GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering
Subject Code: 3725609
Semester – II
Subject Name: Network Security

Type of course:

Prerequisite: Security Fundamentals – cryptography, symmetric, asymmetric algorithm, confidentiality, Integrity, availability, Network protocols

Rationale: In the digital age, lot of data is transmitted over network including passwords, PIN, identity certificates. Network security ensures that the data is secure. Network security secures on line businesses from theft of data. A good network security helps server and workstations to stay safe from spuware and ransomware**.**

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	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Network architecture fundamentals Network segments, perimeter defense, network address translation, basic architecture issues, Address resolution protocol and Media access control, Dynamic host configuration protocol and addressing control, zero configuration networks, system design and architecture against insider threats, common attacks, Network device security, Network hardening	**7**	15
2	Firewalls Packet filtering firewall, stateful packet filtering, Firewall rules	**4**	10
3	Intrusion Detection/Prevention Intrusion Detection systems and mechanisms, Honeypots, responses to intrusion detection, Emerging technologies in Intrusion Detection Systems	**4**	10
4	Kerberos V4, Kerberos V5 Tickets and Ticket granting Tickets, configuration, logging into the network, Message formats	**5**	10
5	IPSec Overview, IP and IPv6, Authentication Header, Internet key exchange	**3**	10
6	Electronic mail security Internet mail architecture, Email formats, E-mail threats, S/MIME, pretty	**3**	10

	good privacy, DNS based authentication of named entities		
7	SSL/TLS Transport layer security, HTTPS, Secure Shell	**6**	10
8	Validating Security Penetration Test, Security assessment, Formal penetration testing methodology, steps to exploring a system	**4**	15

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**30**	**20**	**10**	**0**	**0**

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

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Network Security Bible by Eric Cole, WILEY publication
2. The complete reference Network Security By Roberta Bragg,Mark Phodes-Ousley,Keith Strassberg ,Tata McGraw Hill publication
3. Cryptography and network security By William Stalling, Pearson
4. Firewalls and Internet Security. By W. R. Cheswick and S. M. Bellovin. Addison Wesley, 1994.
5. Applied Cryptography By B. Schneier.. Wiley, 1999.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Identify security risks, attacks, threats involved in networking, network devices..	30
CO-2	Explain and compare various mechanism for securing network communication.	40
CO-3	Implement the security mechanism for securing network communication.	20
CO-4	Select the network architecture for secure communication.	10

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List of Experiments:

1. Implement network sniffing.
2. Implement man in the middle attack.
3. Implement port mirroring
4. Study the SNORT and write rules to protect against flooding, denial of service attack.
5. Write a program to identify spam E-mail.
6. Implement IP spoofing and protection mechanism against IP spoofing.
7. Implement Pretty Good Privacy
8. Encode the text "plaintext" using base64 technique. Assume characters are stored in 8 bit ASCII with zero parity
9. Configure and Write firewall rules for packet filtering firewall on the desktop.
10. Write a small web application and add https in the application.

Major Equipment:

Processor:i3 or i5 or higher
RAM : minimum 4 GB
HDD : 1 TB
Internet and wifi connectivity
Licence Window/Linux operating system

List of Open Source Software/learning website:

1) **www.wireshark.org**

2) **www.snort.org**