Uka Tarsadia University

B.Tech.

Semester V

NETWORK SECURITY

CY5009

EFFECTIVE FROM June-2023

Syllabus version: 1.00

Subject Code	Subject Title	Teaching Scheme			
		Hours		Credits	
		Theory	Practical	Theory	Practical
CY5009	Network Security	3	2	3	1

Subject Code	Subject Title	Theory Examination Marks		Practical Examination Marks	Total Marks
		Internal	External	CIE	
CY5009	Network Security	40	60	50	150

Objectives of the course:

- Students shall be able to design and develop secure solution to provide confidentiality and integrity, user authentication, secure web and email communication, secure wireless communication, secure IP communication, attack tolerance using Intrusion Detection System and firewall.

Course Outcomes:

Upon completion of the course, the student will be able to:

CO1: Design solutions to provide confidentiality and integrity.
CO2: Develop solutions to provide user authentication.
CO3: Design secure web and email communication.
CO4: Create secure wireless communication.
CO5: Develop solutions based on secure IP communication.
CO6: Design secure network using Intrusion Detection System and firewall.

Sr. No.	Topics	Hours
	Unit – I	
1	**Introduction to Network Security** Computer Security Concepts, The OSI Security Architecture, Security Attacks, Services, and Mechanisms, A Model for Network Security, Standards, Symmetric Encryption Principles, Public-Key Cryptography Principles, Introduction to Secure Hash Function and Digital Signature	6
	Unit – II	
2	**Key Distribution and User Authentication** Symmetric Key Distribution Using Symmetric Encryption, Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public-Key Infrastructure, Federated Identity Management	6

Unit – III		
3	**Transport-Level Security and Email Security** Web Security Considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH), Pretty Good Privacy, S/MIME, Domain Keys Identified Mail	6
Unit – IV		
4	**Wireless Network Security** IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security, Wireless Application Protocol Overview, Wireless Transport Layer Security, WAP End-to-End Security	6
Unit – V		
5	**IP Security** IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange, Cryptographic Suites	6
Unit – VI		
6	**Intruders and Firewalls** Intruders, Intrusion Detection, Password Management, The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations	6

Text book:

1. William Stallings, "Network Security Essentials: Applications and Standards", Pearson.

Reference books:

1. Bernard Menezes, "Network Security and Cryptography", Cengage Learning
2. William Stalling, "Cryptography and Network Security", Pearson
3. Behrouz A. Forouzan, Debdeep Mukhopadhyay, "Cryptography and Network Security", McGraw Hill (Indian Edition)
4. Straub, Detmar W., Goodman, Seymour, Baskerville, Richard L, "Information Security : Policy, Processes, and Practices", PHI
5. Atul Kahate, "Cryptography and Network Security", McGraw Hill

Course objectives and Course outcomes mapping:

- To design and develop secure solution to provide confidentiality and integrity, user authentication : CO1, CO2
- Secure web and email communication, secure wireless communication : CO3,CO4
- Secure IP communication, attack tolerance using Intrusion Detection System and firewall : CO5,CO6

Course units and Course outcome mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Network Security	✓					
2	Key Distribution and User Authentication	✓	✓	✓			
3	Transport-Level Security and Email Security	✓	✓	✓			
4	Wireless Network Security	✓	✓	✓	✓		
5	IP Security	✓	✓	✓	✓	✓	
6	Intruders and Firewalls		✓	✓	✓	✓	✓

Programme Outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme Outcomes and Course Outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓	✓	✓	✓		
PO2	✓	✓	✓	✓	✓	✓
PO3		✓	✓	✓	✓	✓
PO4				✓	✓	✓
PO5				✓	✓	✓
PO6						
PO7						
PO8						
PO9						
PO10						
PO11						
PO12						