

**Course Designator/ Course Number:** CprE 532

**Course Title:** Information Warfare

**Course Length:** 45 hours in 15 weeks, 3 one-hour meetings per week

**Course Description:**

Computer Systems and network security: implementation, configuration, testing of security software and hardware, network monitoring. Computer attacks and countermeasures. Emphasis on laboratory experiments.

**ISU Catalog Description:**

CprE 532. Information Warfare. (3-0) Cr. 3. S. prereq: 531. Computer system and network security: implementation, configuration, testing of security software and hardware, network monitoring, authentication, firewalls, vulnerabilities, exploits, countermeasures, ethics in information assurance. Emphasis on laboratory experiments.

**Course Learning Objectives:**

Upon completing this course a student will:

- Understand the ethics of using hacking tools
- Be able to describe the TCP/IP network protocols and the effect of an open network protocol on security
- Be able to snoop traffic from a network and decode the data
- Be able to describe methods to counter traffic attacks like snooping, spoofing, redirection, and flooding.
- Understand the importance of passwords and methods to select good passwords
- Be able to crack passwords and understand the importance of authentication
- Understand the issues of social engineering when used to discover passwords
- Be able to describe a centralized key distribution center and its uses in authentication
- Be able to use one-time passwords, Kerberos, and other authentication systems.
- Understand the issues of anonymous email and email forgery, email privacy.
- Understand and be able to use an encrypted email system
- Understand the relationship of public and private keys to email and the uses of a Public Key Infrastructure
- Be able to identify the security problems with standard terminal based protocols like telnet, ftp, NFS, and web.
- Be able to identify solutions to the security problems with telnet, ftp, NFS, and web traffic.

- Understand how secure protocols like SSH, SSL, and VPN's operate and how they can be used to enhance security.
- Be able to develop a plan to attack a network of computer systems and then be able to develop a plan of countermeasures.
- Understand the use of firewalls and the strengths and weaknesses of a firewall
- Be able to read and identify information in log files for possible security violations
- Be able to use screening routers and software filters to defend a computer system from attack.
- Be able to use probe software to determine the weaknesses of a computer system.
- Understand how intrusion detection system operate and how they can be used to detect attacks

### **Major Topics:**

- Introduction & Ethics
- Network Protocols
- Traffic attacks and defenses
- Authentication attacks and defenses
- eMail Attacks and defenses
- Terminal Services, NFS, and X
- WEB
- Intrusion detection
- Firewalls
- Screening Routers
- Link encryption
- Encryption tools
- Trapping a hacker
- Probe software
- Security management

### **Method of Instruction:**

The course is taught using lectures which are also video taped to the off campus students. The course also has a strong laboratory component where the students connect to the lab remotely to carry out experiments. The labs range from using tools (both attack tools and defend tools) to looking at network protocols. The largest lab is the attack and defend lab where the students try to break into a small company designed by the faculty. The students must detail the attack plan and then provide a detailed description of how to defend against the attacks.

In a field of cutting-edge technological engineering students will be required to be creators of knowledge and inventors of processes, not simply users of information. This requirement will make students move beyond being knowledgeable about the content and into the higher realms of analyzing situations, designing systems, and evaluating results. To accomplish these cognitive goals, the emphasis in the classroom will be on the student.

Student-centered classrooms will enhance student learning by helping them understand the content on the basis of real-world experiences, engaging them in interactive learning situations, and providing problem-based projects from which they will learn.

**Evaluation Methods:**

35% Exam 1  
35% Exam 2  
30% Labs/ homework/ in-class

**Student Enrollment:**

On campus: 50 per year  
Off campus: 25 per year