EE 584 Wireless System Security
Syllabus

Catalog Description:

EE 584 Wireless System Security (3-0-3)
This course addresses system security issues in wireless systems, including satellite, terrestrial microwave, military tactical communications, public safety, cellular and wireless LAN networks. Security topics include confidentiality/privacy, integrity, availability, and control of fraudulent usage of networks. Issues addressed include jamming, interception and means to avoid them. Case studies and student projects are an important component of the course.

Text Book:

"Wireless Security – Models, Threats, and Solutions," by Nichols and Lekkas, McGraw-Hill, 2002, ISBN 0071380388.

Instructor:

Bruce McNair, Distinguished Service Professor of ECE.

Goals:

The goal of Wireless System Security is to familiarize students with the issues and technologies involved in designing a wireless system that is robust against attack. Students will gain an understanding of the various ways in which wireless networks can be attacked and tradeoffs in protecting networks. Students will gain an appreciation of the need to develop an understanding of underlying system applications and potential security issues early in the design process.

Prerequesites by Topic:

- Probability and random variables
- Calculus
- System Theory
- Switching Theory and Logical Design

Grading Policy:

Individual activities:

Three research papers	15% each
Participation in security assessments	20%
Final project report:	25%
Final project presentation:	10%

All assignments provide opportunities for extra credit work. Work that goes significantly beyond what is asked will be graded accordingly.

Course structure

The on-campus section of the course will meet weekly with lectures during the first half of the course and security case studies with significant student involvement during the second half of the course. Final projects will be presentationed during the last two weeks. The on-line section

of the course will be similarly structured in terms of content, but there will be no "real-time" synchronous meetings. That is, no aspect of the on-line course interactions need to be completed at any specific times or days.

Course Components:

- Engineering - 100%

Course Web Site:

http://koala.stevens-tech.edu/~bmcnair/WSS-xxx where xxx is the current semester (e.g., S04)

Schedule of Topics

This is the list of detailed topics and likely order. The specific schedule is TBD.

    Common topics overview
        Wireless
            Characteristics
            Channels
            Propagation
            Types of wireless systems and their parameters
                Satellite
                Terrestrial microwave
                Military tactical
                Cellular
                    AMPS
                    2G – IS-136, GSM, IS-95
                WLAN
                    802.11
        Security
            Definition
            Services
            Mechanisms
                Spread spectrum
                Frequency hopping
                Encryption
                Integrity check-sums
            Assessment
            Issues, specifically related to wireless
                Jamming
                DFing, geolocation
                Interception
                Spoofing
                Fraud
                Theft of service
                Traffic analysis

    Specific examples (case studies) – for each of these, the subject matter is covered as: context, problem, solutions, tradeoffs
        Satellite
            Jamming
            Theft of service – entertainment services on downlink
            Hidden signals – theft of service – uplink
            Monitoring long distance communications

Last revised: October 6, 2010