



CS691 Advanced System Security Design



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Course No.:	CS 691	Instructor:	C. Edward Chow
Class Time:	MW 4:30-7:05 pm	Office Address:	ENS 186
Class Room:	EN 109	Office Hour:	MTW: 3:30-4:30pm
Office Phone:	255-3110	Email / IM:	chow@cs.uccs.edu / MS Messenger

This web page has been accessed **000102** times since 5/7/2010.

Course Objective:

Advanced topics in network and system security, including security policy, policy models, firewall design, network intrusion detection, tracking, and prevention, virus detection, programming language and OS support for security, and wireless network security. It is also served as an IA capstone courses. Students will work with the faculty members to identify/design/implement IA/cyber security research projects.

Course Outline (with links to individual topics):

- Overview of Computer and Network Security
 - Research topics: secure smart grid.
- Security System Design Principles
- Security Policy and Policy Models: Bell LaPadula Model, Biba Integrity Model, Chinese Wall Model
- DDoS Attacks/Defenses.
 - Outpace.
 - Attacks/Defenses Modeling/Simulation.
 - Enterprise DDoS Defense.
- Electronic Voting. [evs.ppt](#)
 - Paillier threshold cryptography
 - Advances in Cryptographic Voting Systems (Ben Adida's PhD Dissertation)
 - Secret Sharing Scheme.
 - Master Thesis of [Brett Wilson](#) and [Hakan Evecek](#).
- Doctrine for Cybersecurity
- Secure Information Sharing.
- Design/Enhance new network protocols.
 - Asymmetric IPSec for Online Backup.
 - Proxy-based Multipath Routing
 - Secure Content Switching
- Tamper Proof Techniques/Methods (HTEE encryption for database; secure smart grid devices)
- Vulnerability Analysis: Techniques/Tools/Case Studies.
- Anomaly (Behavior) Based IDS, techniques dealing with defense against zero-day malware.
- Secure Software Engineering.
 - Security Design Patterns
- Secure Architecture.
- Security and Privacy in Cloud Computing

Grades:

Research project(50%), Research Literature Presentation/Discussion(50%).

Class Info:

Questions and Answers

CS691 S2005 Class Photo Album and Web Pages

CS691 S2003 Class Photo Album and Web Pages

An account will be created for you on gandalf and walrus.uccs.edu (they are behind uccs firewall). Accounts can also be setup for creating virtual machines on EAS vmware virtual infrastructure for your research projects.

Please create a personal web page at <http://gandalf.uccs.edu/~<login>/cs691/> with your personal photo, basic vita, your interests in this class, and potential semester projects that you may work on. This will allow classmates to find common interests and know each other. See <http://cs.uccs.edu/~cs301/graphics/scanning.htm> for scanning your personal photo. You can also use my personal web page as a template. If you do not know how to setup your personal web page, drop by my office. I will help you. This is part of your project requirement..

Make sure you use <login>.jpg for your photo image file. Check on a browser and see if you can access your web page. If you got "forbidden" msg, it means that you need to open the access rights of your home directory and public_html directory. Use "chmod 755 ../<login>" and "chmod 755 public_html" commands for changing the access rights.

CS691 mailist: We established a network alias cs691-l@uccs.edu that can be considered as group mailing address or a distribution list. You can email to the whole class using this email address. Make sure "CS": is upper case when you type the address. When cs.uccs.edu receives an email for this address, it looks up a file with the list of your email addresses, in the format of <login>@cs.uccs.edu, and send each of you a copy. To forward the email to your own server, you need to

- either set up a .forward file which contains the email address with your default mail server, or
- configure your mail program or your default mail server to read mails from POP (post office protocol) server of cs.uccs.edu.

Text: No textbook.

Useful references:

- **Computer Security: Art and Science**, by Matt Bishop, Addison-Wesley, 2003, ISBN 0-201-44099-7.
- "Computer Networks," by Andrew S. Tanenbaum, 4th Edition, Prentice Hall, 2003. Chapter 8 covers Network Security. Very concise and interesting reading with many humorous stories.
- "Cryptography and Network Security: Principle and Practice," 3rd Edition, William Stalling, Prentice Hall.
- "**Security Engineering** - a Guide to Building Dependable Distributed Systems, " by **Ross J. Anderson**, John Wiley & Sons, ISBN: 0471389226, 2001. There is a second edition with a few chapters online and extensive references. His web site contains a lot of security related research papers.
- ACM/IEEE Cyber Security Related Conferences/Journal.
 - ACM TISSEC
 - ACM CCL
 - IEEE Transactions on Dependable and Secure Computing.
 - IEEE Security and Privacy.