Kutztown University
Kutztown, Pennsylvania

CIS 541: Advanced Information Security

I.   Catalog Description

CIS 541: Advanced Information Security   3 sh/3 ch.

   This course is an in-depth study of system and network security. Topics include
   security in information systems, network intrusion detection, firewalls, VPNs, and
   several security protocols. The concepts of the above will be explored and
   discussed. The student will have to implement some concepts learned. Prerequisite:
   CIS 341 or permission of the instructor.

II.   Rationale:

   Networks are used in many aspects of every day life and are being used to transfer
   confidential data, such as credit card information, invoice data, and remittance data.
   It is important to ensure that this information is secure during transmission. The
   concepts studied in this course will build on and complement several other CIS
   courses. Students will be able to pursue careers in information security or
   networking after completing this course.

III.   Course Objectives:

Upon satisfactory completion of this course the student will be able to:

   A. Appreciate the importance of security for information systems.

   B. Understand security threats to networks.

   C. Detect network intrusions.

   D. Examine the advantages of proxy servers and firewalls to network security.

   E. Identify basic terminology, hardware and software used in VPNs.

   F. Identify the concepts of IPSec and the advantages it brings to networks.

   G. Understand the concepts of SSL and how it benefits the Internet.

IV.   Course Outline:
    A. Network Security Principles
        1. Terminology
        2. Security Policy
        3. Security Design

    B. Network Security Threats
        1. Types of Attacks
        2. Vulnerabilities

    C. Network Intrusion Detection
        1. Intrusion Detection
        2. Catching the Thief

    D. E-mail Security
        1. Overview
        2. Tools

    E. Proxy Servers
        1. Overview
        2. Security Issues

    F. Firewalls
        1. Overview
        2. Types of Firewalls
        3. Packet Filtering
        4. Security Issues

    G. VPNs
        1. Overview
        2. Security Issues

    H. IPSec
        1. Overview
        2. Architecture
        3. Components
        4. Deployment

    I. SSL
        1. Security on the Web
        2. Overview of SSL
        3. Securing a Web Site

J. Building a Secure Network
1. Overview
2. Components
3. Design
4. Implementation

V. Instructional Resources

Books:

Abrams, Marshall D., Jojdia, Sushil; and Podell, Howard. *Information Security: An Integrated Collection of Essays.* Los Alamitos, CA, IEEE Computer Society Press, 1996.

Allen, Julia H., *The CERT@ Guide to System and Network Security Practices*. Addison Wesley, 2001.

Black, Uyless. *Internet Security Protocols: Protecting IP Traffic*. Upper Saddle River, NJ., Prentice-Hall, Inc., 2000.

Doraswamy, Naganand, and Dan Harkins, *IPSec: the New Security Standard for the Internet, Intranets, and Virtual Private Networks*. Upper Saddle River, NJ, Prentice Hall PTR, 1999.

Garfinkel, Simson with Gene Spafford, *Web Security & Commerce*. O'Reilly & Associates, Inc. 1997.

McClure, Stuart, Joel Scambray, and George Kurtz, *Hacking Exposed: Network Security Secrets and Solutions*. The McGraw-Hill Companies, 1999.

Merkow, Mark S. and James Breithaupt, *The Complete Guide to Internet Security*. New York, AMACOM, 2000.

Novak, Judy and Stephen Northcutt, *Network Intrusion Detection: An Analysts Handbook*. (Second edition). New Riders, 2000.

Ogletree, Terry William, *Practical Firewalls*. Indianapolis, IN, Que, 2000.

Pfleeger, Charles P. *Security in Computing 2nd Edition.* Vienna, Virginia, Acra Systems, Inc., 1997.

Pipken, Donald L., *Information Security: Protecting the Global Enterprise*. Upper Saddle River, NJ., Prentice Hall PTR, 2000.

Rubin, Aviel D., Geer, Daniel, and Ranum, Marcus. *Web Security Sourcebook: A Complete Guide to Web Security Threats and Solutions.* New York, John Wiley & Sons, 1997.

Ryan, Peter, Steve Schneider, Michael Goldsmith, Gavin Lowe, and Bill Roscoe. *Modeling and Analysis of Security Protocols.* Addison Wesley, 2001.

Schneider, Bruce. *E-mail Security: How to Keep Your Electronic Messages Private.* New York, John Wiley & Sons, 1995.

Smith, Richard E. *Authentication: From Passwords to Public Keys.* Addison Wesley, 2002.

Stallings, William. *Cryptography and Network Security: Principles and Practice (2nd edition).* Upper Saddle River, NJ, Prentice-Hall, Inc., 1999.

Stallings, William. *Network Security Essentials: Applications and Standards.* Upper Saddle River, NJ, Prentice-Hall, Inc., 2000.

Wadlow, Thomas A., *the Process of Network Security: Designing and Managing a Safe Network.* Addison Wesley Longman, Inc., 2000.

White, Gregory B., Fisch, Eric A., and Pooch, Udo W. *Computer Systems and Network Security.* Boca Raton , FL, CRC Press, 1996.

Yvan, Ruixi, and W. Timothy Strayer. *Virtual Private Networks: Technologies and Solutions.* Addison Wesley, 2001.

Journals and Periodicals:

Data Security Letter

Journal of Computer Security

Revised 02/12/02