



CERTIFIED ENCRYPTION SPECIALIST COURSE

Prepared By (CTO) SYNTHOQUEST

45 Days Duration

Duration: 45 days × 2 hrs/day = 90 hrs

Goal: Equip professionals with the knowledge and skills to implement, manage, and audit strong encryption and cryptography solutions for data security.

Core Domains

1. Foundations of Cryptography (20%)

- History of cryptography and modern encryption concepts
- Symmetric vs asymmetric encryption
- Block ciphers, stream ciphers, hash functions
- Key concepts: key size, key management, initialization vectors (IVs)

2. Symmetric Encryption (20%)

- AES, DES, 3DES, Blowfish, Twofish
- Modes of operation: CBC, ECB, CFB, OFB, GCM
- Practical encryption & decryption exercises
- Performance vs security trade-offs

3. Asymmetric Encryption (20%)

- RSA, ECC, Diffie-Hellman key exchange
- Digital signatures & certificate usage
- Public Key Infrastructure (PKI) concepts
- Real-world encryption/decryption and signing labs

4. Cryptographic Hashes & Message Authentication (15%)

- SHA family (SHA-1, SHA-2, SHA-3), MD5, HMAC
- Integrity checking and digital fingerprinting
- Password storage and salting techniques

5. Advanced Encryption Applications & Management (15%)

- TLS/SSL, HTTPS, VPN encryption
- Disk, file, and email encryption (PGP, S/MIME, BitLocker)
- Cloud and database encryption strategies
- Key lifecycle management: generation, rotation, storage, revocation

6. Cryptanalysis & Attacks (10%)

- Brute force, dictionary, rainbow table attacks
- Side-channel attacks, timing attacks
- Weak key usage and mitigation strategies

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