

TSYS Department of Computer Science @ Columbus State University
Course Syllabus: CPSC 5127- Introduction to Computer and Network Security
Fall 2009

Instructor Information:

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Office Hours: TWR 12:30 pm - 4:00 pm (Other times by appointment.)

Class Meetings:

Tuesday and Thursday from 9:30 am to 10:45 am

Room 406 Center for Commerce and Technology

Course Title: CPSC 5127- Introduction to Computer and Network Security

Official Course Description:

This course is a basic introduction to the issues of software security with a focus on raising the students' awareness of the difficulties of maintaining a secure software environment. It reviews traditional security techniques and discusses the vulnerabilities of such methods. The course emphasizes well-written software as a prerequisite to network security and highlights security implications of common programming mistakes.

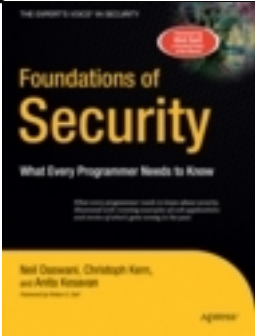
Prerequisites: CPSC 2108 (Data Structures) with a grade of C or better. A strong grasp of basic algebra and calculus, as well as a high level of comfort with writing small to medium-size programs and scripts are expected.

Course Outcomes:

- Students will demonstrate awareness of existing threats to modern computing systems
 - Strategies and Actions used to produce the outcome
 - Study attacks on resource availability (e.g. denial of service), confidentiality (e.g. key logging), and integrity (e.g. virus)
 - Class discussion of the potential implications of each type of attack
 - Identify exploited software vulnerabilities in existing computing systems
 - Recognize the need to keep security in mind when designing, implementing, and using software
 - ABET Criteria Covered: B, E
 - Program Objectives Covered: 2, 4
 - Assessment Methods: Lab Assignments, Quizzes, Exam
- Students will demonstrate knowledge of traditional techniques for protecting the resources of a computing system

- Strategies and Actions used to produce the outcome
 - Study security software
 - Study concepts of cryptography
 - Study the limitations of existing security technologies
 - Perform hands-on experiments
- ABET Criteria Covered: A, B, I, J
- Program Objectives Covered: 2, 3
- Assessment Methods: Lab Assignments, Quizzes, Exam
- Students will demonstrate knowledge of programming errors that have security implications
 - Strategies and Actions used to produce the outcome
 - Study programming practices that have negative security implications
 - Study controls on software development processes that reduce the likelihood of producing unsecure software
 - Perform hands-on experiments using various programming and scripting languages such as C, C++, and Javascript
 - ABET Criteria Covered: B, C, I, K
 - Program Objectives Covered: 3
 - Assessment Methods: Lab Assignments, Quizzes, Exam
- Students will demonstrate knowledge of secure computing practice
 - Strategies and Actions used to produce the outcome
 - Study computing practices that enable individuals and organizations to safely interact with computing systems
 - Study techniques for assessing the security of a computing system
 - Explore and analyze a number of recent case studies
 - ABET Criteria Covered: E
 - Program Objectives Covered: 4
 - Assessment Methods: Lab Assignments, Quizzes, Exam

Required Textbook:

	<p>Foundations of Security: What Every Programmer Needs to Know (Paperback) By Neil Daswani, Christoph Kern, Anita Kesavan Publisher: Apress (February, 2007) ISBN-10: 1590597842</p>
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Supplementary Materials:

- Your own class notes
- In-class/Online handouts
- Materials posted on the course web site

Additional Reference:

Information Security Illuminated (Paperback)
 by Michael G. Solomon and Mike Chapple (Jones and Barlett Illuminated)
 ISBN: 978-0763726775

Major Topics:

- 1) Introduction to Cybercrime and Security
- 2) Cyber-attacks: Denial of Service, Intrusion, Malware
- 3) Security Technologies: Cryptography, Intrusion Detection, Malware Detection
- 4) Assessing the Security of a Computing System
- 5) Programming Mistakes that have Security Implications
- 6) Administering Security

Assessment Criteria:

Your performance will be evaluated via hands-on lab activities (these may involve writing small programs in C, C++, Javascript, and other languages), in-class quizzes, one in-class midterm test, and one in-class comprehensive final exam. Roll will be taken, and your attendance and class participation will be factored into the computation of your final grade. Assessment criteria will be weighted as follows:

Lab assignments	35%
Quizzes	10%
One midterm test	20%
One final exam	30%
Class Participation	5%

Letter grades will be assigned as follows:

A (90%-100%); B (80%-89%); C (70%-79%); D (60%-69%); F (0%-59%)

Tentative Schedule: (May change as we progress through the course material.)

