

CS 535 - Wireless Network Security

Fall 2020

This is a 3-credit course that focuses on security and privacy issues in wireless networks and systems. Generally the security of MAC and especially upper layers are considered in this class. This course is not intended to cover cryptography in detail, but an overview of cryptography will be given at the beginning of the course so that the students who do not know cryptography would have sufficient information to understand the rest of the course.

Although the catalogue information for this course (see below) several sub areas of wireless network security, in this course we will focus in some of them in lectures and some of them will be covered as student presentations.

Catalogue Data: This course covers security and privacy issues in wireless networks and systems, such as cellular networks, wireless LANs, wireless PANs, mobile ad hoc networks, vehicular networks, satellite networks, wireless mesh networks, sensor networks and RFID systems. Security problems of MAC and especially upper layers will be emphasized. Attacks and proposed solutions at several layers, authentication, key distribution and key management, secure routing, selfish and malicious behaviors, and secure group communication are analyzed for applicable wireless network types. A short overview of cryptography and wireless networking principles will be given at the beginning of the course.

Prerequisite: Formally there is no prerequisite for this course, but students are expected to come with undergrad level computer networks background. Moreover, computer-programming expertise is necessary.

Instructor: Albert Levi
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Schedule: W 14:40 – 17:30, <https://sabanciuniv.zoom.us/j/98285341738?pwd=cmRSSXITM0ZLREhhTmY5dUZWWkJKWQT09>

Text: No formal textbook

References: Guide to Wireless Network Security, by Vacca
Network Security: Current Status and Future Directions, by Douligeris and Serpanos
Security for Wireless Sensor Networks, by Liu and Ning
Security and Cooperation in Wireless Networks, by Buttyan and Hubaux
Lots of papers and other web and hardcopy resources

Handouts will be made available electronically or in hardcopy.

Very Tentative Outline

- Introduction (1 week)
- Overview of Cryptography and Wireless Networks (2 weeks)
- Security in Wireless LANs (1-2 weeks)
- Security in Cellular Networks (1-2 weeks)
- Bluetooth Security (1 week) (might be skipped)
- Ad hoc and sensor network security (4 weeks)
- Student presentations in other related areas that instructor did not cover (security and privacy in RFID systems, vehicular networks, wireless mesh networks, satellite networks, etc.) (2-3 weeks)

Student responsibilities and grading (tentative)

Since this is a graduate course, students are expected to perform research and development.

- Student Presentations:** Students are expected to make research on a specific area that the instructor did not cover and make an extensive lecture-quality presentation on it. Depending on the subject, several students may form a group and may make a longer presentation. Our

expectation is to have 25 min. presentation per student. The presentations should be prepared from scratch and should be based on some books, papers or other respectable resources. Students are expected to pick the topic in the 7th week (Nov. 18) of the term and should prepare the list of resources to be used in the presentation and an overview of presentation by the 8th week (Nov. 25).

- **Research and Development projects:** These projects require a detailed investigation on a particular research problem. Depending on the nature of the problem, project output may be a survey paper, a report on some simulation results, or (if you are vigorous and eager enough) a conference paper with a novel contribution. Group projects of at most two people are welcome. Students are expected to submit their proposals by the 8th week (Nov. 25) and periodically report their progress.

Make-up Policy: No make-up! If you miss something, you miss it whatever the reason is!

Very Tentative Grading

Midterm Exam (online, proctored, closed everything)	20 - 30%
Long, open booki proctored online final exam	30 - 40%
Presentation	5 - 10%
1-2 homework	} 30- 45% (total)
Research and Development project	

We will mostly use SUCourse+ for the distribution of the lecture notes, assignments, etc.

PLAGIARISM WILL NOT BE TOLERATED