Computer & Multimedia Network Security (CPE-592WS)

Schaefer School of Engg & Science
Dept of Electrical and Computer Engg
Fall 2025

Instructor: Vidya Sagar

Course Web Address: https://sit.instructure.com/courses/49821

Office Hours: Thursday (10am to 1pm) over Chat (Links to an external site.)

Course Schedule: Course material will be updated weekly

Contact Info: vsagar@stevens.edu

Virtual Office Hours: Thursday 10am -12pm (over Canvas chat)

Prerequisite(s): Probability, Signal Processing and Statistics

COURSE DESCRIPTION

This is an introductory course on security issues in multimedia content (digital image, video), wireless and wired network security. Topics such as digital watermarking, digital steganography, basic cryptography, wireless security protocols, etc. will be discussed.

STUDENT LEARNING OUTCOMES

- Students will understand security issues and threats against computer and multimedia networks
- Students will learn to design digital watermarking algorithms for multimedia data
- Students will implement digital watermarking algorithms
- Students will understand the basic concepts of encryption and decryption
- Students will learn to implement at least one encryption and decryption algorithm
- Students will understand the issues related to wireless security protocols
- Students will be able to present security issues related to emerging wireless technologies

COURSE FORMAT AND STRUCTURE

This course is organized in three broader yet interrelated sections 1) Watermarking and Steganography 2) Computer and Network Security 3) Wireless Network Security. We will have one week for literature review and discussion upon completion of each of these section.

There will be one Midterm examination and one final Project.

Assignments will have some coding tasks. Please feel free to code in any common programming language (C/C++/JAVA/Matlab/JavaScript). This is not a computer language course, therefore coding assignments will be graded mainly of algorithm and methodologies.

Please reach out for any question and query you may have. I am available over email (vsagar@stevens.edu) and Canvas.

TENTATIVE COURSE SCHEDULE

Topics Covered Each Week:

- Introduction to digital watermarking and steganography
- Digital watermarking algorithms, analyses, and implementation
- Attacks against digital watermarking techniques
- State-of-the-art applications of digital watermarking
- Introduction to cryptography
- Cryptography algorithms and analyses
- Implementation of cryptography algorithms
- Application of cryptography in the real-world
- Mid-term exam
- Wireless networking and protocols

- Security issues in wireless networks
- Security vulnerabilities in wireless networks
- Emerging wireless networking standards and related security issues
- Review of the course material
- Final project

COURSE MATERIALS

This course require no textbook. Lecture slides and various literature will be provided weekly.

COURSE REQUIREMENTS

There will be 5 homework assignments,1 mid-term and final project. Please submit them timely fashion. I am will accept email based submission only on case to case basis. Most of assignments will be open-ended. Coding assignments will be optional. Breakdown of various assignments and final project will be as follows

- Homework #1 : 10
- Homework #2 : 10
- Homework #3: 10
- Mid-term Exam # : 50
- Homework #4 : 10
- Homework #5 : 10
- Final Project : 50

GRADING PROCEDURES

- A 100 % to 94.0%
- A- 94.0 % to 90.0%
- B+ 90.0 % to 87.0%
- B 87.0 % to 84.0%
- B- 84.0 % to 80.0%
- C+ 80.0 % to 77.0%
- C 77.0 % to 74.0%
- C- 74.0 % to 60.0%
- F 60.0 % to 0.0%