ECE 1155: Information Security

Spring 2025 Course Syllabus

Lectures: Wednesdays 1:50pm–4:25pm at S506

Instructor: Guanqiang "Tim" Zhou <guanqiang.zhou@scupi.cn>

Office Hours: Thursdays 8:00am–11:00am at N512 (or by appointment)

Teaching Assistant: Dengwen Wang <wdw_nevergiveup@163.com>

Textbook: *Security in Computing*, Sixth Edition, by Charles P. Pfleeger

Course Description

This course provides an introduction to the fundamental principles of information security. Topics covered include cryptography, network security, software security, and the ethical and legal aspects of cybersecurity. The course emphasizes understanding key security concepts, potential threats, and mitigation techniques in both theoretical and practical applications. Students will gain hands-on experience with security tools and methodologies commonly used in the field.

Course Objectives

By the end of this course, students will:

- Understand the foundational principles of information security, including confidentiality, integrity, and availability.
- Explore various security threats, vulnerabilities, and attack techniques.
- Learn cryptographic methods and their applications in securing data.
- Study network security principles and mechanisms.
- Understand system and application security concepts, including authentication and access control.
- Examine ethical, legal, and privacy issues in cybersecurity.
- Gain hands-on experience with security tools and techniques.

Tentative Schedule

Week	Lecture Topics	Readings
Week 1 (2/26)	Introduction, basic concepts, CIA triad	Chapter 1
Week 2 (3/5)	Cryptography – Classical methods	Chapters 2, 12
Week 3 (3/12)	Cryptography – Symmetric encryption	Chapters 2, 12
Week 4 (3/19)	Cryptography – Review of modular arithmetic	Chapters 2, 12
Week 5 (3/26)	Cryptography – Public key encryption	Chapters 2, 12
Week 6 (4/2)	Cryptography – Hash functions, HMAC	Chapters 2, 12
Week 7 (4/9)	Cryptography – Digital signatures	Chapters 2, 12
Week 8 (4/16)	Midterm exam	N/A
Week 9 (4/23)	Review on computer networks	Chapter 6
Week 10 (4/30)	Network security – TCP/TLS	Chapter 6
Week 11 (5/7)	Network security – Firewall, intrusion detection	Chapter 6
Week 12 (5/14)	Software security – Buffer overflow	Chapter 3
Week 13 (5/21)	Software security – Attack and countermeasures	Chapter 3
Week 14 (5/28)	Legal, ethical, and privacy issues	Chapters 9, 11
Week 15 (6/4)	Emerging topics (AI)	Chapter 13
Week 16 (6/11)	Final project presentations	N/A
Week 17 (6/18)	Final exam	N/A

Course Grading

- Attendance and Class Participation: 10%
- Homework: 15%
- Course Project: 15%
- Midterm Exam: 30%
- Final Exam: 30%

Applicable ABET Outcomes

- Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- Ability to communicate effectively with a range of audiences.
- Ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
- Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.