

CSC 371 Data and Software Security

(3 contact hours – 0 lab hour - 3 credits)

Syllabus

General Information

<i>Instructor</i>	
<i>Office</i>	
<i>Phone / Email</i>	
<i>Class Time / Location</i>	
<i>Office Hours</i>	
<i>Teaching Assistant / email</i>	

Course Description

Foundations of software security, focusing on both offensive and defensive perspectives. Topics include software vulnerabilities (e.g., buffer overflows, SQL injection, session hijacking), secure coding principles, input validation, encryption, security frameworks, and advanced testing techniques.

Course Prerequisites

- CSC 313

Course Category

Elective

Course Outcomes

At the completion of this course, students will be able to:

- Identify and analyze software vulnerabilities. [SO # 1]
- Perform security testing and analysis. [SO # 1 and SO # 2]
- Design and develop secure software systems applying the best coding practices. [SO # 2, SO # 6],
- Evaluate security risks and mitigation strategies. [SO # 2, SO # 4]
- Understand legal, ethical, and compliance requirements. [SO # 4]

Required Textbook

- Loren Kohnfelder. Designing Secure Software: A Guide for Developers. ISBN: 9781718501928. No Starch Press. November 2021

Supplementary Textbook

- Erik Fretheim; Marie Deschene. Secure Software Systems, 1st edition 2024. Jones and Bertlett Learning. ISBN:9781284261158
- AWS Cloud Security Foundation Course on AWS Academy

Tentative Schedule

WEEK	TOPIC	MATERIAL (CHAPTERS AND/OR OTHER MATERIAL)
1	Syllabus + Introduction to Software Security	Required: Chapter 1: Foundations Supplementary: Chapter 1: Secure Software Systems Development
2, 3	Software Vulnerabilities and Exploits	Required: Chapter 2: Threats Required: Chapter 10: Untrusted Input
4, 5	Secure Programming	Required: Chapter 8: Secure Programming Required: Chapter 9: Low-Level Coding Flaws
6, 7, 8	Cryptography, Authentication and Authorisation	Required: Chapter 5: Cryptography
9, 10	Security Testing and Program Analysis	Required: Chapter 12: Security Testing Supplementary: Chapter 15: Testing
11, 12	Web and Cloud Application Security	Required: Chapter 11: Web Security Supplementary: AWS Cloud Security Foundation Course on AWS Academy
13, 14	Risk Assessment, Mitigation, and Compliance Frameworks	Required: Chapter 2: Threats Required: Chapter 3: Mitigation Supplementary: Chapter 12: Vulnerability and Threat Assessment
15	Secure Software Development Practices	Required: Chapter 13: Secure Development Best Practices Supplementary: Chapter 5: Managing the Secure Software Systems Development Life Cycle

Grading Scheme

GRADE CATEGORY	WEIGHT
In-class participation	10%
Assignments	30%
Quizzes	10%
Midterm Exam	20%
Final Exam	30%

Academic Honesty

All work presented and submitted in this class must be your own. Submitting work that is not yours is considered cheating and will be subject to the policies of academic honesty at GUST. This includes using text copied from the Internet or other sources, using work generated by AI tools such as ChatGPT, Google's Bard, Bing AI, etc., using materials prepared by a paid agency or individual, using unauthorized help from anyone other than GUST academic staff and approved tutors, or even re-using your own work from other classes and assignments. Remember, anything more than five consecutive words written by someone else can be considered plagiarism and must put in "quotes", cited in-text, and include an accompanying reference at the end of the paper, as per the course standards. Violating the policy of academic integrity will result in severe consequences, including failing grades, loss of university privileges, and even permanent dismissal.

Commit to Integrity

Academic Dishonesty Policy

1. Academic dishonesty includes such things as cheating, inventing false information or citations, plagiarism and helping someone else commit an act of academic dishonesty. It usually involves an attempt by a student to show possession of a level of knowledge or skill that he/she does not possess.
2. Cheating/plagiarism is absolutely forbidden. Any such misconduct may result in obtaining a zero on the assignment, failure in the course, and/or appropriate referral for disciplinary action.

Inclusion (OSC Accommodation)

I wish to fully include persons with disabilities in this course. Please let me know if you need any special accommodations in the curriculum, instruction, or assessments of this course to enable you to fully participate. I will maintain confidentiality of the information you share with me. If you have a disability that impacts your classroom performance and wish to request an accommodation, contact the One-Stop Student Services Center (OSC) at N3-101. The OSC requires up-to-date documentation regarding your disability to enable them to comply with your request. Admission of OSC is voluntary and will be handled in a confidential manner. GUST does not discriminate against people with disabilities.