Week 0

08/18/09	Syllabus & Introduction	
08/20/09	Symmetric Key Cryptography	

Week 1

08/25/09	Symmetric Key Cryptography	
08/27/09	Public Key Cryptography	Quiz 1

Week 2

09/01/09	Public Key Cryptography	
09/03/09	Security Protocols	Quiz 2

Week 3

09/08/09	Malware	Assignment 1
09/10/09	Malware	

Week 4

09/15/09	Denial of Service	Quiz 3
09/17/09	Intrusion	
<i>Week 5</i>		
09/22/09	Authentication	Assignment 2, Quiz 4
09/24/09	Authentication	
<i>Week 6</i>		
09/29/09	Authorization	Quiz 5
10/01/09	Authorization	Assignment 3
<i>Week 7</i>		
10/06/09	Review for midterm exam	
10/08/09	Midterm Exam	Midterm: October 08 (tentative)
<i>Week 8</i>		
10/13/09	Fall Break (No Classes)	
10/15/09	Buffer Overflows	
<i>Week 9</i>		
10/20/09	Buffer Overflows	
10/22/09	Client-State Manipulation	Quiz 6
<i>Week 10</i>		
10/27/09	Client-State Manipulation	Assignment 4
10/29/09	SQL-Injection	Quiz 7
<i>Week 11</i>		
11/03/09	SQL-Injection	
11/05/09	Cross-domain Security in Web Applications	Quiz 8
<i>Week 12</i>		
11/10/09	Cross-domain Security in Web Applications	Assignment 5
11/12/09	Secure System Design	Quiz 9
<i>Week 13</i>		
11/17/09	Secure System Design	
11/19/09	Secure System Design	Quiz 10
<i>Week 14</i>		
11/24/09	Secure Design Principles	Assignment 6
11/26/09	Thanksgiving Break (No Classes)	
<i>Week 15</i>		
12/01/09	Review for Final Exam	
12/03/09	Review for Final Exam	Final Exam: December 9-15

General Policies:

I expect students to come to prepared class and maintain a well organized record of their own notes. At the very least, students should have read the chapter upon which the current lecture is based. Participation in class is crucial and is part of the student's final grade. Students should immediately approach the instructor with any clarification questions they may have.

Quizzes test the students basic understanding of the concepts covered in class. There will be a total of 10 quizzes. No make up quizzes will be given, but the lowest will be dropped. Homework assignments are to be submitted via CougarVIEW. Quizzes and exams will be closed-books, closed notes.

Assignments and quizzes will be graded and returned within 7 days of their due date.

Students are responsible for keeping pace with the progress of the course. **Should any concerns about the course's format and contents be addressed, students must immediately consult with the instructor via email or during office hours.** In addition to regularly reading from the text book and class handouts, students must visit the course's website at least once a day for recent updates and announcements.

Make-ups:

Quizzes/Exams: Unless they are due to a documented emergency reported to the instructor in a timely fashion, **a grade of 0 will be automatically assigned for missed exams and quizzes.**

Assignments: Unless untimely submission of an assignment is due to a documented emergency reported to the instructor before the day on which the assignment is due, **a penalty of 5% per day will be incurred for late assignments. Assignments submitted more than 3 days after their due date will be considered missed and will receive a grade of 0.**

No make ups will be given for the midterm or the final exam. Please be sure you are present for both the midterm and the final exams. Refer to the CSU catalog (<http://aa.colstate.edu/advising/a.htm#AbsencePolicy>) for more information on class attendance and withdrawal.

Academic dishonesty

Academic dishonesty includes, but is not limited to, activities such as cheating and plagiarism. It is a basis for disciplinary action. Collaboration is not permitted on assignments or exams/quizzes in this course. Any work turned in for individual credit must be entirely the work of the student submitting the work. You may share ideas but submitting identical assignments (for example) will be considered cheating.

You may discuss course material and help one another with debugging, however, I expect any work you hand in for a grade to be your own. Written and programming assignments may not contain sections that have been imported verbatim from an outside source, be it online (such as web page) or offline (such as a book or an article). The penalty for the first occurrence of this type of academic dishonesty is a zero grade on the assignment; the penalty for the second occurrence is a failing grade for the course.

A simple way to avoid inadvertent plagiarism is to talk about the assignments, but don't read each other's work or write solutions together. Keep scratch paper and old versions of assignments until after the assignment has been graded and returned to you. **If you have any questions about this, please see me immediately.**

For assignments, access to notes, textbook, books and other publications is allowed. Stealing, giving or receiving any code, diagrams, drawings, text or designs from another person (CSU or non-CSU) is not allowed. Having access to another person's work on the system or giving access to your work to another person is not allowed. It is your responsibility to keep your work confidential.

No cheating in any form will be tolerated. The penalty for the first occurrence of academic dishonesty is a zero grade on the assignment or exam/quiz; the penalty for the second occurrence is a failing grade for the course. For exams/quizzes, access to any type of written material or discussion of any kind (except with me) is not allowed.

([http://aa.colstate.edu/advising/a.htm#Academic Dishonesty/Academic Misconduct](http://aa.colstate.edu/advising/a.htm#Academic%20Dishonesty/Academic%20Misconduct))

CSU ADA Statement:

If you have a documented disability as described by the Rehabilitation Act of 1973 (P.L. 933-112 Section 504) and Americans with Disabilities Act (ADA) and would like to request academic and/or physical accommodations please contact Joy Norman at the Office of Disability Services in the Center for Academic Support and Student Retention, Tucker Hall (706) 568-2330, as soon as possible. Course requirements will not be waived but reasonable accommodations may be provided as appropriate.

ABET Criteria:

- A.** An ability to apply knowledge of computing and mathematics appropriate to the discipline;
- B.** An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
- C.** An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
- D.** An ability to function effectively on teams to accomplish a common goal;
- E.** An understanding of professional, ethical, legal, security, and social issues and responsibilities;
- F.** An ability to communicate effectively with a range of audiences;
- G.** An ability to analyze the local and global impact of computing on individuals, organizations and society;
- H.** Recognition of the need for, and an ability to engage in, continuing professional development;
- I.** An ability to use current techniques, skills, and tools necessary for computing practice.
- J.** An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
- K.** An ability to apply design and development principles in the construction of software systems of varying complexity.

CS Program Objectives:

Our graduates will have achieved:

- 1) a broad general education assuring an adequate foundation in science and mathematics relevant to computing.
- 2) a solid understanding of concepts fundamental to the discipline of computer science.
- 3) good analytic, design, and implementation skills required to formulate and solve computing problems.

4) the ability to function and communicate effectively as ethically and social responsible computer science professionals.