COURSE DETAILS

Course Code: F21CN
Full Course Title: Computer Network Security
SCQF Level: 11
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL

Undergraduate: Yes  Postgraduate Taught: Yes  Postgraduate Research: No

Course Aims:

- Impart critical understanding of key concepts, issues, theories and principles of computer network security.
- Develop detailed theoretical and practical knowledge of foundational issues in computer network security.
- Provide detailed understanding and practical experience with key services and tools used for computer network security purposes.
- Give practical experience of analysing requirements, designing, implementing and testing security solutions for computer network applications.

LEARNING OUTCOMES – SUBJECT MASTERY

- Detailed and critical understanding of the concepts, issues, principles and theories of computer network security.
- Critical theoretical and detailed practical knowledge of a range of computer network security technologies as well as network security tools and services.
- Practical experience of analysing, designing, implementing and validating solutions to computer network security challenges using common network security tools and formal methods.

LEARNING OUTCOMES – PERSONAL ABILITIES

- Ability to deal with complex issues and make informed judgements about network security in the absence of complete or consistent data.
- Exercise substantial autonomy and initiative in addressing computer network security challenges.
- Showing initiative and team working skills in shared computer network security application development. (PDP)
- Demonstrate critical reflection on network security issues. (PDP)

SYLLABUS

- Basics of cryptography: principles & algorithms - concepts (classification, symmetric vs asymmetric encryption etc); public-key encryption: challenges and algorithms. Key Management - key establishment protocols, key management infrastructures. Proof-carrying-code - concepts (role of trust, authentication-based/free certification, logical foundations; case study: PCC for resources. Operating system security - concepts (vulnerabilities in: multi-user, distributed etc OSs), security-enhanced Linux.
- X.800 network security model - attacks, mechanisms, services. Network service fundamentals - sockets, services, threads, base64 encoding. Digests – MD5, symmetric ciphers, JCE. Digital signatures, public key certificates. X.509 certificates, certificate authorities and hierarchical trust models. Signed applets. Secure key
exchange – Diffie Hellman, SSL/TLS, SSH, PGP public keys, OpenPGP, web of trust, Java APIs for PGP, RMI, JNDI, EJB, RMI over SSL, remote class loading, RMI security manager, HTTP authentication, secure web access

Prerequisites: Fundamental knowledge of computer networking, formal methods and Java programming

LOCATION AND ASSESSMENT METHODS

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