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# CSE 694K: Network Security

### Description

An introduction to network security; security threats, services, protocols, veri and design, architectures, technologies, testing, advances; elements of crypto securing network systems and applications.

### Level, Credits, Class Time Distribution, Prerequisites

Level	Credits	Class Time Distribution	Prerequisites
UG	3		CIS 677 or permission of instructor

#### Quarters Offered

■ Sp

General Information, Exclusions, Cross-listings, etc.

## **Intended Learning Outcomes**

- Master some protocols for security services.
- Be familiar with fundamentals of cryptography.
- Be familiar with network security threats and countermeasures.
- Be familiar with network security designs using available secure solution PGP, SSL, IPSec, and firewalls).
- Be familiar with advanced security issues and technologies (such as DDo detection and containment, anonymous communications, and security 
   testing, verification and design).
- Be exposed to original research in network security.

#### Texts and Other Course Materials

- Cryptography and Network Security: Principles and Practice, Third Edit Prentice Hall, 2002. ISBN: 0-13-091429-0 (text book) - William Stallings
- Applied Cryptography, (2nd Edition), Wiley 1996 ISBN 0-471-11709-9 E Schneier.
- Security + Guide to Network Security Fundamentals, Thomson, ISBN 0-6
  7 Paul Campbell, Ben Calvert, Steven Boswell,
- Network Security Private Communication in a Public World, Prentice I

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ISBN 0-13-061466-1 - Charlie Kaufman, Radia Perlman and Mike Specine

## **Topics**

Number of Hours	Topic			
Security principles and security threats: (1) Security service confidentiality, authentication, integrity, availability, non access control, etc (2) Security threats: traffic analysis, IP of service, routing attacks, information leakage, remote a execution, viruses, etc. (3) Social, ethical, policy and legative will teach and will not teach				
3	Elements of cryptography: (1) Classic ciphers, modern ciphers and ciphers and one-way functions (2) Secret key (symmetric): DES/AE public key (asymmetric): RSA			
9	Protocols for Security Services: (1) Key distribution and manageme Hellman key exchange and certificate (2) Non-repudiation and digi signatures, ElGamal signature (3) Authentication and its protocols: and Needham-Schroeder (4) Integrity (5) Privacy (6) Authorization			
7	Securing network systems and applications: (1) Email security: Pre Privacy (PGP) (2) Web security: Secure Sockets Layer (SSL) (3) IP so and VPN: IPSec (4) Security in routing: OSPF and BGP (5) Firewalls: detection			
6	Advanced security issues and technologies: (1) Large scale attacks Internet and their defense (2) DDoS attack and its defense: types of DDoS attacks, trace-back and attack containment (3) Active worm (4) Anonymous communication (5) Wireless security			
3	Security with constrained resources: case studies in sensor networ			
1	Exam			

## Representative Lab Assignments

- Implementation of a key exchange protocol in wireless sessor networks
- Modification of a protocol for Logical Grid Routing
- Implementation of the strong hop-by-hop integrity protocol

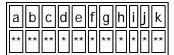
### **Grades**

Homework assignments	20%
Lab exercises	25%
Midterm exam	30%
Research project	25%

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## Relationship to ABET Criterion 3



detail

## Relationship to CSE Program Outcomes/Objectives

1a 1b 1c 2	a 2b 2c	3a 3b	4a 4b	5a 5b 5c
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detail

Course Coordinator: Anish Arora

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