Network Security and Cryptography

UNIT 1: Introduction

Introduction to Cryptography, Security Threats, Vulnerability, Active and Passive attacks, Security services and mechanism, Conventional Encryption Model, CIA model

UNIT 2: Math Background

Modular Arithmetic, Euclidean and Extended Euclidean algorithm, Prime numbers, Fermat and Euler's Theorem

UNIT 3: Cryptography

Dimensions of Cryptography, Classical Cryptographic Techniques Block Ciphers (DES, AES) : Feistal Cipher Structure, Simplifies DES, DES, Double and Triple DES, Block Cipher design Principles, AES, Modes of Operations Public-Key Cryptography : Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Elgamal Algorithm, Elliptic Curve Cryptography

UNIT 4 :Hash and MAC Algorithms

Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Digital Signatures, Key Management : Key Distribution Techniques, Kerberos

UNIT 5: Security in Networks

Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, Email Security – PGP, S/MIME