CS 340 – Cyber Security

Weisberg Division of Computer Science
College of Information Technology & Engineering
Marshall University

Course Description:

Concepts and issues in physical and cyber security; technological vulnerabilities found in operating systems, database servers, Web servers, Internet, and local area networks; developing defensive and offensive security measures.

Classroom Sections, Locations, and Meeting Times:

Section: 201 CRN: 3078 Days: TR Time: 3:30 – 4:45 Location: GH206A

Textbook:

Conklin and White, *Principles of Computer Security, 3rd Ed*, McGraw-Hill, ISBN-13: 978-0071786195

Pre-requisites:

CS 320 – Internetworking

Instructor:

Dr. Paulus Wahjudi
Office Location: Gullickson Hall Room 205A
Office Hours: TR 8:30 – 9:30 and TR 1:30 – 3:30 (or by appointment)
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Course Outcome Objectives:

Course Student Learning Outcomes	How students will practice each outcome in this Course	How student achievement of each outcome will be assessed in this Course
Discuss the concepts of physical and cyber security	Chapter reading, class discussions and writing assignments	Exams and Chapter Quizzes
Explain the basics and likelihood of an attack against an environment	Chapter reading, class discussions, lab activities and writing assignments	Chapter quizzes, class discussion, exams. Lab quizzes
Discuss techniques to find vulnerabilities in an environment	Chapter reading, Class discussions, Lab activities, programming and writing assignments.	Chapter quizzes, class discussion, exams. Lab quizzes
Enumerate the steps invaders take to attack systems	Chapter reading, Class discussions, programming and writing assignments.	Chapter quizzes, class discussion, exams. Lab quizzes
Explain the difference between internal and external attacks	Chapter reading, Class discussions, programming and writing assignments.	Chapter quizzes, class discussion, exams. Lab quizzes

Discuss means to acquire the fundamentals of target acquisition	Chapter reading, Class discussions, programming and writing assignments.	Chapter quizzes, class discussion, exams. Lab quizzes
Discuss the role of encryption in cyber security and explain symmetric and asymmetric encryption	Chapter reading, Class discussions, programming and writing assignments.	Chapter quizzes, class discussion, exams, Lab quizzes, assignments
Recognize and correct errors in firewalls and proxies	Chapter reading and Lab activities	Lab quizzes, assignments and Final Exam
Discuss specifics on how to penetrate the following environments: Windows XP, Linux, Unix, Web servers, Database servers, Application servers, and computer networks	Chapter reading, chapter discussions, lab activities, programming and writing assignments	Chapter quizzes, class discussion, exams, Lab quizzes, assignments
Describe the elements of a security policy and its implementation	Chapter reading, Class discussions, programming and writing assignments.	Chapter quizzes, class discussion, exams, Lab quizzes, assignments
An understanding of professional, ethical, legal, security and social issues and responsibilities	Chapter reading, Class discussions and writing assignments.	Chapter quizzes, class discussion, exams, Lab quizzes, assignments
An ability to analyze the local and global impact of computing on individuals, organizations, and society	Chapter reading, Class discussions and writing assignments.	Chapter quizzes, class discussion, exams, Lab quizzes, assignments

Course Resources:

All course resources are available on MUOnline. These consist of reading assignments, lecture slides, lab exercises, quizzes, a detailed schedule of topics, and a complete calendar of events for the course. Students are strongly encouraged to visit the site often to check for updates.
Each student has a personal folder for course assignment submissions in the `\\CITEcs\CS340` file share.

Course Activities:

Reading Assignments

You are expected to read the assigned chapters from the textbook outside of class.

Class Participation

Students are expected to participate in classroom discussions. These discussions will be focused on the assigned reading material and its relevance to current events related to Cyber Security. The following point system will be used for each discussion session:

0 points: did not participate
1 point: participated in the discussion
2 points: contributed something of significance to the discussion

Reading Quizzes

An on-line quiz will be given at the beginning of most classes. They will consist of questions based on the reading assignment due for the day. Students may bring an 8½ by 11 sheet of paper with handwritten notes on both sides for reference when taking the quiz. Quizzes must be taken during the class period.

Lab Assignments

There will be a series of lab assignments designed to give you hands-on experience in Cyber Security. You will be given significant class time to work on the labs. You are expected to finish incomplete labs outside of class. There will be online lab quizzes.

Programming and Writing Assignments

There will be several programming assignments to demonstrate the implementation of the theoretical material presented in the course and writing assignments on topics related to Cyber Security. You are expected to complete the assignments outside of class and submit them on or before the due date.

Interim Exams

There will be two interim exams during the semester. Students are reminded to bring a calculator for use during the exams.

Assessment Day

Assessment Day is Wednesday, April 3, the hours 8:00-4:00 are set aside for university assessment activities. An activity will be scheduled by the division and announced later in the semester.

Final Exam

The two hour final exam period will be used to conduct an exercise in which you and your team will try to protect a set of servers from a cyber-attack while you simultaneously attack an opponent's server configuration. Each team will be given a set of objectives that must be achieved in the given time. All servers and workstations used in this exercise will be on a stand-alone network that is isolated from the Marshall network on campus. Each student will be evaluated individually based on their performance, instructor evaluation and peer evaluation.

