جامعة خليفة
Khalifa University

COSC 795 PhD Written Qualifying Examination

PhD Qualifying Exam Topic	Department
Computer and Network Security	**Computer Science**

The exam is closed book and closed notes. Basic scientific calculator is allowed.

Relevant Undergraduate Course(s):

- COSC 340 Introduction to Computer Security
- CCEN 446 Network Security

Topics:

#	Topic	Reading Material [Primary Textbook, Chapter]
1	Introduction to computer security: overview and definitions that include vulnerabilities, threats, attacks, assets, integrity, confidentiality, and availability.	[1, Ch.1] [2, Ch.1]
2	Fundamentals of cryptography: Substitution ciphers, hash function, symmetric encryption and public key encryption.	[1, Ch.2, Ch.20, Ch.21] [2, Ch.2-Ch.13]
3	Program Security: program vulnerability detection and exploit, this includes buffer overflow, format string, stack overflow.	[1, Ch.10, Ch.11]
4	Web vulnerabilities: vulnerabilities related to web such as SQL injection, cross site scripting.	[1, Ch.5]
5	Identification and Authentication: Username and passwords, spoofing attack, password cracking including rainbow table.	[1, Ch.3] [2, Ch.16]
6	Malware: Viruses, worms, backdoors, rootkit, Trojan horse, signature-based versus anomaly-based detection.	[1, Ch.6]
7	Network Security Protocols: IPSec, TLS, SSL, HTTPS.	[1, Ch.22] [2, Ch.17]
8	Network Firewalls: concepts, VPN, DMZ, stateless and stateful firewalls.	[1, Ch.9]
9	Network Intrusion Detection and Prevention Systems, Snort, and Honeynets.	[1, Ch.8]
10	Modern Network Threats and Security: DDoS attacks, Botnets, Cloud Security, SCADA security	[1, Ch 7, Ch. 13] [2, Ch.22]

*Note: Ch.2-Ch.13, dash means all chapters from Ch.2 to Ch.13 (inclusive)

Primary Textbook(s):

[1] Computer Security: Principles and Practice, Global Edition, by William Stallings and Lawrie Brown, 5th Edition, 2024, ISBN: 978-1292473291.

[2] Cryptography and Network Security, by Stallings William, 8th Edition, 2025, ISBN: 9789357059718