits of Network, Network classification(PAN, LAN, MAN, WAN), Peer to Peer, Client Server architecture, Transmission media: Guided & Unguided, Network Topologies. Networking terms: DNS, URL, client server architecture, TCP/IP, FTP, HTTP, HTTPS, SMTP, Telnet OSI and TCP/IP Models: Layers and their basic functions and Protocols, Comparison of OSI and TCP/IP. Networking Devices: Hubs, Switches, Routers, Bridges, Repeaters, Gateways and Modems, ADSL.	8	20
2.	UNIT-II Ethernet Networking: Half and Full-Duplex Ethernet, Ethernet at the Data Link Layer, Ethernet at the Physical Layer. Switching Technologies: layer-2 switching, address learning in layer-2 switches, network loop problems in layer-2 switched networks, Spanning-Tree Protocol, LAN switch types and working with layer-2 switches, Wireless LAN.	8	20
3.	UNIT- III Internet layer Protocol: Internet Protocol, ICMP, ARP, RARP. IP Addressing: Different classes of IP addresses, Sub-netting for	8	20



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	an internet work, Classless Addressing. Comparative study of IPv4 & IPv6. Introduction to Router Configuration. Introduction to Virtual LAN.		
4.	UNIT- IV Transport Layer: Functions of transport layer, Difference between working of TCP and UDP. Application Layer: Domain Name System (DNS), Remote logging, Telnet, FTP, HTTP, HTTPS, Transport layer security, and SSH.	9	20
5	UNIT- V Introduction to Network Security, Symmetric Cipher Model, Cryptography, symmetric and asymmetric cryptography, Concept of Public Key and Private Key, Cryptanalysis and Attacks; Substitution and Transposition techniques, Stream ciphers and block ciphers, Public Key Cryptosystems with Applications, RSA Algorithm, Digital Signature.	9	20
	Total	42	100

Reference Books:

1. Computer Networks, Andrew Tanenbaum, Prentice Hall
2. Data Communications and Networking, Behrouz Forouzan, McGraw Hill
3. Cryptography And Network Security, Principles And Practice, William Stallings, Pearson
4. Cryptography and Network Security Atul Kahate, TMH

Suggested Specification Table with Marks (Theory): (For BVOC only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	0	0	0

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

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand basics of Networks and Networking Models	20
CO-2	Understanding of Ethernet Networking and Switching Technologies	20
CO-3	Understand Internet Layer Protocol.	20
CO-4	Understanding of Transport Layer and Transport Layer Security.	20
CO-5	Understanding of concept of Information Security and cryptography.	20

List of Open Source Software/learning website:

Students must refer to following sites to enhance their learning ability.

- Software: cryptool (www.cryptool.org)
- Software: Wireshark (www.wireshark.org)
- Netsim3
- NS2