Evaluation and Grade Computation:

Your final grade is computed by multiplying each Student Activity score by the weighted percentage and summing all of the weighted percentage values.

Student Activity	Score	Weighted %	Value
Class Participation		x 0.10	
Reading Quizzes		x 0.10	
Lab Assignments		x 0.10	
Programming and Writing Assignments		x 0.30	
Interim Exams		x 0.25	
Final Exam (Hack Fest)		x 0.15	
		Grand Total =	

Evaluation Scale				
90 & Above =A	80 - 89 = B	70 - 79 = C	60 - 69 = D	59 & Below = F

Attendance and Decorum:

The golden rule: Do not disturb the class and/or your classmate(s)

This includes but not limited to:

- Late for class. If you are late, enter the classroom in the least intrusive way possible.
- Sleeping during class. Students who sleep during class will be asked to leave the classroom.
- Leaving class early without proper excuse will be counted as an absent.
- Loud electronic devices. Turn all cell phone, pager, MP3 player, radio, TVs, Boombox, etc off or to silent before class starts.
- Answering phone and texting in class. If it is an emergency and you need to answer your cell phone, please step out of the class and walk away for a good distance before answering the phone. Texting is not allowed in any circumstances.
- Eating during class. Students may bring drinks that have proper lids.
- Web surfing, chatting, checking email and other activites on the computer that is not related to the course is prohibited during class. All laptops must be off with the lid closed during discussions and lectures.
- Any other manners that disturbs the class as determined by the instructor.

Students are expected to attend class on time and behave professionally. For any student that is deemed to disturb the class, the instructor reserves the right to ask the student to leave the classroom. In addition, repeated disturbance will be reprimanded in the same manner as an absence. Students are expected to attend and participate in every class. After 3 unexcused absences (≥ 5 minutes late == 0.5 absent), your grade will be decreased by one letter grade and continue to decrease by a letter grade for every two absences afterwards.

Students will not be counted as absent under one of the following conditions:

- They present a University Excused Absence
- They present a valid medical excuse
- Other extraordinary circumstance as determined by the instructor

Due to the sensitive nature of the course, each student must accept and conform to the course agreement. Each student must submit a signed and dated letter of agreement to the instructor prior on the first class meeting.

Course Schedule:

We will cover the following chapters in the textbook:

Chapter 1 – Introduction
Chapter 2 - Security Concepts
Chapter 3 - Operational Security
Chapter 4 - People in Security
Chapter 5 – Cryptography
Chapter 6 - Public Key Infrastructure
Chapter 7 - Standards and Protocols
Chapter 8 - Physical Security
Chapter 9 - Network Fundamentals
Chapter 10 - Infrastructure Security
Chapter 11 - Remote Access
Chapter 12 - Wireless Security
Chapter 13 - Intrusion Detection
Chapter 14 - Baselines
Chapter 15 - Types of Attacks
Chapter 16 - E-Mail
Chapter 17 - Web Components
Chapter 18 - Secure Software Development
Chapter 19 - Disaster Recovery
Chapter 20 - Risk Management
Chapter 21 - Change Management
Chapter 22 - Privilege Management
Chapter 23 - Computer Forensics
Chapter 24 - Legal Issues and Ethics

Important Dates

21-Jan: Martin Luther King, Jr. Holiday (no class)
17-Mar: Spring Break (no class this week)
03-Apr: Assessment Day
03-May: Last day of class
07-May: Final Exam (Cyber War) - 3:30 - 5:30

Academic Conduct:

You are allowed and encouraged to work with other students on the completion of assignments, subject to the following constraints:

- Copying someone else's work and submitting it as your own is plagiarism and will not be tolerated.
- You may work with others to develop a solution to a problem but the material you submit must be your own work and you must acknowledge your collaborators.
- Unless designated as a team exercise, you may not sub-divide the tasks of an assignment; each student is expected to complete the whole assignment.

It is your responsibility to satisfy the spirit of this conduct. If you have any questions, please ask the instructor for clarification. Depending on the severity of the offense, the instructor may:

- Take no action
- Penalize the student on the assignment in question
- Assign the student a failing grade in the course

Policy for Students with Disabilities:

Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall Room 117, phone 304 696-2271 to provide documentation of their disability. Following this, the DSS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation they will need to ensure equality in classroom experiences, outside assignment, testing and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit

http://www.marshall.edu/disabled or contact Disabled Student Services Office at Prichard Hall Room 117, phone 304-696-2271.

Bibliography:

[1] Ross J. Anderson. *Security Engineering: A Guide to Building Dependable Distributed Systems*. John Wiley, New York, NY, 2001. ISBN: 0471389226.
[2] Matt Bishop. *Computer Security: Art and Science.* Addison Wesley, Boston, MA, 2003. ISBN: 0-201-44099-7.
[3] Frank Stajano. *Security for Ubiquitous Computing.* John Wiley, 2002. ISBN: 0470844930.

Internet Web Sites:

Online Textbook Materials www.securityplusolc.com

University Policies:

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802

The policy covers: Academic Dishonesty, Excused Absence Policy for Undergraduates, Computing Services Acceptable Use, Inclement Weather, Dead Week, Students with Disabilities, Academic Forgiveness, Academic Probation and Suspension, Academic Rights and Responsibilities of Students, Affirmative Action, and Sexual Harassment.