17CS3103 - CRYPTOGRAPHY AND NETWORK SECURITY

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| **Course Category:** | Program Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Knowledge in Computer security basics and counter attack mechanisms from Internet Threats. | **Sessional Evaluation:****Univ.Exam Evaluation:****Total Marks:** | 4060100 |
| **Objectives** | * Understand OSI security architecture and classical encryption techniques.
* Acquire fundamental knowledge on the concepts of finite fields and number theory.
* Understand various block cipher and stream cipher models.
* Describe the principles of public key cryptosystems, hash functions and digital signature.
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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: |
| CO1 | Understand the basics of Computer Security and conventional encryption issues. |
| CO2 | Analyze the models for internet security and learning different types of modern algorithms and its classification. |
| CO3 | Study different methods of public key cryptosystems and its real-time implementation |
| CO4 | Learn different message authentication codes and basics of hash functions |
| CO5 | Study authentication protocols and classification of digital signature standards |
| CO6 | Deal with Internet related security and system security mechanisms. |
| **Course Content** | UNIT – I**Introduction**: Overview of Computer Security, Security Attacks, Security Mechanisms and Security Services. Model for Network Security, Network Access Security Model.**Conventional Encryption:** Symmetric Cipher Model**,** Classical Encryption Techniques and Steganography.UNIT – II**Modern Techniques:** Block Cipher Principles, S-DES, DES, Strength of DES, AES, Block Cipher Modes of Operation.**Number Theory:** Prime numbers, Modular arithmetic, Fermat’s and Euler’s theorems, Testing for Primality, Euclidean Algorithm, Chinese Remainder Theorem, and Discrete Logarithms.UNIT – III**Public Key Cryptography:** Principles of Pseudorandom Number Generation, Key Distribution & Management, RSA Algorithm, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.UNIT – IV**Hash Functions:** Introduction and concepts, Applications**,** Security of Hash functions, Secure Hash Algorithms.**Message Authentication Codes:** Message Authentication Requirements and functions, Security of MACs, MAC based on Hash Functions and Block Ciphers, Message Digest Algorithm.UNIT – VDigital Signatures: Digital signature concept & Applications, Digital signature standards.User Authentication: Remote User Authentication, Kerberos, X.509 directory service.**UNIT – VI****Web Security**: Web Security requirements, Secure socket layer and Transport layer Security, HTTPS, SSH, Secure Electronic Transaction. **IP Security:** Overview, Encapsulating Security Payload, Internet Key Exchange.**System Security:** Intruders, Viruses and Related threats. Fire wall Design Principles, Trusted systems. |
| **Text Books and References:** | **Text Books:**1. Cryptography and Network Security: Principles and Practice-William Stallings, Pearson Education.
2. Network Security Essentials (Applications and Standards) by William Stallings, Pearson Education.

**Reference Books:**1. Fundamentals of Network Security, by Eric maiwald
2. Principles of Information Security by Whitman, Thomson.
3. Network Security - The Complete Reference by Robert Bragg.
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| **E-Resources** | 1. WilliamStallings.com/Crypto/Crypto5e.html
2. www.Tutorialspoint.com
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