Introduction to Information Security - Theory and Practice

Workshop Description: This workshop will give an overview of the basic concepts of information security, various types of attacks and protections, and recovery actions. Cybersecurity concepts and case studies, Lab exercises to provide exposure to various cybersecurity monitoring tools. Programming overview of Python for cybersecurity.

Prerequisite(s): Intermediate Programming

Textbook(s): Prepared Notes and Handouts


Student Outcomes: The student will be able to:
1. Understand and discuss the fundamental concepts related to information security.
2. Apply information security principles and practices in real-world situations
3. Be able to use security tools.

Course Topics:
1. Introduction to Security
   - CIA Triad, Defense-in-Depth
2. Access Control - Authentication, Authorization and Audits
   - Principle of least privilege, authentication methods, Multi-factor authentication methods
3. Vulnerabilities and Threats
   - Fault tree analysis, Hardware and Software vulnerabilities, Resource Protection Models
4. Network Security
5. Web Attacks, Web Security Model and Securing Web Applications
   - URLs, HTTP requests, and HTTP digest authentication, HTTP cookies, Cross-site scripting, SQL injection attack and various methods of remediation, Open web application security project (OWASP)
6. Basics of Cryptography
   - Cryptographic techniques for Encryption, Authentication, Digital Signatures, use of Symmetric/Asymmetric ciphers, Key Exchange mechanisms
7. Targeting the human element
   - Phishing, Social Engineering Attacks
8. Privacy and Information Security
9. Legal and Ethical implications of Information Security
10. Python programming for cybersecurity
11. Cybersecurity Tools

Schedule: Lecture: 8 hours per week for 3 weeks
Lab: 6 hours per week for 3 weeks

Evaluation: Discussion and Participation, Assignments, Quizzes, Exams, Hands-on Labs in Cybersecurity
Students are expected to complete a final project that involves the use of cybersecurity tools and techniques to solve a real world problem.

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